

# EMAS IN INDUSTRIAL DISTRICTS: THE CURRENT STATUS IN ITALY

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## 1. Introduction

Recently, due to the growing awareness among enterprises of the relevance of sustainable development and to the commitment of national and international organisms (governmental organisations and non) [15] several environmental volunteer tools (from EMAS to Ecolabel, from LCA to ISO14001, from Environmental Reporting and Accounting to Green Public Procurement) have been provided [1, 5 and 14]. In this landscape, EMAS and ISO14001 are probably two of the most important and diffused among the voluntary, integrated and preventive management instruments. Yet, on the practical side, the adoption of these instruments is far from been optimal [17]. In fact, while the number of ISO14001 certifications of the world is still growing, EMAS has faced a crisis, because of decreasing number of registrations, based principally on German turn down.

Despite this general situation [11], applications of the Environmental Management and Audit Scheme (EMAS) in Italy are expanding [20, 3], even less – in absolute terms - then in other countries (from 69 organisations in 2001 to 236 in 2004) [16]. Moreover, with the second era of EMAS (EC 761/2001 known as EMAS II), this scheme could become more and more attractive, enabling Italian small and medium enterprises (SMEs) to master environmental challenges while improving their competitive position, according to specific further opportunities: the new specifications seem to fit better with peculiar features of the Italian economic system [19]. According to this context, this paper aims to describe if and how area and local agreements between firms, can simplify and improve the diffusion of EMAS in a country, and how the new EMAS regulation can give a new impulse to the certifications of EMS (Environmental Mangement System) in the Italian context.

The paper is organised as follows: in the first part the literature has analysed and in particular: (i) an overview on EMAS; (ii) improvements of EMAS II related to specific form of industrial organisations/area and (iii) the specific characteristics of Italian districts. In the second part, after the research design description, three case studies have been conducted in order to answer to the research questions.

## 2. State of the art

It is not in the aims of this work to illustrate widely the studies of several authors which have recently analysed the reasons and benefits for an enterprise to develop a pro-active environmental strategy adopting, as a direct consequences, voluntary environmental tools (among the others: [2, 4, 5, 7, 9 and 22]). Referring directly to the EMAS, various national perspectives and analysis [3, 8, 21, 26, 27, and 31] have been provided.

Starting form the contributes of these and other authors, we analysed (i) the EMAS regulation and specifically (ii) the articles related to small enterprises operating in a territory producing the similar products/services and (iii) the features of Italian districts.

### 2.1. The EU Eco-Management and Audit Scheme (EMAS)

The EU Eco-Management and Audit Scheme (EMAS) is a management tool for companies and other organisations to evaluate, report and improve their environmental performance. The scheme has been available for participation by companies since 1993 (Council Regulation (EEC) No 1836/93 of 29 June 1993) and was originally restricted to companies in industrial sectors.

Since 2001 EMAS has been opened to all economic sectors including public and private services [12]. In addition, EMAS was strengthened by the integration of EN/ISO 14001 as the environmental management system required by EMAS; by adopting an attractive EMAS logo to signal EMAS registration to the outside world; and by considering more strongly indirect effects such as those related to financial services or administrative and planning decisions.

Participation is voluntary and extends to public or private organisations operating in the European Union and the European Economic Area (EEA: Iceland, Liechtenstein, and Norway).

Briefly, to receive EMAS [12, 16] registration an organisation must comply with the following steps:

- conduct an *environmental review* considering all environmental aspects of the organisation's activities, products and services, methods to assess these, its legal and regulatory framework and existing environmental management practices and procedures; on those that result significant, it has to put the attention and fix targets and programmes.
- in the light of the results of the review, establish an effective *environmental management system* aimed at achieving the organisation's environmental policy defined by the top management. The management system needs to set responsibilities, objectives, means, operational procedures, training needs, monitoring and communication systems.

- carry out an *environmental audit* assessing in particular the management system in place and conformity with the organisation's policy and programme as well as compliance with relevant environmental regulatory requirements.
- provide a *statement of its environmental performances* which lays down the results achieved against the environmental objectives and the future steps to be undertaken in order to continuously improve the organisation's environmental performance.

The environmental review, EMS, audit procedure and the environmental statement must be approved by an accredited EMAS verifier and the validated statement needs to be sent to the EMAS Competent Body for registration and made publicly available before an organisation can use the EMAS logo.

## **2.2. The opportunity given by the new EMAS**

As pointed out previously, EMAS II, the revised scheme in 2001, has made EMAS registration available to all types of organizations. Among the others innovative issues, we focus our attention on a specific and recent opportunities to small enterprises [10] operating in a given large territory and producing the same or similar product or services. In fact, more specifically, article 11(1) of Regulation (EC) No 761/2001 reads “(...) *In order to promote participation of SMEs, including those concentrated in well defined geographical areas, local authorities, in participation with industrial associations, chambers of commerce and interested parties may provide assistance in the identification of significant environmental impacts. SMEs may then use this in defining their environmental programme and setting the objectives and targets of their EMAS management system (...)*”.

In these geographical areas the SMEs (which very often may share a common technological level, the same production methods and approximately the same organisational and management systems) shall necessarily:

- consider the interaction between their environmental impacts and those produced by the other industrial operators existing in the geographical area as well as by public services enterprises and civil residences.
- interact with the same community, the same institutions, the same environmental control bodies at local level, with respect to their environmental problems. Indeed they face identical needs regarding the quality of environment,
- consider the interaction between their environmental impacts and those produced by the other industrial operators existing in the geographical area as well as by public services enterprises and civil residences.

On the other hand they have the possibility of:

- searching common solutions for solving their environmental problems (to increase efficiency of plants for reduction of pollutants, to overcome their cultural restrictions or their inadequacy for environmental management, and so on);
- supporting each other, for example, by:
  - exchanging experiences on the identification of environmental aspects and impacts,
  - drafting an environmental policy and programme together,
  - performing internal audits vice versa in the partner's organisation to easier identify environmental aspects and impacts,
  - hiring a common environmental consultant,
  - using the same infrastructures for the management of various environmental impacts such as wastewater treatment plants, waste incinerators, dumps etc. and creating specific organisations, like consortia, for that,
  - and, on the basis of their common efforts to implement EMS, hiring the same verifier which may, due to the similarities within EMSs, facilitate the verification and validation process and lower the related costs;
- participating in local environmental projects, such as Agenda 21 processes (local or regional authorities or industrial organisations may support such activities by helping build up networks).

Taking into account the previous considerations the definition of a general programme, implemented by local authorities, industrial associations, chambers of commerce on the basis of an initial environmental analysis of the whole territory, represents a very useful preliminary step for SMEs approaching EMAS.

The territorial environmental programme should then be clearly identified, published and accepted by all concerned parties, and seek for significant improvement of the environment of the whole area. Once environmental objectives and targets have been adopted and recognised, each organisation (SMEs, public services, local authorities, etc.) could then, on a voluntary basis according to the EMAS procedure, set out the necessary steps to individually comply to Regulation (EC) 761/2001 and seek for registration on an individual basis. The verifier, in such a case, would have to assess that the environmental management system is capable to deliver the specific objectives and targets of each single organisation according to the general programme, objectives and targets of the whole area. The environmental statement should then, beside its content required by EMAS, clearly identify the specific organisation's contribution to the targets of the whole environmental programme.

### **2.3. The Italian districts**

The Italian entrepreneurial reality is characterised by the prevalence of enterprises of medium or small dimension, geographically localised in aggregated cluster of companies operating along the same production chain [13, 22]. In Italy there are about 245 industrial districts, concentrated mostly in the Centre-North of the country and specialised, among the others, in the following production sectors [6]: mechanical, textiles/clothes, paper, food, plastic/rubber, jewellery, leather/shoes, home products.

Co-operative relationships among firms and the diffusion of knowledge constituting the dominant characteristics of this districts economy represent also a driving force for economic development and innovation. The spatial concentration of economic relations favours not only a stronger network of sectoral interdependencies, but especially the exchange of information and expertise and the coherence in the achievement of development targets. Industrial districts represent an exemplary form of competitive advantage linked to productivity and to valorisation of resources. A firm operating within a district will have better opportunities of reaching excellence levels, precisely because the context in which it is located contributes to elevate its specialisation and to value its specificity. As a consequence, the territory of a district not only represents a background framework for economic action. It also constitutes the fundamental condition for making the production system more competitive. Moreover, the territorial concentration of enterprises and production units with homogeneous inter-branch linked technological cycles represents also one of the most favourable conditions for developing a joint approach towards environmental problems thanks to the exploitation of scale economy generated by the concentration of a high technical skill along different phases of the production chain.

Local rooting, joint development and diffusion of innovation, proximity to local institutions: these all represent important factors contributing to voluntary commitment in collectively binding decisions, such as choices of environmental protection applied to a certain territory.

The EMAS II seems to fit with recent initiatives, in fact several districts in Italy have become conscious of the impact of their economic activities on the territory and have developed strategies of intervention to improve their environmental performance [6], especially with reference to waste generation; water, energy and raw material consumption; land use change for the development of plants and industrial areas; impacts generated by goods transportation and mobility of the operators to and from the district.

Once these impacts have been pointed out, solutions have been searched in terms of institution of:

- integrated infrastructures for environmental protection: environmental facilities (water treatment, waste treatment, energy generation) at the service of all enterprises of the district, in many cases oriented towards eco-efficiency;
- integrated environmental services: laboratories and technical assistance and advice centres on monitoring and environmental innovation;
- integrated energy services: consortia for the acquisition of electric energy related to services of energy audit;
- actions to promote clean technologies: diffusion of best available technologies and best practices;
- actions to promote environmental quality product labels: enterprises that have obtained an environmental quality label for the product created by the district.

Other innovative experiences: introduction of EMS on the model of industrial ecology. With reference to the latter point, the project *CLOSED* of the textile district of Prato (Province of Prato; Tuscany Region) has the objective of creating a link between the needs of economic development and those of environmental protection in small and medium sized enterprises of the paper, vegetable market and garden nursery, and textile sectors. The project, financed with the EU LIFE instrument, is aimed at pursuing a “third way” to the practical implementation of industrial ecology through the creation of an “eco-industrial district”.

As experienced in Prato as well as in the ceramic tiles district of Sassuolo (Provinces of Modena and Reggio Emilia; Emilia Romagna Region) and in the knives and scissors district of Premana (Province of Lecco; Lombardy Region), another key action to promote a wide scale adoption of EMAS is the elaboration of simple and clear guidelines for EMS implementation in specific industrial sectors: in fact, in industrial districts it is possible to exploit economies of scale and reach a large number of firms operating in the same production chain.

### **3. Methodology**

The study aims at understanding if and how the new regulation EMAS works into Italian industrial districts, and specifically if the emphasis placed on encouraging participating of SMEs in the scheme has found application. As far as this intention is concerned, the research objective needs to deepen the most relevant managerial and organisational problems faced by small companies and by whole district on the way to obtain the EMAS. In order to achieve it, the study needs to be supported by three detailed embedded case studies, where managerial and organisational issues can be discussed and analysed in depth.

Among several districts, which are currently developing EMAS projects - even if no one is still concluded – (among the others Latina, Lucca, Novara, Prato, Premana, Santa Croce sull’Arno, Sassuolo and Valli Bersciane), this empirical research focuses over a sample composed by three significative Italian districts. It has been selected those which activities were demonstrated by a large number of Web documents; papers and publications: Sassuolo (the first district which faced to EMAS); Prato, which is well-known for the integration of EMAS project within other environmental management programmes and Premana Area (in Lecco district), which is a relatively small area with limited amount of financial and human resources.

The involved districts are reported in table 1; all are situated between northern and central part of the country.

<i>District:</i>	<b>Sassuolo</b>	<b>Prato</b>	<b>Premana</b>
<i>Province:</i>	Modena, Reggio Emilia	Prato	Lecco
<i>Region:</i>	Emilia Romagna	Toscana	Lombardia
<i>Companies:</i>	144	7.000	100
<i>Employees:</i>	21.200	43.000	500 (ca)
<i>Sales Turnover:</i>	4.200 millions of euros	4.200 millions of euros	40 millions of euros
<i>Production:</i>	Ceramic tiles	Textiles	Scissors and knives
<i>Certified companies (EMAS):</i>	8	1	0

Table 1 – Main data regarding the selected case studies (<http://www.clubdistretti.it/>, 2004)

Before the direct interviews, the following steps of the empirical research have been conducted:

- an in-depth analysis of all available documents, concerning the district itself and its EMAS project, including conference and journal papers and documents available on Web sites;
- a focus group with environmental offices (or delegates) of each district, including every one of member of staff involved, somehow in the EMAS process.

The interviews have been carried out to the Enterprises Associations have been completed from April 2004 to July 2004 these interviews consisted in a 2-hours meeting aiming at:

- investigating which environmental impacts the industrial process produce;
- understanding the reasons for the adoption of environmental policies and programme, within greater projects;
- drawing a picture of all environmental management activities (not only the EMAS project) carried out by each district, focusing positive and negative experiences;
- analysing the feedbacks and suggestions coming from the enterprises belonging to the district.

#### 4. Case studies

#### **4.1 The ceramic district of Sassuolo**

The highest concentration of ceramic factories in Italy is in the Provinces of Modena and Reggio Emilia, in the district of Sassuolo, known as “The Ceramic District”, which manufactures about 80% of total domestic ceramic tiles.

The proximity to clay deposits in the Apennines has been one of the factors that mostly affected the settlement and high concentration of ceramic industries in this area, developing around some primary settlements characterised by the presence of favourably combined common requisites, with the simultaneous and interdependent development of ceramic production and linked business sectors.

The high territorial concentration of companies and the great mobility of technicians, skilled workers, and sales force have created a ceramic “culture”, which has in turn contributed to accelerating the imitation process.

Although in the 1990s the Italian ceramic industry had to face new market challenges, the sector was able to keep its world leadership. And still today, in the presence of even greater competitiveness on all markets, the Ceramic District is confirmed as the fulcrum of the Italian ceramic industry and remains the reference point for the sector at world level.

##### **4.1.1 The environmental management in the district**

Considering the main impacts of the ceramic industry, the emissions originated by the production cycle are fluorine and its derivatives and lead. The common pollutants in the wastewater are heavy metals, fluorine, boron, sand, clay and paste.

The solid wastes usually generated in the production process are tiles, raw ceramic materials and mud from the manufacturing activities and the wastewater treatment.

The most significant environmental impacts are the consumption of energy and water and the use of not-renewable raw materials (clay) and chemicals products (enamels). The awareness of these impacts of industrial activities has forced the firms to adopt the environmental volunteer tools. More specifically, in this field, several initiatives have been designed. In the Ceramic Districts, the environmental sensitiveness is testified by the application of Ecolabel criteria at four companies; in this project Ecolabel - Ecoaudit Committee and APAT (Italian Agency for environmental and territorial protection) have been involved.

The result of the pilot project is the realization of guidelines for the application of standards in order to present documents for the request of Ecolabel certification.

Analysing the data concerning the ceramic production process and the related environmental impacts, the following considerations have emerged:

- in the last few years the production seems to be established on steady levels;

- despite the increase of production, the total environmental burden of air emissions has been constant, due to the reduction of the flow per production unit;
- the wastewater (after the treatment) are largely recycled;
- the 90% of scraps are recycled inside the production cycle.

The major environmental problems are related to: (i) emissions of stinking organic substances (that cause complaints from neighbours); (ii) noise especially during the night; (iii) increased water consumption; (iv) waste production and brownfield site manage, (v) the induced traffic that produces air pollution and noise [6].

In the promotion of environmental management tools, Assopiastrelle (the Enterprises Association of the district) has played a fundamental role; the main activities undertaken are:

- the diffusion of environmental certifications, through the publication of an operative guide for companies;
- the realization of an integrated report on Environment, Quality, Health and Safety, Energy;
- the creation of an e- register where the spread of information and exchange of materials and waste is made easier.
- the participation in two pilot projects for the environmental management: EMAS in the ceramic district and Ecolabel for ceramic tiles
- the realization of an environmental benchmarking project, that involved 160 companies in order to evaluate environmental and energetic performances.

#### **4.1.2 The EMAS project**

The pilot project “EMAS applied at ceramic industrial district of Modena and Reggio Emilia” was promoted by Emilia Romagna Region, Provinces of Modena and Reggio Emilia, Ecolabel and Ecoaudit Committee and Assopiastrelle and it involved the local Public Administration (Scandiano, Viano, Castellarano, Casalgrande, Rubiera, Sassuolo, Formigine, Fiorano Maranello, Castelvetro), a lot of organizations and entities with a representativeness in the territory (industry, craftsmanship, transport sector, citizens, public services...) and labour unions [30].

In June 1999, an Initial Protocol between Emilia Romagna Region, Provinces of Modena and Reggio Emilia and Assopiastrelle was signed; followed by an Agreement signed with the EMAS Italy Committee for the realization of the project.

The operative groups identified are: (i) the Technical Team, for the realization of the territorial environmental review and the assistance for draft the environmental programme; (ii) the Executive Committee, for the control and validation of the tools produced by the Technical Team and for the management of external relations; (iii) the Promoting Committee that coordinates, overviews and discusses about the results.

The three teams have worked on carrying out the phases that constitute the project:

1. information activities in order to involve all the subjects with interest in the territory;
2. specification of a method for spreading the initiative and the results;
3. realization of the initial environmental review of the territory;
4. definition of the environmental programme for the district;
5. description of the managerial elements (procedures, monitoring system,...);
6. audit and certification of the programme by an accredited competent body.

Another important issue is related to the development of a label to make recognizable the enterprises that have demonstrated the obtained results in terms of sustainable development of the area.

After the initial environmental review of the territory, a programme for the environmental improvement was accomplished: a plan with more than 800 millions of euros and 134 public and private actions for the protection of the environment, that intends to support an environmental certification for the companies in the area.

The main interest of Assopiastrelle in the project is the definition of procedural simplifications for enterprises that will implement their own environmental management system according to the targets set in the improvement programme of the area; for example [23]:

- in the initial environmental review, each company could report only its contribution to the general status pointed as critical in the territorial environmental review;
- the initial environmental review could be placed in the objectives of the environmental programme of the company and realized following the sector guidelines established by Local Administrations or Ceramic Associations;
- it is possible to suggest a common scheme for the environmental policy for enterprises in the district, referring to the engagement at the continual improvement of the territorial criticisms and at the maintenance of reply actions;
- the EMS could have a general model containing a typical manual structure and common operative procedures;
- the periodic environmental management system audits could be conducted by a common organization, constituted by the EMS representatives of each company;
- it could be proposed a common scheme for the environmental statement.

All the activities aim at reaching the following objectives:

- identify, in the district, environmental criticisms and priorities, basing the analysis on a process that collects, explains and evaluates the information related to natural resources consumption and pollution;

- find, sharing with all the entities, the opportunities of improvement and the action to be undertaken in order to concentrate the strengths on the significant aspects;
- build a process of analysis and programming, easily replicable, auditable and manageable;
- develop management systems that could be updated, compared and improved;
- spread awareness and environmental culture in all the organizations that operate in the territory;
- give details for the application of identified methods in other local context (districts or areas).

One of the purpose of the project is to point out, founding on the experienced difficulties, needs and requirements to be satisfied in the implementation of environmental policies, in order to increase the possibilities of the application of EMS to territorial areas.

## **4.2 The textile district of Prato**

The industrial district of Prato extends on an area of 700 square kilometres where about 330,000 people reside. It represents one of the highest concentrations of European textile business.

The companies of Prato are specialized in the production of knitting yarns, clothing fabrics and other textile items (velour, daub, artificial) for clothing, shoe, and furniture industries. The textile companies are about 7,000 and cover all processing steps of the sector, from trimming to fabric finishing.

A strong trait of the Prato industrial system is relating with international markets. The textile sector exports over half its production and trades with over 100 countries.

### **4.2.1 The environmental management in the district**

The main environmental effects of the production process in the consumption of water, drawn from ground water table supplied by the catchmen's basin of Bisenzio river; the industrial wastewater are carried, through the public sewer system, to treatment plants.

In the textile district, all the production wastes are mud derived from the treatment of wastewater in the phase of fibres' scouring and dyeing and solid wastes from the manufacturing of synthetic fibres (polyacrylic, polyamide, polyester).

In the Prato area, it is widespread the diffusion of technologies utilizable for the reduction in quantity of mud, like membrane treatment in the management of water cycle. The reuse of fibres could be possible by plants that use rejects like raw materials in input for the packages production [6].

### **4.2.2 The EMAS project**

The main project developed in the area is the application of EMAS for the Macro-lot I of Prato. This industrial area (part of the district) is about 600.000 square meters extension, employing 3.500 persons in 301 companies [18].

The project (included in a larger plan of environmental management in three industrial districts in Tuscany) is promoted by the textile district, the Prato Industrial Association, ARPAT (regional association for environment and territory protection), Tuscany Region, Ministry of Environment and Ecoaudit and Ecolabel Committee.

This tool was chosen in order to improve the territory and the industrial sector, integrating environmental aspects in the company' decisional process, with the supervision of Public Authorities that ensure the transparency of the method towards the community, for the improvement of the quality [24].

The first step was the sign of a Intent Protocol for the EMAS certification of the industrial area and the realization of several studies for the initial environmental review of the area.

After the opening action, the project has stopped because of problems related to the misunderstanding in the definition of the entity to be registered.

The territorial environmental review [18] has been completed and it includes the identification of (i) environmental aspects and their level of significance and (ii) critical situations in the area where improvement' initiatives will be undertaken by each company adopting EMAS.

This project is achieved by a Technical Committee which all the entities with interests in the territory have participated to. All activities aim at:

- analysing the integration between all the environmental aspects (air emissions, waste water, wastes, natural resources consumption, noise,...) which interact in the territory of an industrial district;
- helping SMEs that want to introduce an environmental management system, giving them tools and spreading information from other successful experiences;
- make systemic the relationship between technical and organizational environmental services, in order to increase the efficiency and the accessibility from the enterprises;
- starting an inter-sector exchange of competences and experiences, assessing potential technological transfer in the field of environmental protection;
- promoting a systematic dialogue between the industrial district and all the social and public stakeholders, basing on the voluntary engagement, believable from the companies;
- encouraging the voluntary adoption of EMAS and evaluating the possibility of the third-part verification of environmental effort of the district (like unique entity) so that joint activities could be at companies' disposal;

- beginning a process for the registration of enterprises of the whole district, following the indications included in the EMAS Regulation and related to the Commission Decision.

### **4.3 The scissors district of Premana**

Premana is a small town lying under the Lecco Province, in Alta Valsassina, part of the Mountain Community including 27 towns among Valsassina, Val Varrone, Val d'Esino, and Riviera.

The towns, characterized by a strong craftsmanship and industrial vocation, form, for the neighbouring area, a true productive centre.

The Premana district produces about 28,000 scissors daily, any type and for any need, besides knives and cutting tools (cases for manicure, scissors and tools for body treatment), kitchen tools (various types of scissors and knives), professional tools (office scissors, embroidery and sewing scissors, scissors and shears for tailoring and industrial use, professional cutlery for butchery and meat and fish industries), equipment for alpinism, caving and hiking (crampons, spikes, ice axes, karabiners) and rural tools for livestock and agriculture (pruning knives, sickles, shears).

The business, besides absorbing local labour, attracts employment also from surrounding towns and in time has seen a parallel development of a continuous linked business for product refinishing (nickeling, chromium plating) and the making of tooling machines and accessories.

The most important markets of the district are the European Union countries, USA, Turkey, Brazil, Australia, Africa, and Italy as mentioned.

#### **4.3.1 The environmental management in the district**

In the engineering industry, the major environmental problem is related to the production of wastes difficultly disposable from the phases of superficial treatments, metals covering and painting.

In 2002, the consult committee of Deutsche Bank (Lecco Division) with the local entrepreneurial Association, the Chamber of Commerce and local institutions promoted the "Quadrifoglio" project.

This initiative of environmental improving includes several actions in order to spread the adoption of EMS in the companies, taking them to the certification ISO 14001 or to the registration EMAS.

In the first phase, the project aims at increasing the knowledge of Environmental Management Systems; while the second part wants to promote the implementation of EMS through additional financial resources like awards for the best companies that will reach the environmental certification [6].

#### **4.3.2 The EMAS project**

In the Premana district in 2001, a project aiming at the implementation of guidelines for EMS in the sector was realized, starting from several considerations related to significant environmental problems specified in the local context [29]:

- the presence of environmental effects rising from similar production process (pollutants in wastewater, waste production, energy consumption, ...);
- the possibility of use the same infrastructures for managing specific environmental impacts (wastewater treatment plant);
- the need of make a strong relationship with local stakeholders about environmental aspects.

In the evaluation of environmental effects of each production process, a company has to consider the outcomes generated from other companies and to value the environmental safeguard actions of public structures.

In the purpose of the promotion team, the adoption of an Environmental Management System of the territory will contribute to improve the collaboration between the production units operating in the area and encourage the application of synergies towards an integrated management, in order to solve the problems of the whole territory.

The common environmental programme will bring:

- the possibility of realization other common infrastructures for environmental services;
- the division of costs for the EMS audit and for the monitoring of environmental data;
- the facility in reaching national or European funding.

The activities realized in 1999 and 2000 were:

- meeting for spreading and making more aware enterprises in the district about the project and its potential future implications;
- environmental review (audit of legal requirements, identification of environmental aspects) in 5 artisan companies and 1 industry in the area;
- environmental review of the territory, with the analysis of critical aspects;
- evaluation of environmental aspects in 6 pilot companies, recognizing the significant aspects;
- definition of environmental objectives and a proposal for an environmental programme for each company;
- meetings for sharing the results in the companies of the district, presenting the environmental programme for the area;
- realization and distribution to the companies of the guidelines for the application of the environmental management system;
- assistance and supply of material to an industrial company for the implementation of its EMS;
- training about water and waste management addressed to all the companies operating in the district;

- series of audits in several companies in order to assess the actions of environmental improvement.

#### **4.3 Results emerged from the case studies**

From the analysis of the three case studies, where EMAS projects have been developed in different territorial and industrial contexts, common features have emerged. In fact, the projects have arisen according to *several favourable conditions*:

- the requirements (due to an internal environmental sensitivity and the evaluation of the environmental impacts of production processes) for promoting environmental management in SMEs, considering the district as an optimal ambit for the integrated growth of competitiveness;
- the needs of (i) exchange experiences in the identification and assessment of environmental aspects; (ii) realize jointly environmental policies and programmes; (iii) use the same infrastructures for manage several environmental impacts (i.g. wastewater treatment plants) and create specific organization as consortium.
- the chance to use the environment as a tool for territorial promotion; in fact, industrial districts exist thanks to local specialized production [25], that carries on the market, together with products, the image of the territory; an area characterized by an high environmental level is a key factor for increasing the value of the place, that contributes to maintain and attract financial and human resources.

In these pilot projects, the *Public Authorities* play a fundamental role; they promote the diffusion of environmental culture, helping enterprises in a practical way in managing the environmental topics:

- (i) from one hand, the comprehension of problems and the activities undertaken for improving environmental performances could be better realized at local level (district) where it is superior the proximity and consequently the perception of citizens towards impacts [28];
- (ii) from the other, the effectiveness of each part depends on the capability in sharing and cooperating, everyone in its own role, for the achievement of common objectives.

The first step, recognizable in the three experiences analysed, is the sign of an Intent Protocol that defines functions and responsibilities of each involved actor, for the success of the project. The cooperation has to continue during the project, because the fundamental founding principle is the sharing of assessments, choices and commitments taken by all the public and private entities involved.

The second one, observed into the case studies, is the drafting of a territorial environmental review, base for the definition of the territorial environmental programme, aiming at continual improvements of performances for each company, towards the sustainable development of the whole area.

After this point the successive stages, in the three pilot projects, were different, due to several organizational/managerial reasons; the analysis of other experiences for EMAS applied at districts, has highlighted a different approach, that goes in the direction of implementing guidelines for conducting companies operating in a particular industrial sector to environmental certification (the guidelines include a model for the production process, the water balance, the evaluation scheme for environmental aspects,...).

## **5. Conclusions and further developments**

Starting from the experiences of EMAS applied at industrial districts, an operative scheme for the effective adoption of EMS in industrial areas could be hypothesized; the different phases (in order) are:

1. Intent Protocol between all the involved subjects (including Public Administrations);
2. definition of a promotion body, a coordination team and an executive team;
3. feasibility study for the realization of EMS in the district;
4. initial environmental review of the district;
5. environmental policy of the district;
6. environmental programme of the district;
7. agreement for the implementation of initiatives and for structuring shared rules between the involved subjects;
8. adoption of EMS by each organization (enterprise), including procedural simplifications previously agreed;
9. audit by the environmental inspector on the organizations, that, apart from EMAS requirements, have to conform to the environmental programme of the district.

Analysing deeply the three case studies the following indications emerged:

- the phase of information and diffusion of the project to the major number of local subjects is fundamental, in order to define voluntary agreements and creating a permanent consultation forum.
- the constitution of a common plan has to focus the attention on the European Commission principles of co-responsibility, so that everyone (Public Authorities, Enterprises

Associations and companies) has to give its contribution proportioned to its role in the system.

- in the district, as regards of requirements existing at different levels (from the strategic stages to ones more operative), integrated initiatives have to be developed; it is important to link activities with the implication at the area level (environmental training, participation to Local Agenda 21 process, ...) with actions that are more operative, included in the environmental programme (wastewater treatment plans, waste management systems, ...).

Finally in the adoption of EMAS in industrial districts, the definition of the roles inside the operating structure is relevant for a successful process, as the involvement of all the subjects with interests in the territory and the integration with other projects in the area (for example Agenda 21 process). The involvement, the system vision and the continual improvement are the key-factors for the environmental management of industrial districts.

Future developments of the research could be related to the analysis of other industrial districts in Italy, trying to verify if the underlined approach is adopted. It is interesting to study other experiences implemented in European countries for industrial clusters, in order to research widespread requirements and common approaches. In this case the European Commission could be forced to take a defined position towards the implementation of EMAS in industrial districts/areas.

## Note and references

This paper is the results of the joint work of the authors. However Annalisa Citterio wrote sections 4 and 5; Emanuele Pizzurno the sections 1, 2 and 3.

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