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# The DELTA programme: An example of participative technology transfer approach in the south and east Mediterranean countries

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## Abstract

Sustainable Business Associates (SBA) aims at transferring to South and East Mediterranean countries environmental management tools, knowledge & expertise with the active commitment of local users, i.e. industrialists and managers structured in the form of 'Business & Environment' associations, the DELTA Networks. For eight years, numerous small and medium enterprises (SMEs) have applied eco-management tools and implemented home-grown corrective measures, leading to positive environmental and financial results. Most of the measures identified and implemented were managerial and organizational improvements; none of the measures involved technology transfer from abroad. The success of the DELTA Programme is due to SBA's participative approach to transfer environmental technology and knowledge in a sustainable way considering human and organisational elements.

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*Keywords:* Eco-efficiency; Good housekeeping; Technology change; Technology transfer; South and east Mediterranean countries

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## 1. Transferring knowledge

Over the past ten years, it seems that the classical approach of technology transfer to emerging countries has reached its limits. This approach, based on the idea that the lack of development of emerging countries is essentially due to their lack of technologies, has proved to be false. How many times has it occurred that once technical facilities and equipments have been installed, they do not work properly and local communities face problems related to planning, design, operation and management of these technologies. For instance, experts wonder whether “we [are] really doing a good job with the millions of dollars that are being invested” in the transfer of water supply and sanitation technologies in Columbia [5]. Given this situation, the Swiss Agency for Development and Co-operation (SDC) as well as other cooperation agencies encourage the development of new methodologies that change the prevailing attitudes and procedures vis-à-vis technology transfer.

In this respect, participative approaches of technology transfer offer interesting perspectives. They actually consist of questioning the problem in its overall context and in taking purposeful and pragmatic actions aimed at improvement. They suggest a view of technology that cuts across the traditional distinctions between science, technique and technology. In this perspective, technology has at least three different layers of meaning: physical artefacts (such as an engine), human activities (such as monitoring a process) and knowledge (such as imagining an innovation). Therefore, when studying transfer of technology, one must take into consideration the social, organisational and economic dimensions of technology. Technology transfer is a learning process in which the actors—the transferors as much as the transferees—are learning from each other. Thus, participative approaches of technology focus on humans rather than on technology and actively involve users not as beneficiaries but as actors in search for their own development and their own solutions.

Founded in 1995, Sustainable Business Associates (SBA) is an international Swiss-based non governmental and non profit organisation. SBA’s aim is to transfer to

South and East Mediterranean countries (SEMC) environmental management tools, knowledge & expertise, conduct training courses and offer a broad range of services related to environmental management with the active commitment of local users (i.e. companies, especially small and medium sized enterprises). Composed of a small multilingual team of European and Arab experts specialised in different aspects of environmental management and of Mediterranean managers committed to the environment within their country, SBA relies on a participative approach to transfer environmental technology and knowledge in a sustainable way. In this respect and with the support of SDC and the European Commission (LIFE Third countries programme), SBA has launched in 1995 the DELTA Programme (Developing Environmental Leadership Toward Action) to sensitise industrialists to environmental risks and opportunities and to federate managers into national associations of Business & Environment. To do so, SBA bases its action on the principle of eco-efficiency (see Section 3 below).

## 2. Objectives of the DELTA Programme

The DELTA Programme<sup>1</sup> has the global objective of environmentally upgrading companies in the Mediterranean basin so that they can attain certain levels of eco-efficiency and improve their environmental performance. In order to engage industrialists in environmental action and sustainable development, the DELTA Programme:

- introduces environmental management concepts and state-of-the art approaches to SEMC
- develops and disseminates new environmental management tools that are easy to adopt and encourage a systematic approach to minimising waste, conserving water & energy, preventing pollution, reducing material use
- provides capacity-building and training to promote a broad implementation of these tools
- offers technical assistance that can facilitate the transfer of cleaner technology & know-how and innovative approaches (North–South and South–South)
- stimulates the launch of pilot projects to develop local

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<sup>1</sup> See SBA’s web site: <http://www.sba.hello.to>

competence and practical experience in integrating eco-efficiency principles & practices into industrial operations.

### 2.1. Changing mentalities

When launching the DELTA Programme in 1995, SBA initiators tried to assess the state of the environment in SEMC in order to respond to local needs. What are the major threats? Who are the main polluters?

Over the past years several studies stated that the Mediterranean region has reached critical levels in the environmental deterioration [12]. Responsibilities for this situation are multiple and undoubtedly linked with uncontrolled demographic and urbanisation trends and mass tourism. Nonetheless, the lack of public environmental awareness and the absence or weakness of management and organisation at the governmental level have a great deal of responsibility too. Inadequate institutions, policies, regulations, lack of funding and of investments in Cleaner Production (CP) and Cleaner Technologies (CT) dramatically lead to the misuse of natural resources. To reverse current threatening trends, there is a need to redirect economic policies and ineffective administrative and legal systems, as well as increase awareness among the different actors of social life. The private sector has an essential role in this respect.

One solution to the spiralling degradation of nature lies in long-term and regional commitments, incorporating the elements to develop a policy of sustainable development within economic policies. In this respect, sustainability, which ensures social and economic stability in the long-term by enhancing co-operation among countries and involving various stakeholders, seems the only solution to halt, and eventually reverse, the damages to the Mediterranean region. As depicted by many analysts, a major challenge for Mediterranean countries is to change in a sustainable way the overall perception of environment and “persuade the population of the region and especially the decision makers that environment issues have long-term consequences directly impacting on immediate concerns”.<sup>2</sup>

The DELTA Programme relies on this principle and, rather than promoting mere technology transfer, is based on the idea that environmental knowledge transfer is primordial to ensure and develop environmental awareness and sustainability in the region [7]. As a participative approach, the DELTA Programme requires the voluntary participation of local actors. As a learning approach, it necessitates a skilled pedagogical team, able to pass on environmental knowledge to its target audience com-

posed essentially of local SMEs. In this respect the knowledge of the SEMC culture and mentality is essential.

### 2.2. Target audience: Small and medium enterprises

Industries are recognised to play a key role in the achievement of sustainable development. As mentioned in Chapter 30 of Agenda 21,<sup>3</sup> business and industry are major stakeholders who cannot be ignored to achieve sustainable goals. Mediterranean industry is mainly composed of SMEs. The wastes they produce are far more damaging to the environment than those generated by households. The major pollutants resulting from industries include chemicals (including agro-chemicals and fertilisers), textiles, food processing, tanning, oil refining and petrochemicals, metals and machinery, and power.

Considering that SMEs could be a potential actor towards sustainability, SBA consolidated its contacts in the SEMC and organised two regional forums in September 1996 (Amman, Jordan) and February 1998 (Marrakech, Morocco) under royal patronage to identify local driving forces who would lay the base for long-term environmental co-operation. During this awareness phase more than 70 round tables were organised in order to identify pro-active local figures. Given their position and relations in their country, they started convincing their peers (i.e. industrialists and managers) to move toward action and set up local structures in charge of disseminating and promoting eco-efficiency principles in their country. By directly asking industrialists to define their own needs and capacities, the DELTA Programme put the leading role into local managers and decision makers’ hands, as they had to set their own programme and undertake their own actions. At the end of the forums, each national delegation announced its interest in forming ‘Business & Environment’ structures that were to become the national chapters of the DELTA Programme—the DELTA Networks [11,14].

This first step in the structuring process enabled the future DELTA Networks to pin down their pro-active members and elaborate a national action plan. As a result of the two regional forums, 11 DELTA Networks were created in Algeria, Egypt, Jordan, Lebanon, Libya, Mauritania, Morocco, Palestine, Syria, Tunisia and Turkey (cf. Table 1).

The DELTA Networks are SBA’s principal partners in the implementation of the DELTA Programme. They have become self-sufficient structures which collaborate closely with SBA to plan, implement and promote the

<sup>2</sup> Investing in the Mediterranean environment, Cycle II of the Mediterranean Environmental Technical Assistance Programme (METAP II) (April 1993:1), European Commission, United Nations Development Programme, European Investment Bank, World Bank.

<sup>3</sup> Chapter 30 of Agenda 21 indicates that business and industry have a critical role to play in achieving sustainable development goals—by reducing the environmental impact on their operations and by integrating environmental criteria into product design, use and disposal.

Table 1  
The DELTA networks

Country	Name	Estimated nb of members	Structure	Year of creation
Algeria	Association pour la Promotion de l'Eco-efficacité et la Qualité en Entreprise (APEQUE)	160	Newly created NGO representing the DELTA Network in Algeria and composed of managers from SMEs and bigger companies. APEQUE has 4 sub-national branches	1998
Egypt	Association of Enterprises for Environmental Conservation (AEEC)	200	Newly created NGO representing the DELTA Network in Egypt and composed of managers from SMEs	1996
Jordan	Friends of the Environment Society / Jordanian Network of Environmentally Friendly Industry (FOES/JNEFI)	92	The DELTA Network is incorporated into FOES, an NGO active in environmental awareness and its JNEFI programme especially intended for industries	1999
Lebanon	International Chamber of Commerce (ICC Lebanon)	35	The DELTA Network is incorporated into ICC Lebanon and composed of managers from industrial and commercial sectors	1996
Libya	Import-Export Promotion Board	50	The DELTA Network is incorporated into the Import-Export Promotion Board and composed of managers from industrial and public sector	1998
Mauritania	Confédération Générale des Employeurs de Mauritanie (CGEM)	10	The DELTA Network is incorporated into CGEM and composed of managers	1998
Morocco	Confédération Générale des Entreprises Marocaines (CGEM)	40	The DELTA Network is incorporated into CGEM and composed of managers	1998
Palestine	Palestinian Federation of Industries (PFI)	120	The DELTA Network is incorporated into PFI and composed of industrialists, NGOs and governmental bodies	1999
Syria	Ministry of State for Environmental Affairs	60	The DELTA Network is incorporated into the Ministry and is composed of governmental bodies, NGOs and industrialists. DELTA Syria has 4 sub-national branches located in the main Directorates for Environment and has tied links with local Chambers of Industry	1996
Tunisia	Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat (UTICA)	30	The DELTA Network is incorporated into UTICA and composed of industrialists	1998
Turkey	Chamber of Environmental Engineers (CEE)	50	The DELTA Network is incorporated into CEE and composed of environmental engineers working in the private and public sector	1999

activities of the DELTA Programme. Their main objectives are to:

- exchange information, experience, contacts, and environmental know-how
- identify common environmental & resource issues and set priorities for action
- be consulted by government in the policy-development process
- help identify private sector partners for eco-efficiency projects and public-private partnerships
- launch needed training activities and pilot projects to facilitate concrete action to improve the environmental & business performance of companies in their respective countries.

In order to enhance the knowledge of local experts, SBA and the DELTA Networks have trained 'Resource Persons'—or technicians—who are responsible at the national level for the dissemination of the eco-efficiency principles provided by the DELTA Programme. In this respect, the evaluation of the DELTA Programme that

was finalised in March 2003 [2]<sup>4</sup> recognises the key role of the Resource Persons for improving the impact and the sustainability of the programme.

In order to implement a real participatory process of environmental knowledge transfer and develop local ownership to the DELTA Programme, the activities carried out are cost-shared by SBA and the DELTA Networks. As a rule, the DELTA Networks provide all local logistics and local dissemination whilst SBA covers the costs related to the development and promotion of the eco-management tools as well as those related to the networking process and the exchange of information between the DELTA Networks (see Section 4.6.). In this respect, an annual average of US\$40,000 is dedicated to activities with each DELTA Network.

The DELTA Networks have developed their own funding mechanism. The dynamism and the pro-activeness of the DELTA Networks are a core assumption to

<sup>4</sup> This study was requested by SBA and SDC in order to serve as a basis for shaping the next phase of the DELTA Programme.

implement the DELTA activities and reaching a sustainable impact.

### 3. Eco-efficiency: a driver toward action

The principle of eco-efficiency addresses a simple but essential question: how to show small and medium sized enterprises (SMEs) the opportunity to protect the environment in their daily activities?

Environmental protection is usually perceived as a peripheral concern by SMEs. Furthermore, in SEMC the drivers that usually lead companies towards implementing environmental management are insufficiently constraining. These drivers (including environmental legislation, market forces, public pressure groups, corporate image, stakeholder goodwill and personal commitment) may apply to a certain extent in industrialised countries but they fail to engender significant results in emerging countries such as SEMC.

To encourage SMEs in Middle East and North Africa to apply environmentally sound principles, the DELTA Programme thus faces the necessity to offer a strong incentive with immediate results. In this respect, the concept of eco-efficiency gives efficient solutions in order to rally SMEs toward environmental commitment. Developed in the early 90's by the World Business Council for Sustainable Development,<sup>5</sup> eco-efficiency is a management philosophy which encourages business to search for environmental improvements that yield parallel economic benefits. By linking economy and ecology, it translates environmental improvements into economic value. Improved environmental performance offers an economic payback and can be a serious incentive for companies that do not value environment protection. Eco-efficiency appears as an obvious idea: reducing waste and pollution, and using fewer energy and raw material resources is obviously good for the environment. It is also self-evidently good for business because it cuts companies' costs. By its simplicity and its immediate economic efficiency, eco-efficiency can be considered as a relevant incentive to foster the implementation of environmental management among SMEs. These positive aspects of eco-efficiency principles became the leitmotiv of the DELTA Programme.

## 4. Activities within the DELTA Programme

### 4.1. Dissemination of eco-management tools

SBA transfers environmental knowledge by proposing eco-management tools to the DELTA Networks. Indeed, SBA develops or adapts, in collaboration with other organisations, environmental management methods and guides to serve as practical tools that lead companies towards effective pollution prevention with a strong economic incentive. These environmental management tools are intended to complete each other and offer to SMEs a broad and progressive range of practical guidelines to be used according to their environmental maturity [see Fig. 1]. Thus, the environmental management tools presented in the frame of the DELTA Programme are tailor-made for SMEs, do not necessitate external assistance, lead to concrete corrective measures and are free of charge.

As the eco-management tools have been translated into Arabic, English, French and Turkish, their use is facilitated and made accessible to all SMEs of the region as well as to all levels in the hierarchy of the company from top management to operators. Ranging from a simple awareness raising (Good Housekeeping Guide) to a more systematic approach (Environmental Performance Indicators), the selected tools offer an easy-to-implement and inexpensive methodologies as steps on the path towards environmental certification such as ISO 14'001 or EMAS.

#### 4.1.1. The Good Housekeeping Guide (GHK)

This environmental management tool was developed in 1998 by SBA and the German Technical Co-operation (GTZ/P3U) in collaboration with a pool of Tunisian and Lebanese experts. It stemmed from the wish to develop a very simple and easy-to-use tool adapted to the very low environmental commitment of SMEs in SEMC, which have limited financial resources, small scale oper-

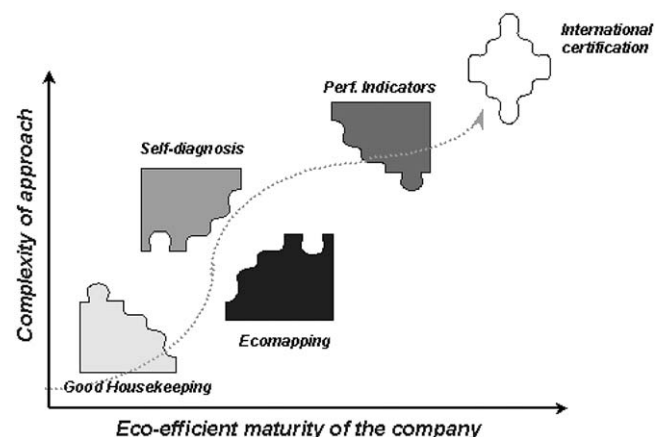


Fig. 1. DELTA eco-management tools.

<sup>5</sup> The World Business Council for Sustainable Development (WBCSD) has been created in 1992 spurred on by the Rio Earth Summit. It is a coalition of 170 international companies gathered by a shared commitment to the environment and to the principles of economic growth and sustainable development.

ation, low technology level, untrained manpower and limited management capacity. The GHK Guide does not require investing in Cleaner Technologies (CT), but rather concentrates on low cost and no cost solutions. It is set up in the form of checklists covering 5 areas (raw materials and supplies, waste, materials and products transfer, water and energy) that can help managers identify significant environmental aspects of their activities. The GHK Guide also proposes calculation sheets to identify and allocate environmental costs to the operations responsible for generating those costs. This permits to calculate the potential of savings resources and waste, the necessary investment and running costs for corrective measures.

#### 4.1.2. Ecomapping

This method elaborated by the Association Belge des Eco-Conseillers (ABECE, Belgium) is a visual tool that enables managers and staff to assess the environmental performance of a micro-company or workshop. By drawing a series of thematic maps (sketches of the plant), one can quickly locate the most significant environmental hazards in the company and pinpoints areas for improvement. Ecomapping is a participatory tool that involves all the employees as they are the ones who know the sites best. The involvement of the staff has proved to be one of the most efficient way of leading to palpable results.

#### 4.1.3. Minimisation Opportunities Environmental Diagnosis (MOED)

Conceived by the Centre per a l'Empresa i el Medi Ambient (CEMA, Spain) in the frame of the Mediterranean Action Plan's (MAP) programme for pollution prevention and cleaner production, this tool allows industrialists to have a better knowledge of the material and waste flows induced by the company's activities and points out potential minimisation opportunities. The MOED consists of an assessment carried out by external experts to determine the possible opportunities for prevention and reduction of pollution at source.

#### 4.1.4. Self-Diagnosis Guide (SDG)

Elaborated by Entreprises pour l'Environnement (EPE, France), this self-appraisal methodology has been conceived for bigger companies who have already made a first step toward environmental upgrading. By systematically filling in technical sheets, the guide enables industrialists to identify the environmental impact of their company and its managerial practices which will then lead to the setting-up of a structured and operational action plan based on the priorities identified.

#### 4.1.5. Environmental Performance Indicators (EPI)

EPI acts as a red thread between the different eco-management tools and will guide companies in their

application. EPI enables companies to document their performance in terms of environmental management. EPI gives synthesised, analytical and progressive indicators on the environmental pertinence of the companies' initiatives. As a result, EPI permits to evaluate the impact of implemented actions and to assess the evolution of the company's environmental performance in a sustainable perspective. Internationally recognised indicators are adapted to the SEMC industrial context so that each company can build up its own EPI depending on its economic, environmental and social characteristics.

In short, the DELTA eco-management tools are not designed to be ready-made and complete tools. They are instead developed in a way to take the needs of SMEs into consideration and to be easily adapted to the technical and managerial situation of the company. As a result, the dissemination of such eco-management methods requires a participatory process.

#### 4.2. Training of resource persons

In order to hand out the DELTA eco-management tools to SMEs in SEMC, SBA relies on the DELTA Networks and more specifically on the trained personnel within them. The approach consists of training local experts so as to hand out the necessary knowledge and allow further local dissemination. The transfer of knowledge is ensured by hiring one or more Resource Persons who are usually part of the DELTA Networks' staff and responsible for disseminating and promoting eco-management tools on the national level.

A train-the-trainer module has been elaborated by SBA for each eco-management tool. Regularly, train-the-trainer sessions are organised in different SEMC in order to educate the Resource Persons as well as other actors with new eco-management tools. During these two-day sessions, the Resource Persons participate actively so as to consolidate their pedagogical skills and enhance their knowledge of the methodologies. Pedagogical material is handed out to the Resource Person so as to help him in his mission.

With the help and outreach of the national DELTA Network, the Resource Person is then in charge of documenting cases of application of the eco-management tools from several industrial sectors. At the same time, he provides technical assistance to SMEs who wish to implement the eco-management tools. Experience has shown that it is important to give industrialists basic guidelines regarding the use of the tools even if the tools are meant to be self-sufficient.

The external evaluation of the DELTA Programme confirmed that the appointment of a Resource Person pursues two objectives: firstly, it involves a large number of SMEs in the process of environmental management implementation; secondly, it builds long-term local

capacities and give leadership of the transferred environmental knowledge to local individuals.

#### 4.3. Training of SMEs

Since 1998, SBA in collaboration with the DELTA Networks has conducted more than 35 local technical seminars in order to introduce industrialists with the different eco-management tools. The target audience of the technical seminars is composed of engineers, production managers of SMEs as well as consultants, representatives of local authorities, industrial associations and unions, NGOs, etc. Due to their professional position, these people are expected to have a multiplier effect. Indeed, participants are selected provided they have the potential to promote environmental principles at the national level. In this respect, training courses are intrinsically sustainable, as individuals are considered the driving force toward action and the outcome is expected to be collective.

Training sessions are designed so that awareness and commitment arise through discussions, interactions and active participation. The technical seminars combine theory, local and international examples, exercises, work groups and practical cases. Indeed, the peak of the participants' training takes place during the visit of industrial plants. Site visits are an excellent exposure to concrete day-to-day environmental problems. For participants, they are the most motivating part of the training, as they provide the ability to identify problem areas, propose solutions, formulate suggestions and discuss results with the other participants as well as with the representative of the visited company. As a result, each participant concretely tests the proposed environmental methodology but also feels the tangible role he can play in real life to improve the overall environment. Finally, technical seminars usually end with a public commitment of each participant vis-à-vis environmental protection: everyone commits in front of the audience to encourage the implementation of eco-efficiency principles, starting within his own factory or field. Follow-up on these commitments will then be the role of the local Resource Persons.

#### 4.4. Application within companies

Knowledge transfer is obviously meant to lead to tangible results and environmental improvements. In this field, the DELTA Programme receipt has enabled more than 200 companies to successfully apply eco-management measures over the past four years. Following the technical seminars, a thorough follow-up is made by the Resource Persons so as to ensure that knowledge does not disappear in nature. Companies are given the means and help to implement environmentally friendly measures and may count on the DELTA Networks for infor-

mation and assistance. The DELTA Networks have a significant role to play as far as the effect of multiplication is concerned. Indeed, as business networks, they encourage information exchange and lead to a snow-ball effect.

The Resource Person plays a key role at this point as he not only assists enterprises, but also collects information about the implementation. The Resource Person is also requested to document successful applications of eco-management tools. In this respect, the Resource Person interacts with companies to obtain all relevant information. The requested information includes the profile of the company, the technical application of the eco-management tool as well as the economic and environmental results. Then the Resource Person writes a report using a standard template developed by SBA. The final text is supplied to SBA who will then edit it, lay it out in the form of a double-sided technical sheet, print it and put it on-line in a dynamic database. The objective of disseminating technical case studies is firstly to serve as positive examples for other companies; secondly, to show the efficiency and the outcome of the activities undertaken under the DELTA Programme umbrella.

A major concern in collecting case studies is to make sure that the suggested measures are applied in the company before the case study is released. Publishing case studies is very time-and-money consuming for SBA and the DELTA Networks as documenting environmental actions is not always the main priority for industry.

In this respect, the external evaluation of the DELTA Programme was not fully able to measure the outreach and impact of the programme as such. Around the circles of close DELTA Network members who communicate their achievements, there are many individuals and companies that have applied DELTA eco-management tools without any return of information to the DELTA Programme. Nevertheless, this gap in the return of information can be explained by the fact that the loose and independent structure of the DELTA Networks does not allow to impose on them a heavy system for reporting.

The DELTA case studies have focused on highlighting economic results in order to convince a wider circle of decision makers and managers in companies. Environmental results have had less attention until now. In a perspective of sustainable development and social responsibility of companies, it would be useful to also measure the environment improvements of the environmental action undertaken under the framework of the DELTA Programme.

#### 4.5. Implementation of corrective measures

With the help of the eco-management tools, since 1998, more than 200 SMEs have identified 240 possibilities to improve their environmental performance. These improvements are basically good housekeeping,

low cost and no cost measures, i.e. practical measures based on common sense, which do not necessarily involve mere technology changes. They can be classified in terms of eco-efficient options, as follows:

Identified corrective measures Total: 244		
	Number	%
<b>Eco-efficient options</b>		
1. Good Housekeeping (*)	53	22%
2. Input material change	9	4%
3. Better process control	36	15%
4. On-site recovery & reuse of waste (recycling)	55	23%
5. Equipment/hardware modifications/replacement	28	12%
6. Change of process technology	12	5%
7. Production of useful by-products	47	20%
8. Product modification	0	0%
<b>Total</b>	<b>240</b>	<b>100%</b>

(\*) The option 'Good Housekeeping' must be understood as activities related to general management and logistics, maintenance of the plant out of the process, health & safety, training of personnel, etc.

Out of 240 identified possibilities of improvement, 111 lead to the successful implementation of corrective measures, which have been documented by SBA in the form of technical sheets (see Section 4.4.). In terms of eco-efficient options, these 111 implemented measures can be sorted out as follows:

Implemented corrective measures (111 out of 240)		
	Number	%
<b>Eco-efficient options</b>		
1. Good Housekeeping	26	23%
2. Input material change	5	5%
3. Better process control	19	17%
4. On-site recovery & reuse of waste (recycling)	28	25%
5. Equipment/hardware modifications/replacement	15	14%
6. Change of process technology	7	6%

7. Production of useful by-products	11	10%
8. Product modification	0	0%
<b>Total</b>	<b>111</b>	<b>100%</b>

Results reveal that most of identified and implemented measures were managerial and organisational improvements (good housekeeping, better process control, on-site recovery). More complex and technical options, such as change of input materials, modification of end product and measures to upgrade the process technology, were scarcely considered by companies. This is not surprising, as such measures usually imply important initial investments and a long payback period. Moreover, small and medium sized companies in SEMC can hardly afford the costs of prospecting abroad for partners who may provide innovative technological solutions.

As a rule, managers of the companies have tried to find home-grown and easy-to-implement solutions. Most of the solutions were found by the technical team of the company itself. The DELTA Networks' and SBA's consultants only contributed by giving the incentive to consider environmental issues, highlighting the areas to be tackled first and sharing their regional experience. In most of the cases, the main motivation for the managers was the financial and technical short term capacity of the company. The implementation of new environmentally-friendly technologies or the acquisition of international license were not considered as effective solutions. As a result, no case of technology transfer from abroad has been identified as such.

In terms of financial results, a total investment of 97,000 USD has been made by 60 companies to implement Good Housekeeping measures. The global annual savings so far amounted to 250,000 USD (cf. Fig. 2). When analysing each company individually, initial investments are normally between 0 and 20,000 USD. It is relevant to note that 80% of the companies invested

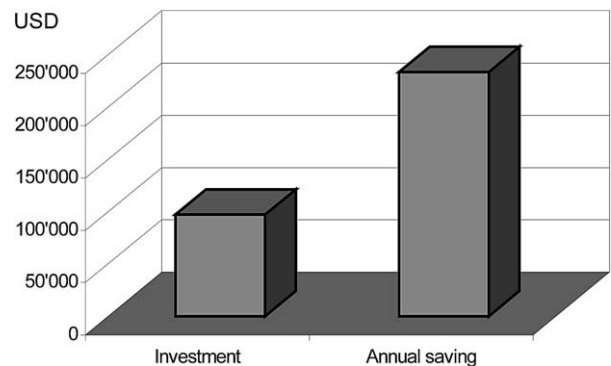


Fig. 2. Good Housekeeping applications in 60 companies. Total amount of Investment and annual Saving (in USD), 1999-2000.

less than 2,000 USD (cf. Fig. 3). This shows two things: first, companies are not willing to spend important amounts of money for their environmental management, and second the eco-management tools do allow significant savings with low initial investments.

In order to enable companies to invest in Cleaner Technologies, the SEMC countries should develop local green financial mechanism and soft loans. These instruments are not yet in place: only pilot green budget lines have been established in a few SEMC countries with very little clients due to the limited available funds and the bureaucracy to obtain a credit.

#### 4.6. Networking and information exchange

A main focus of the DELTA Programme is to foster relations between companies, industrial sectors and countries. In its participative approach, SBA is committed to providing information and experience to local experts so that actions are locally mastered. Exchange of information is essential at this point, as local experts may learn from each other and share experience.

As a sustainable environment has no border, SBA has tried for the past years to foster regional relations and encourage North–South and South–South exchanges contacts. These contacts make it possible to:

- report results and success stories
- provide a neutral forum where industrialists can exchange experiences, case studies and methodologies
- identify further collaborations and partnerships that would be effective in enhancing the competitiveness of industry of the SEMC
- span a bridge between the SEMC industrialists and European and international companies, to create a cross-regional network of competence and experience.

In this respect, several channels of communication have been implemented under the framework of the DELTA Programme. The rapid emergence of Information and Communication Technologies (ICT) in the

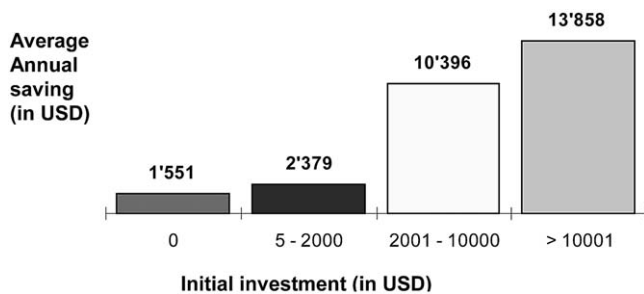


Fig. 3. Good Housekeeping applications in 60 companies. Average annual savings per initial Investment (in USD), 1999–2000.

region was a positive trend that enabled easier and quicker information exchange and networking. Indeed, many industrialists and decision makers in SEMC seem to have recently adopted Internet as a quick and efficient mean of communication.

##### 4.6.1. Newsletter

A regular newsletter (the DELTA News) is available as an informational source for the DELTA Networks in order to facilitate the exchange of information and experiences and create contacts between managers interested in the eco-efficiency approach. This newsletter also informs partners and other organisations about ongoing activities and highlights the important role of economic and industrial actors in the achievement of sustainable development.

##### 4.6.2. Web site

Accessible and free information is provided on SBA's web site (<http://sba.hello.to>). It offers comprehensive information on each DELTA Network (which is regularly updated by the DELTA Networks themselves), free downloading of eco-management tools and a database containing eco-management case studies.

##### 4.6.3. E-conference

SBA launched in Spring 2000 a three-month E-mail Conference open to all industrialists and other people interested in good housekeeping measures within companies. This E-conference took place exclusively via e-mail allowing more than 500 participants to participate at their own pace from all over the world and without leaving their office. Following the success this first E-Conference, SBA carried out one year later during two months a new electronic conference on networking and information exchange to improve co-operation for sustainable development in the Mediterranean basin. This second E-Conference with 1500 participants turned into a permanent forum on the Internet, where DELTA members and other interested people can freely post comments and ask questions.

##### 4.6.4. E-platform

For the past 2 years, SBA has collaborated with the University of Fribourg (Switzerland) to develop a web-based information system, the DELTA Platform. The DELTA Platform is meant to be an interactive system that helps users to share information and add value for the members of the DELTA Networks by helping them to solve eco-management problems and to find partners. Users, that is companies, environmental experts, consultants and public institutions, are able to consult others' needs and proposals, and directly update their own information. The DELTA Platform contains a database with information in four major fields: information on private companies, information on Mediterranean experts in cle-

aner production and environment management, information on current and future environment-oriented projects, and information on funding sources, where donors can present their funding possibilities, and partners express their needs.

The challenge with such a tool for information sharing is first of all to keep the information up to date, in order to have always an attractive platform. The main problem is that information is provided by participants. The DELTA Platform requires a very active and participatory role from participants. For the moment, participation to the DELTA Platform is very low and subsequently the information that it contains is not renewed. This tool seems not yet appropriate for information exchange in SEMC countries.

#### 4.6.5. E-learning

In addition to the face-to-face technical seminars, SBA has developed an E-learning module that enables the DELTA Networks to broaden their audience in the coming years. Basically, the E-learning module is thought in a way to adapt existing eco-management tools and the related pedagogical material to electronic means. Two E-Learning sessions have been conducted during 2002. On the medium term, E-learning sessions could be conducted by SBA for the DELTA Resource Persons in order to complement the face-to-face training. At their turn, Resource Persons would then organise seminars on eco-management using the DELTA E-learning support at a national level. Participants would be offered an individual coaching through Internet.

This new mean of sharing knowledge requires new attitudes from the learners and from the trainer who becomes more like a coach or a tutor. E-Learning has the advantage to be flexible as participants can attend their course at their own pace provided they fulfil a certain number of hours during each week of the session. E-Learning is thus suited for adult training but requires a lot of discipline from participants as well as the tutor. Specially in SEMC countries where the physical contact is very important, E-Learning will never replace the face-to-face meetings; it will complement them and extend their impact and outreach. E-Learning is not a revolution in the education system but rather an evolution.

### 5. The DELTA networks and the National Cleaner Production Centers

The National Cleaner Production Centers (NCPCs) programme that was created by the United Nations Environment Programme (UNEP) together with the United Nations Industrial Development Organisation (UNIDO) has a lot of similarities with SBA's DELTA Programme. Both focus on awareness raising, training,

demonstration projects, technical assistance to companies, information dissemination. UNIDO experts have recognized that: "there are multiple synergies between the NCPCs and the DELTA Programme. As a matter of fact, the Moroccan CPC benefited from the initial groundwork established by DELTA Morocco within the Confédération Générale des Entreprises du Maroc (CGEM)" [13].

An important criteria for both programmes is that they are demand oriented and aim for the sustainability of the actions. Local beneficiaries (i.e. industry) contribute financially to the programme's activities in order to affirm the demand orientation and to help with the financial sustainability of the programme at local level.

One difference lays mainly in the structure of the local partners. NCPCs are usually independent entities with their own managing board whereas the DELTA Networks are more loose structure. NCPCs have a secured important budget for their launching phase whereas the DELTA Networks need to seek their limited financial means. NCPCs have several permanent staff whereas DELTA Networks have rarely more than one part time resource person.

These difference are related to a slight difference of perspective in the overall goal of both programmes. Both programme aim to enhance local capability in environment management and local competitiveness for industry. NCPCs are meant to become financially independent structures over the time in order to provide services to industry. The DELTA Networks are meant to remain loose structures and a neutral forum for industry to meet and exchange experience. Ultimately, the DELTA Programme aims also to bring good governance and democracy in a certain group of decision makers.

### 6. Conclusion

Under the framework of the DELTA Programme, SBA transfers environmental technology and knowledge by actively involving users, i.e. industrialists and managers structured in the form of 'Business & Environment' associations, the DELTA Networks. SBA's approach does not consider that technology is merely instrumental. It assumes that technology is embodied knowledge, which considers human and organisational elements. To efficiently transfer environmental technology, SBA plays the role of the animator, which consists of stimulating creativity and change by blowing energy and ideas to the DELTA Networks from outside. In this respect, SBA actively contributes to the overall transformation of the identity of the private sector in SEMC.

After eight years of existence, the DELTA Programme has provided encouraging results which lead to the belief that the selected methodology offers a good alternative

to classical technology transfer methods. The success of the DELTA Programme is due to different factors. The participative approach has definitely proved to suit the context of SEMC and has bred intense collaboration and contacts between SBA and its local partners as well as among them. The concept of eco-efficiency is also perfectly adapted to SEMC as it is a major incentive as long as solid and widespread commitment to the environment fail to exist. Exchange of experiences and word-to-mouth advertising both contribute to multiply voluntary actions based on eco-efficiency principles and create a wider and permanent environmental conscience at medium term.

SBA's success is also linked to its tight and extended network of relations that grows continuously. As a small but permanent team, SBA's staff has been able to establish personalised and durable relations with local proactive individuals and can count on their support and motivation to develop its activities. The understanding of Arabic culture and mentality was certainly an asset for SBA in this respect. On several occasions, SBA has noticed that, no matter how motivated the foreign experts are, a programme for sustainable development has no chance of success as long as the project is not supported by local personalities. For this reason, and in order to avoid mistakes made by others, SBA puts local participation on top of its priority list and regularly adapts its activities to local needs expressed by the beneficiaries of the programme.

## 7. Uncited references

[1,3,4,6,8–10,15]

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