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The IPTS REPORT

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SPECIAL EURO-MEDITERRANEAN ISSUE

EUROPEAN COMMISSION
Joint Research Centre

ENGLISH VERSION

ABOUT THE IPTS REPORT

The IPTS Report was launched in December 1995, on the request and under the auspices of Commissioner Cresson. What seemed like a daunting challenge in late 1995, now appears in retrospect as a crucial galvaniser of the IPTS' energies and skills.

The Report has published articles in numerous areas, maintaining a rough balance between them, and exploiting interdisciplinarity as far as possible. Articles are deemed prospectively relevant if they attempt to explore issues not yet on the policymaker's agenda (but projected to be there sooner or later), or underappreciated aspects of issues already on the policymaker's agenda. The long drafting and redrafting process, based on a series of interactive consultations with outside experts, guarantees quality control.

The first, and possibly most significant indicator of success is that the Report is being read. Issue 00 (December 1995) had a print run of 2000 copies, in what seemed an optimistic projection at the time. Since then, circulation has been boosted to 7000 copies. Requests for subscriptions have come not only from various parts of Europe but also from the US, Japan, Australia, Latin America, N. Africa, etc.

The laurels the publication is reaping are rendering it attractive for authors from outside the Commission. We have already published contributions by authors from such renowned institutions as the Dutch TNO, the German VDI, the Italian ENEA and the US Council of Strategic and International Studies.

Moreover, the IPTS formally collaborates on the production of the IPTS Report with a group of prestigious European institutions, with whom the IPTS has formed the European Science and Technology Observatory (ESTO), an important part of the remit of the IPTS. The IPTS Report is the most visible manifestation of this collaboration.

The Report is produced simultaneously in four languages (English, French, German and Spanish) by the IPTS; to these one could add the Italian translation volunteered by ENEA: yet another sign of the Report's increasing visibility. The fact that it is not only available in several languages, but also largely prepared and produced on the Internet World Wide Web, makes it quite an uncommon undertaking.

We shall continue to endeavour to find the best way of fulfilling the expectations of our quite diverse readership, avoiding oversimplification, as well as encyclopaedic reviews and the inaccessibility of academic journals. The key is to remind ourselves, as well as the readers, that we cannot be all things to all people, that it is important to carve out our niche and continue optimally exploring and exploiting it, hoping to illuminate topics under a new, revealing light for the benefit of the readers, in order to prepare them for managing the challenges ahead.

Preface

The focus of this special edition of the IPTS Report is on the Southern and Eastern Mediterranean countries, which are closely linked to Europe for geographical, historical, economical and cultural reasons, and possess a considerable development potential.

The European Union initiated a co-operation process with Southern Mediterranean countries in the 1970s and intensified its efforts in this sphere on the occasion of the Barcelona Conference in November 1995. In this way, it is making a substantial contribution to sustainable development in the region; an issue on which it neither can, nor wishes, to remain indifferent.

The situation is complicated and currently constitutes one of the Union's greatest challenges. By the year 2025, the population of Southern Mediterranean countries will have doubled that of 1995. This demographic explosion must be accompanied by a development of resources, an increasing employment offer and an improvement in living standards.

A strong economic interdependence does exist between Northern and Southern Mediterranean countries. While the European Union is heavily dependent on the Middle East and North Africa for energy resources and raw materials, we note how reliant countries in the Southern region are on the Union in terms of technology and finance, as well as finished products.

Science and Technology will play an important role in guaranteeing a harmonious and sustainable development in this region. This is why the European Commission intends to pursue its co-operation efforts in this domain, particularly in respect of training, research and technology transfer, in order to contribute to the success of this process.

Edith Cresson

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JUNE 1998

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SPECIAL EURO-MEDITERRANEAN ISSUE

EDITORIAL

G. Caratti, S. Gómez y Paloma and I. Spiewak, IPTS

The Barcelona process has opened new avenues for co-operation between the European Union and the 12 Mediterranean Partner Countries (MPCs). This process will require a thorough understanding of the complex political, socio-economic and cultural structure of the region, and how the EU and MPC can best complement their actions to mutual advantage based on the principle of a true "Partnership".

This Special issue of the IPTS Report highlights the potential role of science and technology (S&T) in bridging socio-economic gaps that currently exist between the two parties. The average per capita GDP of the MPCs is 1/4 that of the EU on a purchasing power parity (PPP) basis, or only about 1/10 on a dollar basis. Creating an equitable free trade area by 2010, the key goal of the Barcelona declaration of 1995, requires many measures not yet foreseen, but raising the level of S&T and education in the MPCs is surely one of the key measures where the EU and its Member States can be of considerable help.

We should not forget that the MPCs are a truly heterogeneous group, some of which (Israel, Cyprus, Malta) are already at economic levels within the EU range and others (Israel, Cyprus, Turkey) have strong technological capabilities and active private sectors. The MPCs have a great deal to learn from each other, and one of the goals of the Barcelona process is the expansion of intra-MPC co-operation and trade which currently are far below interactions with Europe.

Fernando Aldana's introductory article presents a view of the role of research and development in creating a successful Mediterranean partnership. R&D, as a catalyst for innovation, can only be considered as one element of a social and cultural process of modernisation that faces many barriers. There appears to be a need for governments to rethink their R&D policies in specific domains to optimise the social benefits. The new information and communication technologies are cited as a key to accelerate modernisation. (See the article of Mas and Belzunegui in this issue.)

Bichara Khader provides an overview of the unaccomplished tasks that represent barriers to the Partnership. The mountain of foreign debt owed by many of the MPC governments dwarfs the flows of foreign aid and investment, hindering growth. Many MPC governments have been slow to build institutions that promote investment in the private sector; the needed institutions include universal education and S&T capability. Uncertainties concerning trade liberalisation in agricultural products, and the restrictive measures hindering free movements of citizens, are important concerns when viewed from the South. Finally, the unresolved political conflicts of the region are major impediments to economic co-operation. The strategic role of S&T co-operation to underpin long-term growth and prosperity in the region is largely underestimated by current Euro-Mediterranean negotiations.

Bontoux, Hardy and Rojo present data on science and technology trends in the MPC. Most of this group are investing less than 0.5% of GDP

in research and development, in contrast to 2% by the EU. Steps are being taken to increase this effort in some countries. Investment in education and technical training have been shown to correlate strongly with economic growth; R&D forms an essential element in training high-level scientists and engineers.

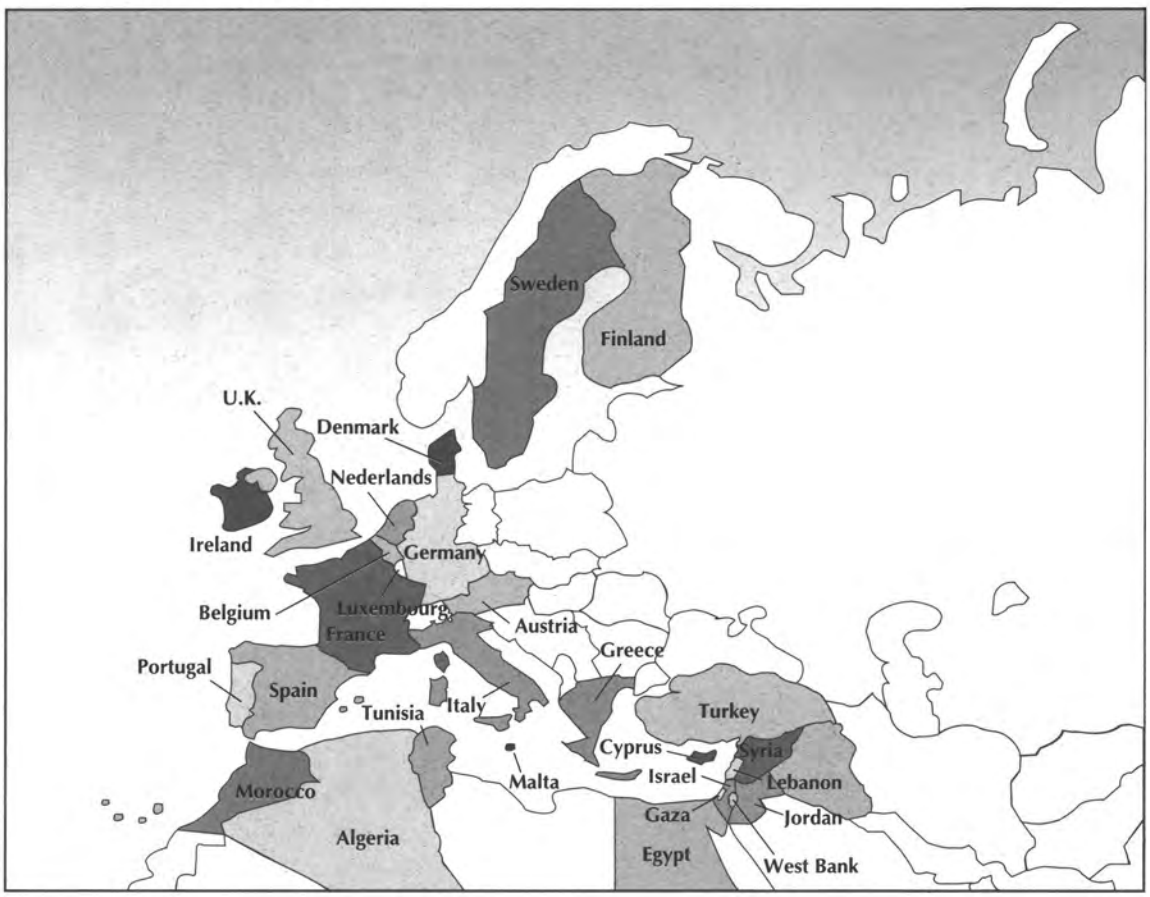
Di Pietro, Gazi and Gómez y Paloma discuss the critical role played by small and medium enterprises (SME) in the MPCs, where SMEs apparently provide over half the jobs and most industrial employment in many countries. The direct application of models which have proved useful for SMEs in Europe is questionable. Attention should be oriented towards the identification of policies promoting international networks of co-operation.

Marita Kayamanidou contributes a paper on water management in the Mediterranean region, where most countries suffer from a level of water resources below the desirable threshold of 1000 m^3/yr/capita. There has been a general overuse of renewable water resources, with many instances of deterioration in quality, particularly of ground-water. International co-operation, good management and appropriate application of treatment technology can help to maximize the benefits from water use. However, the most pressing problem may be the equitable sharing of disputed water resources that cross national borders.

Mas and Belzunegui provide a hopeful note in their discussion of the new information and communication technologies (ICT). Apparently, the Internet is spreading rapidly and is now available in all MPCs except Syria. Electronic communication has vast potential for reducing cultural barriers, in education, in technology transfer, and in facilitating research and development co-operation. There is, however, a need to strengthen the telephone networks of many MPCs.

Bonazzi and Gómez y Paloma point out that the evolution of Europe's Common Agricultural Policy (CAP) will have strong impacts on the MPCs, where 40% of the jobs currently lie in the agro-food sector. As an example, the CAP led to an over-expansion of the Spanish olive oil sector via mechanization, with an accompanying loss of jobs and negative social impacts. The authors suggest a balanced approach to the future evolution of agro-food policies in the Euro-Mediterranean region which would avoid excessive priority given to productivity at the expense of human and cultural values, and would take into account rapid population growth and the strains of urban migration.

Euro-Mediterranean Countries



PROLOGUE

The role of R&D in the Euro-Mediterranean partnership: A view from Southern Europe

Professor Fernando Aldana Mayor, Director of the Spanish Office for Science and Technology

The EU has officially expressed a growing interest in the support of non-EU Mediterranean Countries through the launching of several initiatives with the goal of emphasising a partnership in the Mediterranean region. The co-operation between the EU and other Mediterranean countries started during the 1970s, i.e. long before the process launched during the Ministers of Foreign Affairs conference held in Barcelona in late 1995. Nevertheless, at the beginning of this decade it was already clear that the trade concessions and financial aid that characterised co-operation agreements during the 1970s and 1980s had not reached the target of supporting vigorous socio-economic development in most of Southern and Eastern Mediterranean countries (SEMC). This is why, in the framework of the Renovated Mediterranean Policy (1992), the Barcelona Conference introduced the concept of 'partnership' for the first time as related to concrete goals, including, among others, 'the construction of a zone of shared prosperity,' by establishing the Euro-Mediterranean free trade area in 2010. Yet, 'partnership' implies an active involvement of all actors - from EU as well as from non-EU countries - in reaching the goals that have been determined.

Despite all the comprehensive difficulties faced by the 27 countries participating in the historical challenge of implementing the 'Barcelona process', this has to be considered as the first necessary step in creating stable and peaceful conditions in the region, and also in attaining sustainable development for all human beings living in the area extending from Helsinki to Casablanca, and from Lisbon to Amman.

One of the most important initiatives launched by the EU is MEDA, aimed at fostering socio-economic development in several sectors under a regional perspective. Nevertheless, the socio-economic development in the SEMC is a highly complex issue. The success depends on many different factors; some of them rely on the general structure and modernisation of the economy, and the way that local, national and international agents interact; others on the skill level of their human resources or on the infrastructure capacity and its dissemination in the region.

But these are all only scattered pieces of a larger and more complex puzzle, in which all the elements mentioned above are held together by cultural and social constraints that explain the difficulties in speeding up the innovation process and the take-up of new products and services in the society of SEMCs. The strong interaction between them precludes the design of isolated initiatives, even when these proved useful in other contexts. Socio-economic advances should be pursued simultaneously in all perspectives involved. Generally speaking, no magic solutions will appear from the use of limited perspectives. R&D is one of the areas requiring this broad perspective.

In spite of the great hopes put on the priority to establish research and development

programmes as the catalyst for innovation, many practical difficulties in the involvement of policy makers and academic and industrial groups from both sides of the Mediterranean were encountered in the past. An effective partnership between European and Mediterranean Partner countries to provide a sound basis for long-term co-operation is still lacking.

This situation will force us to redefine the role of research and development policies from an overall scenario and also in specific domains. The case of the Information Society is a good example, where the above mentioned partnership could produce valuable results and it will be further detailed in the following.

The dramatic progress in Information and Communications Technologies (ICT) accumulated in the last decade and its wide impact on society has led to the term "Information Society", to describe the society of the XXI century. Its relevance in many different economic and social sectors, where ICTs represent the basic ingredient for competitiveness, is responsible for the attention paid to its deployment by governments all over the world. SEMC do not constitute an exception to that.

The main difference between services and products of the Information Society and its associated technologies, with respect to other domains, is the capability to use the ICT itself as a mechanism to accelerate progress by jumping over many intermediate steps. In other words, the main advantage behind ICTs is the ability to use the latest products and services without passing through the intermediate steps. A crucial push to innovation is derived from that fact. Another important element is the horizontal impact of ICT in other technological sectors (like manufacturing, energy, education, etc.). Never, in the history of mankind, has a technology had the enabling capability that ICT is demonstrating today.

In this context of pursuing political stability, rapid socio-economic development and clear visibility of progress, the EU can justify the cost of programmes like MEDA and the prioritisation of several domains of application. The synergism between education, technology and innovation must play an important role in improving living standards. These inputs will also be needed to develop economic activity that will complement rather than antagonise the EU. Partnership is the key word for that.

Euro-Mediterranean Partnership (EMP): The Unaccomplished Tasks

Prof. Bichara Khader, *Université Louvain-La-Neuve, Belgium*

Issue: Achieving the goals of Euro-Mediterranean partnership foreseen in the Barcelona Declaration, leading to a free trade area by 2010, requires a massive set of concerted actions from both the European Union and the Partner Countries. These actions encompass the settlement of existing international disputes, and the creation of infrastructure that will promote regional co-operation and expedite rapid economic growth in the Partner Countries.

Relevance: Judging from the limited actions taken so far in the Barcelona process, decision-makers both in the EU and in the Partner Countries may be unaware of the broad and complex set of measures that will be required and the relatively limited amount of time available. The actions include relatively little-publicized aspects such as alleviating the heavy indebtedness of many countries of the region, greatly broadening their educational structure, and increasing the science/technology capability of most of the countries involved and directing that capability to the problems of the region.

Taking stock of the facts

When the representatives of the 27 European and Mediterranean partners wrapped up their discussions and issued, after heated debate, the Barcelona Declaration on November 28, 1995, many observers thought that something new was looming on the horizon. Many spoke of a decisive "turning point" in Euro-Mediterranean relations. Those who dared to express scepticism about the project of "partnership" were described as "Cassandras" in the euphoric climate of the end of 1995.

Neither a historic turning point, nor a media celebration, the Barcelona Conference has only been the launch pad for a complicated and difficult process aiming at three main objectives:

- to preserve peace and stability;
- to set up a shared zone of prosperity through the establishment of a free trade area;
- to promote understanding between different cultures.

These objectives correspond to the three well-known sectors of the CSCE, political, economic and financial, social, cultural and human security.

In contrast to previous European initiatives as embodied in the Global Mediterranean Policy (1973-1992), and the renewed Mediterranean Policy (1992-1996), *Euro-Mediterranean Partnership* (EMP) was supposed to be based on reciprocity, on lasting multilateralism, on political dialogue, on graduality, on liberalization, on respect for variety and pluralism, and

A great deal of joint effort is still required on the part of the Euro-Mediterranean Partnership to implement the European free trade area by 2010

The Barcelona Conference served as a launch pad for a process aiming at three fundamental objectives: preserving peace and stability, establishing a free trade area and promoting understanding between different cultures

Unlike preceding European initiatives, Euro-Mediterranean Partnership (EMP) was supposed to be based on reciprocity, on lasting multilateralism, on political dialogue, on graduality, on liberalization, on respect for variety and pluralism, and conditionality

Serious barriers to partnership are raised by the considerable differences between the EU and MPC, in terms of GDP per capita, incomes and wages and the level of the latter's trade dependency on the former

conditionality. All these innovations are to be found in the network of Euro-Mediterranean Association agreements already signed with Tunisia (July 1995), Israel (November 1995), Morocco (February 1995), the West Bank and the Gaza Strip (February 1997) and Jordan (April 1997), and the *Customs Union signed with Turkey* (March 6, 1995). Generally these agreements aim at bringing the European Union and the Mediterranean Partners closer together through the gradual establishment of free trade, the provision of EU financial support for the economic transition period (4.685 million ECUs), the speeding up of economic modernization, the involvement of civil societies, and the respect for human rights and democracy.

To monitor the whole process, it was decided to set up a Euro-Mediterranean Committee for the Barcelona Process consisting of officials from the Troika (Representatives of the present, previous and following Presidency) and from the 12 Mediterranean Partners.

In a "progress report on the Euro-Mediterranean partnership" prepared by the Commission to the Council and the European Parliament (Com(97) 68 final), just before the Second Ministerial Conference of Malta (April 1997), we have a complete review of what has been achieved in terms of ministerial and technical meetings, of confidence-building measures, of regional co-operation programmes (such as Medstat), of efforts to promote private investment in the region or to strengthen sub-regional co-operation and integration, and of financial support (2,2 billion ECUs in 1997 alone) through the MEDA Programme (981 million ECUs in 1997) or through *the European Investment Bank*.

Facing up to the challenges

A free trade area is not an end in itself but only a means intended to bridge the gap between the shores of the Mediterranean, to diminish the economic and social disparities, to accelerate sustainable development, to promote regional co-operation, and to integrate the Mediterranean Partners into the world economy in order to avoid their marginalization within the new multilateral trading system.

But the *different levels* of development among European and Mediterranean Partners, the huge disparities in GDP per capita, in income and in wages, and the high rate of trade dependence of Mediterranean Partner countries on the European Market constitute, if not insurmountable obstacles, at least serious barriers to a successful and equitable partnership.

Some other problems might cripple the whole project. The first is the *question of debt*. With 200 billion dollars of Government foreign debt, the Mediterranean Countries have to disburse annually some 17 to 19 billion for debt servicing while they receive from the EU an average of 2 billion (grants and EIB loans). Debt reduction schemes would hence need to be explored. Negotiation on debt conversion should start without delay. Being the largest creditor, Europe can take the initiative. Moreover, according to World Bank tables, only Algeria of the Partner Countries enjoys a trade surplus, and only Algeria and Malta come close to balanced current accounts. This complicates the problems of debt repayment and potential restructuring. The experience of Latin American countries with debt reduction in the 80s and 90s should be useful in this context.

The other problem relates to the uncertainty concerning *trade liberalization in agricultural products and the restrictive measures hindering the free movements of citizens*. Although one can understand the European stand on these two sensitive issues, a negative impression is created

The Meda Programme

Michael Webb, *European Commission, DG I-B*

The MEDA programme is the principal financial instrument of the European Union (EU) for the implementation of the Euro-Mediterranean Partnership. It accounts for 3,424.5 million ECU of the 4,685 million ECU of budgetary resources allocated for financial co-operation between the EU and its Mediterranean partners for the period 1995-1999. These grants from the Community budget are accompanied by substantial lending from the European Investment Bank (EIB).

Already in 1995 and 1996, 1,205 million ECU were committed from the EC budget, and EIB loans were signed for 1,694 million ECU. In 1997, a further 1,084 million ECU in grants were committed. MEDA accounted for most of the grants. In 1997, EIB loans amounted to 1,094 million ECU.

Some 90 per cent of the resources allocated to MEDA are channelled bilaterally to the partners (this relates to Algeria, Egypt, Jordan, Lebanon, Morocco, Syria, Tunisia, Turkey and the Palestinian Authority). The other 10 per cent of the resources are devoted to regional activities. All the partners are eligible to benefit from these activities (those mentioned previously, together with Israel, Cyprus and Malta).

MEDA resources are subject to programming: three-year national indicative programmes are drawn up jointly for the bilateral channel, and a regional indicative programme covers the multilateral activities. These programmes are revised annually.

The priorities for MEDA resources are:

- support to economic transition: the aim is to prepare for the implementation of free trade through increasing competitiveness, with a view to achieving sustainable economic growth, in particular through development of the private sector;
- strengthening the socio-economic balance: the aim is to alleviate the short-term costs of economic transition through appropriate measures in the field of social policy;
- regional co-operation: the aim is to complement the bilateral activities through measures to increase exchanges at the regional level.

Respect for human rights and democratic principles are an essential element of co-operation through MEDA.

Examples of projects financed by MEDA are: structural adjustment programmes in Morocco, Tunisia, Algeria and Jordan; social fund for employment creation in Egypt; rehabilitation of the public administration in Lebanon; rural development in Morocco.

Examples of loans signed by the EIB are: projects to improve waste water treatment and management of water resources in Egypt, Lebanon, Jordan, the West Bank and Gaza Strip and Morocco; measures to reduce pollution and modernisation of traffic control systems at airports in Algeria.

As far as science and technology is concerned, a Monitoring Committee of representatives of the 27 partners has been set up. The fifth meeting of the Committee is being held in May 1998. Its aim is to co-ordinate bilateral and multilateral activities in RTD co-operation and to develop a global strategy in this field. Co-operation at the regional level focuses on exchange of experience and best practice, networking and training.

when viewed from the South. Europe should not convey the impression that the Euro-Mediterranean partnership is conceived as a market access strategy for European products and as a way of stopping the flow of illegal immigrants into ITS territory.

The level of indebtedness of MPCs also poses a problem, with EU aid and trade balances unable to cover the debt servicing charge, pointing to the urgent need for debt reduction and restructuring

The insistence on the part of the European Union on free market economy and the dynamization of the private sector fits perfectly with the market-oriented strategies of the European countries. But *safety* nets should be put in place in Partner Countries to limit the negative fall-out of worsening labour conditions and markets because of industrial closures and bankruptcies, or economic restructuring in privatized enterprises. We should not forget that the social cost of structural adjustments and trade liberalization can be immediate and unbearable, while the beneficial impact is conditional, and needs time to materialize; moreover, privatization per se is not a magic recipe. Transforming a public monopoly into a private monopoly does not constitute a solution to economic stagnation. This is why joint ventures should be encouraged, stock markets developed, and banking systems revitalized.

Safety nets need to be implemented in MPCs to mitigate the immediate effects of economic restructuring in the bridging period until its benefits can materialize

In other words, the role of the state should be redefined. Obviously, the state can no longer afford to insulate the national economy from the global market. It should allow for greater participation of private economic actors, keeping to itself the role of arbitrator between interest groups, referee in economic disputes, regulator of markets and provider of an institutional framework that reduces transaction costs. At a time when the state is no more the employer of final resort, it is essential to ensure that the private sector becomes pivotal in labour redeployment, in vocational training and in job-creation. In this area, the European Union should provide advice, training and financial assistance, and an expert monitoring group on privatization schemes should be set up.

The EU has a role to play in providing consulting, advisory, financial and training assistance in the MPCs' move towards greater private sector activity

This relates intimately to the question of foreign investments as well. The 12 Mediterranean Partners attract annually only a tiny share (less than 2%) of European foreign investments. The reasons behind this fact are obvious: the fragmentation of Mediterranean markets, social and political instabilities, economic uncertainties, lack of transport infrastructure, insufficient training of manpower, administrative backlogs, inadequate legal and institutional infrastructure, wide-spread corruption and the authoritarian nature of governments; all these deter the establishment of new business and reduce the attractiveness of the region for new investors.

To the problems of debt, of social cost of structural adjustment, of the tortoise-paced increase of foreign investments, one can also add: the continuing political conflicts, the configuration of demographic transition and its impact on the labour markets, the region's untapped potential, and finally the increasing disillusionment with the stalled peace-process in the Middle East and its negative spill-over on the Barcelona process. The inference that can be drawn from the Malta second ministerial conference (April 1997) announces failure to force intra-regional economic relations ahead of political settlements in the region. The outcome of the Economic Summit held in Doha (November 1997) serves to confirm this.

Science and technology: the missing dimension of EMP

One major issue in Euro-Mediterranean relations seems, however, to be neglected and overlooked: it is the Science and Technology

Policy, which is the under-explored dimension of Euro-Mediterranean Partnership. Science and Technology co-operation is mentioned in the effort but no clear political will is apparent on the part of the European Union to assist the Mediterranean Partners in building up high value-added science and technology-led growth, to upgrade their scientific potential, and to push for better scientific and R&D co-operation.

A large share of the blame lies with the Mediterranean Partner countries themselves. With the exception of Israel, the Mediterranean Partner countries, mainly the Arab countries, have been very slow to discover that foreign investment is no longer attracted by cheap labour, that the low level of labour training does not prepare for international competitiveness, and that the turn-key technology dependent policies, although necessary in an initial stage, are totally inadequate and even detrimental to economic growth in the long term. Energetic proactive science policies are needed. The scarce resources devoted to Research and Development (± 0,2 - 0,5% of total GDP) and the rudimentary nature of science and technology systems have slowed down the development of science-based industries and hindered innovation in the traditional industries. Antoine Zahlan, one of the leading Arab experts in Science and Technology policies, reports that in 1995, Arab scientists published 7,077 articles and notes in internationally refereed journals, mainly in clinical medicine and applied chemistry. As measured in terms of numbers of publications per million inhabitants, Arab world output that year was 26; in contrast Brazil was 42 and France 840.

Yet in 1995, there were some 10,000 full-time researchers, and 50,000 Ph.D. professionals in Science and Technology in the Arab countries. But the low R&D budgets and the absence of Science and Technology Infrastructure limit their productivity (Zahlan's publications in the Arab Unity Studies Center, Beirut). Similar results have been reached in other recent studies, e.g. (i) the research into Science and Technology issues in the Maghreb Countries (Djeflat, A. and Zghal, R., 1995) and (ii) the research on Science & Technology Policy Systems in selected Mediterranean countries (Hardy, P., 1997).

Training, including S&T-enhanced training, is an important element in raising skills and wage-earning potentials in the MPCs. In light of this, an enhancement and careful weighing of emphases and resources across primary, secondary and tertiary education, including professional training, is in order.

The European Commission is strategically placed to become a catalyst for promoting greater interest in Science and Technology within the Mediterranean Partner Countries. Commission programs should offer consultancy to promote indigenous technological skills and scientific capacity, to help unpack imported technologies, to limit the destructive environmental effects of certain technologies, and to ensure an uninterrupted flow of scientific and technological information to potential Mediterranean users.

Summing up

The Euro-Mediterranean Partnership is a difficult process fraught with contradictions and difficulties. At this stage nobody can tell whether it will lead to shared prosperity and political stability in the Mediterranean. To achieve its declared goals, EMP should preserve the Barcelona momentum, mobilize political wills, involve civil societies, capitalize on human resources, and bring societies closer

Other problems include the low level of foreign investments in MPCs, continuing political conflicts, migratory movements and their impact on the labour force, the unexploited potential of the regions and increasing disillusionment with the stagnant peace process in the Middle East

One under-explored issue in EMP relations is that of assistance to MPCs in promoting Science and Technology Policy, with a view to fostering indigenous technological skills and scientific capacity, technology-led growth, innovation of traditional industries and better R&D capabilities

The EMP should also promote institutional and political reforms which will guarantee: bureaucratic efficiency, accountability, decentralization and transparency

through mutual understanding and cross-border business class exchange programs. It should also promote institutional and political reforms which will guarantee: bureaucratic efficiency, accountability, decentralization and transparency. Flow of money and trade liberalization without real institutional change might backfire and be counterproductive. Obviously there is a link between institutions and growth. Hence the importance of the issue of governance which incorporates the institutional dimension and the states' political reform to development. Finally, nobody should forget that the Mediterranean is a hub that is criss-crossed by many potential lines of conflict, in particular the Arab-Israeli conflict. Endeavours to put the peace process back on track should be pursued relentlessly if we want to progress with the Barcelona process. De-linking the two processes is impractical and counter-productive. Negative spill-overs can lead to total bankruptcy of the Euro-Mediterranean Partnership or, at best, to substantial delays in its materialization at a time when pressing problems require urgent responses.

About the author

Prof. **Bichara Khader** is Director of the Arab Study and Research Center at the Catholic University of Louvain (Louvain-La-Neuve, Belgium). He is a well-known expert in Euro-Arab and Euro-Mediterranean Relations. His last books include L'Europe et la Méditerranée: géopolitique de la Proximité, L'Harmattan, Paris, 1994; Le Partenariat euro-méditerranéen après la Conférence de Barcelone, L'Harmattan, Paris, 1997; L'Europe et la Palestine (forthcoming, end of 1998).

Keywords

Mediterranean Free Trade Area, science/technology policy, EU policies, regional development, foreign debt, EU foreign aid

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Technological Change and Economic Growth in the Euro-Mediterranean Region: Science & Technology Trends

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Issue: At present, the indications are that the technical-economic gap between Europe and the Southern and Eastern Mediterranean Countries (SEMCs) is widening, without the desired catching-up process taking place.

Relevance: The European Union proposed to set up a Euro-Mediterranean Partnership with the aim of developing a Euro-Mediterranean Free Trade Area (EMFTA) by the year 2010. The weakness of Science & Technology, especially in its relation to enhancing labour skills, is still identified as one of the major factors inhibiting the growth potential of SEMCs, particularly in terms of the relatively low levels of education and technological output shared by many of these countries.

Introduction

While the average figure for developing countries' expenditure on R&D was 0.65% of GDP in 1992, the corresponding figures for the European Union, Japan, and the United States were 2%, 2.8%, and 2.4%, respectively. The SEMCs, understood as all countries bordering the Mediterranean from Turkey to Morocco, including Jordan and Syria, but excluding Libya, mostly belong to this last group. They have a very low relative RTD expenditure (usually less than 0.5% of GDP) with the clear exception of Israel (2.3%). Algeria, Tunisia and Turkey are making strong efforts to emerge from this situation and are on course to reach 1% of GDP.

A comparison between SEMCs and the EU shows the existence of a clear economic gap. Furthermore, the economic growth rate of most SEMCs has been low. While for 1991, the average GDP per capita for the EU 15 was 15,350 US$, the combined SEMC average was 3,890 US$[1]. This figure reveals the magnitude of the disparities existing between both trading blocks, which is even larger when compared with the lesser performing SEMCs. It should be noted that large differences exist among the SEMCs; Cyprus, Israel, and Malta showing GDP levels within the range of EU countries.

Human capital: the mobilizing factor impacting economic growth

The levels of education and skills of the labour force among countries are identified in several studies (Sachs and Warner, 1996 and Easterly and Levine,1997) as a fundamental factor explaining income differentials among countries. Assuming the adoption of an open trading policy, a developing country with a well-

The weakness of Science and Technology, especially in its relation to labour enhancement, is still identified as one of the major factors inhibiting the growth potential of SEMCs

Low levels of spending on Research and Technological Development in SEMCs, coupled with low economic growth rates, are two indicators of the huge economic gap which exists between many of them and the EU

Education and training on all levels is seen as a way of promoting economic growth in SEMCs by equipping populations to absorb external technology on a specialist level and to increase productivity on a more general one

Educational policy priorities need to be defined to prepare the human resources available for targeted economic areas, taking maximum advantage of the training/education investment

Institutions, laws, rules and government policies are key factors in supporting wealth generation. Government policies largely determine levels of investment and productivity

educated and skilled labour force can take advantage of the technology produced world-wide more easily.

Training of highly-skilled scientists and engineers is an important input to absorbing external technology. University R&D is part of the training process and may have some spill-over into local industry.

There is evidence to support that economic growth and schooling levels are highly correlated everywhere. Moreover, the growth rate of the economy appears to be enhanced by increased emphasis on universal primary education (Barro, 1996). A bi-directional causation between education and growth is likely. On the one hand, as a country invests in education, productivity rises, with the ensuing rise in salaries of skilled personnel affecting the economic growth rates. On the other hand, as a country develops it can dedicate more resources to education. This starts a virtuous feedback loop between the level of education and productivity which can enable poor economies to escape from the poverty trap, but policies can largely affect the final equilibrium attained. Moreover, education is a public asset. It is therefore important to allow the whole population to benefit from investments in education.

Gómez y Paloma and Rojo de la Viesca (1998) find empirical evidence in this respect, showing that human capital is more important for stimulating growth in SEMCs than in the EU. However, it is necessary to implement educational policy priorities in primary, secondary and higher education that permit SEMC economies to absorb the human capital resources available. For example, if graduates cannot find jobs for their qualifications, a waste of skilled labour force occurs, as these skills are often not useful in traditional activities. Also, if skilled labour does not find a supportive economic environment that enables them to develop their capacities fully, a brain-drain can take place. Investment in higher education (including technical training) and government promotion of fields in which these countries can develop a comparative advantage, should strengthen their ability to catch up economically and to progress technologically.

The role of institutions in progress and wealth creation

Through continuous technological progress it is possible for an economy to experience long-term growth. Paradoxically, this source of wealth creation is often available to all. Today, technology is more easily transferred across borders than ever before. Progress in transport, communications and computers (e.g. Internet, technology transfer) have made it easier for poor countries to access the global economy. In addition, the existence of globalized financial markets has rendered the introduction and adoption of new technologies more accessible to developing countries. Therefore, additional factors must be taken into account to explain growth differentials between countries.

Two of these factors appear to be the availability of institutions and the degree of institutional evolution (North, 1990). Institutions determine the costs of acting in various ways and seem to play an important role in economic development. The existing institutions define the hospitable environment necessary to generate growth, while bringing the supportive environment that increases the confidence of foreign investors to set up new business and to encourage investments in SEMCs. Moreover, the availability of good infrastructures is likely to stimulate capital investments, the amount of foreign investment in technology transfer, the incentives for people to accumulate productive

skills and of entrepreneurs to develop new businesses. Institutions, laws, rules, and government policies are key factors in supporting wealth generation. In this respect, government policies largely determine levels of investment and productivity. The recent crisis in East Asia is a good example, proving that growth cannot simply be sustained by relying on technology imports, heavy savings, and investments in physical and human capital. Sound and stable institutions, such as an efficient financial and banking system, are also needed.

Technological progress: the engine of economic growth

Technological progress is the engine of economic growth in developed economies, in that it generates a virtuous circle which provides incentives to people for accumulating skills, and to entrepreneurs for initiating new businesses.

There is agreement on the notion that growth in less-developed economies can take place by learning from and imitating more advanced economies. This process requires a framework that promotes the diffusion and transfer of technology. In order to have the internal capacity to make efficient use of this technology, it is important to raise the level of skills and training of the population. This capacity can be introduced only after a certain level of development has been achieved. Furthermore, in less-developed economies, technological progress may open the possibility of competing not just in labour-intensive products.

Most SEMCs have not reached the stage of promoting their own research and development activities (R&D) to efficient levels. They often rely on technology produced elsewhere. Their national R&D systems should complement and support the technology acquired through technology transfer or imported capital goods. The adoption of foreign technology requires the existence of a trained and skilled labour force that is capable of adapting the technologies to the particularities of their national economies, enhancing the competitiveness of their industry.

There is a large diversity of R&D situations in the SEMCs, both in terms of human and financial resources. However, in general, science and technology have been recognized as an important area for future development. Most SEMCs have set up single institutions co-ordinating their R&D efforts and most have a science & technology policy, or at least a strategy for investment in science and technology. The Palestinian Authority and Syria appear to be exceptions in this respect (Hardy and Bontoux, 1997).

The growth rate is positively influenced by R&D spending, itself dependent on the availability of people with higher education. In the same way, the general improvement in the level of education is believed to have contributed to the world-wide growth experienced since the 1950's. As a result, academics of economic growth have long recommended investment in education.

Openness to trade and growth

SEMCs can clearly benefit from opening their economies further to foreign trade. For small countries, like most SEMCs, foreign trade enables the emergence of economies of scale. Therefore, to achieve a minimum efficient scale they should increase the amount of goods traded, especially with Europe, their main trading partner. However, successful penetration of the markets in industrialized countries depends on their ability to achieve high quality standards. This probably explains why maintaining quality and quality control figure prominently in the S&T priorities of many of the SEMCs.

The establishment of technological infrastructures in SEMCs is required to promote internal R&D activities which will complement imported technologies and adapt technology transfer to national requirements

Euro-Mediterranean Rtd Co-operation

G. Borsalino and M.N. Kayamanidou, *European Commission, DG XII*

As a complement to the bilateral co-operation projects of the Member States, the co-operation of the Community with Mediterranean countries in the field of research and technological development (RTD) has developed gradually since the mid-eighties. In 1992, the launch of the AVICENNE initiative, the first regional co-operation action, marked its effective start. The ministerial Conference "European Research and the Mediterranean" of Sofia-Antipolis, in March 1994, provided a new impetus.

The objective of this co-operation is two-fold:

- To contribute to the implementation of the Euro-Mediterranean Partnership;
- To help in the creation of "a Euro-Mediterranean scientific and technological area".

To this end, the future action of the Community should develop along three main lines:

- **Strengthening RTD capacities**: assistance with the definition of research policies; development of human resources; creation of infrastructures and networks.
- **Joint RTD activities**: undertaken on priority topics corresponding to the common interests of the countries of the region; these activities should also aim towards the development of a "Euro-Mediterranean Information Society".
- **Transfer of technologies and knowledge**: three topics are envisaged: the analysis of results of joint research activities, the stimulation of intra-Mediterranean transfer, and of the Euro-Mediterranean transfer of technologies and knowledge.

The main instruments which may be used for the implementation of these actions are, on the one hand, the RTD framework programme and its specific programmes, and on the other hand, the various programmes of bilateral and regional co-operation drawn up under the MEDA[1] Regulation.

The framework programme should be used to support of joint research activities and certain aspects of the strengthening of RTD capacities. A specific action pointing to the Mediterranean is set up under action II, "International Co-operation", of the 5th Framework Programme. Moreover, the Mediterranean Partners have the possibility of participating in the other specific programmes open to Third Countries.

Funds assigned to bilateral co-operation should also be mobilized to increase the research capacities of the Mediterranean Partners, in particular to facilitate the participation of teams in these countries in the Framework Programme's specific programmes.

On the whole, Euro-Mediterranean scientific and technological co-operation will only have the expected impact on the economies and societies of this region under the following conditions:

- Inclusion of **research and technology** in the **forefront of their priorities** by the Mediterranean Partners' **Governments**.
- Establishment of an **EC/Mediterranean Partners dialogue** on questions of **research policy**.
- **Improvement of the co-ordination** of the instruments available and of the actions implemented at the Community level.
- **Strengthening the means** assigned to the co-operation project with the countries of the Mediterranean region in the **Framework Programme**.
- **Strengthening the coherence** of the actions carried out at the European and national levels.

The guidelines corresponding to several of these conditions are outlined in the Commission Communication and in the Common Position adopted on February 12, 1998 by the Research Council of the 5th Framework Programme (1998-2002). They should take further shape during the discussions on the Specific Programmes.

Note

1- EC Regulation nº 1488/96, of 23 July 1996, pertaining to financial and technical support measures aiming to reform economic and social structures within the framework of the Euro-Mediterranean Partnership (hereafter "the MEDA Regulation").

However, beyond the need for co-operation with the EU for technology transfer, training, etc., and the achievement of higher quality standards, if the Euro-Mediterranean Free Trade Area is to bring benefits to its Southern region, the SEMCs will probably also need to specialize in the areas where they can enjoy comparative advantages. This presupposes, on the one hand, that these areas can be easily identified and on the other hand, that the economy is able to shift production factors to these areas.

Furthermore, the degree of openness of developing countries to foreign trade and the levels of trade flows with their industrialised partners offer them the opportunity of adapting and taking advantage of the technological advances generated elsewhere. This can happen both by importing capital goods and implementing the new technologies produced world-wide. The increased competition exerted by foreign trade on their industry is a stimulus for this shift. However, ultimate success depends on accompanying policy measures. For example, the successful opening up of Tunisia in the mid 1980s was accompanied by a foreign exchange policy that enabled the increase in exports of labour-intensive manufactured goods, such as textiles (29 % of total exports in 1987) and garments.

In addition, one should not forget that the trade policies adopted by developed countries, here by the EU, must ensure the correct functioning of the market. They must bring the necessary transparency, so that companies from the SEMCs can develop the correct strategy for penetrating their potential markets in developed countries.

SEMC priorities

In general, SEMCs appear to have understood the challenges posed by the coming EMFTA and its potential impact on their economies. However,

Quality and quality control have been identified by many SEMCs as a priority issue

SEMCs will need to concentrate on activities in which they can enjoy a comparative advantage, which will entail not only the ability to identify these areas, but the transfer of production factors to them

One priority common to all SEMCs is the need to integrate research and technological development into the socio-economic system

Technology transfer, acquisition of knowledge and joint research projects with developed partners are identified as the three main ways of increasing S&T capabilities in SEMCs

Human resources development is also recognised as a priority by all SEMCs

SEMCs all manifest a desire for S&T co-operation with the EU, mainly as a result of their large need for technology transfer and training to improve their own RTD capacities

the priorities identified by an IPTS survey[2] involving official representatives of 12 SEMCs (Hardy and Bontoux, 1997; Hardy, 1997) differ according to economic level and local factors, such as population, natural resources and infrastructure. The need to integrate research and technological development into the socio-economic system appears throughout all SEMCs. However, while productivity is especially mentioned by the Jordanian and Syrian representatives, employment, as in the European Union, seems to be an underlying issue in most of the countries surveyed.

Three main modes for increasing the science and technology capacity of the SEMCs were identified: technology transfer, acquisition of knowledge (e.g. buying know-how) and joint research projects with developed (mainly European) partners. For example, responses from Jordan, Lebanon and Morocco, indicated that technology transfer appears to be most important. Priorities indicated by respondents from Cyprus included strong interest in joint research projects with the European Union, while responses from Israel, Jordan, Lebanon and Morocco consider acquisition of knowledge as most valuable.

With the exception of Israel, which probably already has an adequate level of higher education, human resources development is identified as a high priority by all SEMCs. The representative of Israel mentioned industrial competitiveness as its principal high priority. Socio-economic development was identified as high-priority by all SEMCs, except Israel and Lebanon.

The most important specific industrial issues to be addressed by research and technological development have been identified. The three Maghreb Countries and Cyprus have identified the need to bring their SMEs to the European level, probably as a response to the objectives of the Euro-Mediterranean Free Trade Area. The response of Egypt adopts approximately the same stance. The response of Jordan places the emphasis on Total Quality Management (TQM), while those of Lebanon, the Palestinian Authority and Morocco stress quality control.

Environmental issues also figure prominently among the concerns of most SEMC, in particular in Cyprus, Jordan, Lebanon, Morocco and Syria. In general, pollution prevention ranks highly in all its aspects (sea pollution, air pollution, etc.), while sustainable development, clean technologies and water issues appear as specific areas of concern.

The desire to co-operate with the EU

The main objectives of RTD in most Southern and Eastern Mediterranean countries are to improve their own RTD capacity. This translates into a strong demand for training and technology transfer from the EU, hence their interest in co-operation. The broad priority areas are agriculture and food, environment and water, raw materials and energy (in particular renewables) with some particular high technology efforts (space in Morocco, advanced technologies and biotechnology in Egypt). The specific concerns vary widely across the SEMCs.

Co-operation is well developed, mostly between the EU and the SEMCs. Co-operation between the SEMCs themselves is less well-developed and mainly involves Morocco, Tunisia, Egypt and, above all, Israel. The main fields of co-operation are water, energy, environment, agriculture and public health. A greater level of co-operation among the SEMCs in RTD would be highly desirable, given the large number of shared concerns.

CNR Research and Training Program for Third Mediterranean Countries

E. Martuscelli, *CNR*

In recent years the Italian National Research Council (CNR) has recognised the importance of having an Office, such as the "Office for Scientific and Technological Co-operation with the Mediterranean Area" (SMED), to single out and co-ordinate training programmes and create new professionals, transfer technical and scientific results, and generally to develop Euro-Mediterranean co-operation. The CNR has established 51 networks involving research groups from Universities, Institutions and Industries in the framework of the "CNR Research and Training Programme for Third Mediterranean Countries". In such a framework great importance was attached to training activity, as well as to the organisation of periodical "Mediterranean Schools". To undertake scientific projects, the CNR singled out subjects and fields of activities that matched the priorities defined by the European Commission in the framework of programs such as MEDA and INCO-DC.

Due to its contribution to the development of scientific and technological co-operation in the Mediterranean area, the SMED has been selected by the Ministries of Foreign Affairs of Italy and Egypt to organise training activities to provide Egyptian researchers with specific experience in drafting projects within EU programmes for which they are eligible. The training and co-ordination activities will be carried out in the framework of the "Protocol on Scientific and Technological Co-operation between the Republic of Italy and the Arab Republic of Egypt (1998-2000), as concerns the area 'Business development' of the bilateral agreement. This activity is considered as a model that can be reproduced in many other countries, contributing both to the training of scientists and engineers and to increased research and development in the Mediterranean Partner Countries.

Enabling sustainable continuous growth in SEMCs: elements for a long-term strategy

An analysis of the success of the world's richest nations in the long term offers valuable lessons for understanding the determinants and, therefore, the policies and reforms necessary to foster technological progress and ultimately, economic growth, in the SEMCs. These determinants include:

- Introduction of economic and social infrastructures (rules, regulations and institutional establishments) that provide the correct incentives to individuals to make long-term investments in capital, skills and technology;
- Initiation of large reforms to improve economic efficiency (liberalization, privatization) and to promote welfare;
- Provision of market-oriented economic institutions to provide incentives for technological progress;
- Establishment of government policies that enable improvement of educational levels and skill-upgrading of the labour force, to permit the internalization of the opportunities offered by technological progress;
- Provision of a stable macroeconomic environment to encourage production.

These determinants complement each other and, ideally, should be introduced simultaneously. However, this is difficult because of the large amount of resources needed to be able to escape from the poverty trap. It is therefore necessary to pool national and international efforts to jump start a virtuous circle in those countries.

A greater level of RTD co-operation between SEMCs themselves would be highly desirable, given the large number of shared concerns

Keywords

Mediterranean Free Trade Area, science/technology policy, EU policies, technology transfer, education, training

Notes

1- These figures are compiled using data from the United Nations Statistical Yearbook (1995), based on GDP in purchasing power parity (PPP).

2- Respondents to the survey, which consisted of a number of detailed questions, were the SEMC members (comprising government-appointed civil servants and academics) of the Monitoring Committee for Euro-Mediterranean Co-operation in RTD (MoCo). The survey was supplemented by a literature review and review of official documents submitted by MoCo members. Finally, MoCo members reviewed the IPTS Reports, summarizing the survey's results.

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Competitiveness of Mediterranean Partner Countries' SMEs in the Euro-Mediterranean Zone

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Issue: In MPCs (Mediterranean Partner Countries), the contribution of small (0-9 employees) and medium-sized (10-24 employees) enterprises to employment generation and sustainable growth is significant. Since many of these SMEs are engaged in traditional sectors, it is assumed that the impact of the Customs Unions and of a Euro-Mediterranean Free Trade Area from 2010 will be harder on SMEs in comparison with the impact on large establishments.

Relevance: The creation of technology support systems, as well as technical assistance and training by international partners, especially by the EU, may provide keys to upgrading SMEs' competitiveness in MPCs. This would support the industrial policy of many MPCs which, through different kinds of incentives, is aimed at both promoting, the opening of new SMEs and further boosting those already in operation.

Introduction

SMEs play a pivotal role in the socio-economic fabric of MPCs. Their importance as factors in economic stability and social cohesion is increasingly recognised. Several regions are home to a number of family-owned small and medium-scale enterprises with a tradition extending over centuries. These firms are thus an integral part of the texture of the local communities in which they are rooted, and their continuity of being passed on through generations is assured.

In most of the MPCs there is an undeniably solid link between employment and SMEs. An explanation for this could lie in the historical dearth and the divergent nature of large-scale enterprises in these countries with respect to Europe. Put another way, the role played by middle classes in the economic history of each MPC has been modest *vis à vis* Europe's experience. The role has been taken up by economic actors such as local elites wielding military power or foreign firms that have only been marginally linked to the socio-economic fabric of MPCs in the last three decades. Also to be noted in this connection is the recently diminished role of the public sector as a provider of jobs and income in MPCs. This could reflect adoption of the various adjustment plans imposed by the International Monetary Fund and the World Bank on these countries. One of the necessary conditions for reopening credit lines called for a diminished government role in the economy.

SMEs account for a large share of traditional sector activities in MPCs and are likely to be the hardest hit by the effects of the European Free Trade Area

SMEs play a pivotal role in the socio-economic fabric of MPCs. Their importance as factors in economic stability and social cohesion is increasingly recognised, as is the solid link which they provide with employment

A priority issue in the economic policy of MPC governments is support for the creation of new SMEs and development of those already in operation

It is difficult to compile data on SMEs in MPCs due to lack of precise definition of concepts and the operation of many of them on the black market

With this background, it should thus come as no surprise that the MPC governments consider the creation of new SMEs and the further development of those already operating as a key issue in their industrial policy. The growing awareness of the strategic importance of these firms to their economy is also underscored by the establishment of ad hoc bodies. Examples include Algeria's creating of the Ministry of Small and Medium Sized Enterprises in 1992, Turkey's establishing of a department (KOSEGB) at the Ministry of Industry and Commerce to handle the problems of local SMEs and Israel's setting up of the Small Business Authority.

Moreover, some countries have devoted significant efforts to SMEs in reconstructing their production systems. For instance, Tunisia implemented its *mise à niveau* programme in September 1995, which features a far-reaching series of measures involving all areas of economic activities and including SMEs. Many MPCs have even announced, as part of their planned co-operation with the EU policies, that support to SMEs is among their immediate concerns, e.g. item 6.4 of the document accepted by all participants at the Euro-Mediterranean Conference of the Ministries of Industry, Brussels, May 20-21, 1996.

The aim here is not to present a full list of support measures for SMEs in MPCs, since, for instance, certain policy areas may deserve detailed discussion. On the contrary, this article is focused on three specific issues related to SMEs in which we believe our contribution, both in terms of statistics and observations, could both provide new empirical evidence on the important role of these firms in MPC economies, and trigger fresh arguments about a number of instruments and polices in their support.

These issues can be summarised as follows:

- The contribution of SMEs to employment and their sectoral characteristics.
- Technology policies and systems of innovation.
- The limits inherent in the assumption that the countries on the Mediterranean's southern rim can learn important lessons from the experience of the European 'industrial district' policy approach.

MPC SMEs and employment

Two efforts have been made here: collecting data for certain MPCs on small and medium-scale enterprises and harmonising the information.

Data on MPCs' economic activities are in general very poor compared with similar data in industrialised countries. In addition, a specific difficulty in collecting data on SMEs in MPCs concerns their large presence in the so-called 'informal' economy.

Unlike the EU, MPCs have not yet generally defined in a uniform and exact way what they mean by a SME. The results of our research indicate that the statistics of most MPCs define a small business as one with less than ten employees, while medium sized business are often defined as having anywhere from 10 to 25/50 employees (up to 24 in Jordan and Lebanon).

The different definitions of small and medium-scale enterprises adopted by the EU and MPCs make it difficult to compare EU and MPC SMEs. The comparison of the 'small' category could best be made between the micro-firms (0-9 employees) of the EU and the small ones of MPCs. On the other hand, medium-scale enterprises of the MPCs could be compared with small firms in the EU (10-25 employees).

Tables 1 and 2 below compare data on SMEs in MPCs. They indicate, for those countries with available data, that SMEs carry the most weight in Egypt, Jordan and Lebanon (Tables 1 and 2).

SMEs are found in every sector of the MPC economy and especially in labour-intensive sectors, such as agriculture, manufacturing and services, including commerce, tourism, transport, etc. For instance, 98 per cent of Turkish and 96 per cent of Lebanese SMEs are active in manufacturing. The concentration of SMEs in labour-intensive sectors could reflect the dearth of labour-saving technologies in MPCs.

SMEs are active in most MPC economic sectors, particularly labour-intensive ones, such as agriculture, manufacturing and services

Table 1. SMEs in MPCs, as against total number of enterprises

Country	Firms with less than 10 employees
Egypt[1]	94.7 %
Jordan	93.2 %
Lebanon	88 %
Gaza Strip[1] (Palestinian Territory)	± 56%
Tunisia	42.3 %

Source: Di Pietro, G. and Gómez y Paloma, S. 1998.

Table 2. SMEs and employment in MPCs

Country	SME share of national work force (%)	SME share of industrial-sector work force (%)
Jordan	60.7 %	60 %
Lebanon	-	73.3 %
Morocco	48 %	60 %
Turkey	56.3 %	-

Source: Di Pietro, G. and Gómez y Paloma, S. 1998.

Technology policies and systems of innovation

To date, technology support systems for SMEs in most MPCs are not a widespread phenomenon. Nevertheless, some important initiatives have been taken in this direction by some of them.

Egypt has set up several BTDCs (Business & Technology Development Centres) to provide consulting, marketing and human resources services to promote the development of its SMEs. Tunisia implemented the "Fund for the Promotion and Use of Technology" in 1994 to boost R&D projects for its SMEs. Turkey has established two technology parks through its SMIDO (Small and Medium Industry Development Organisation), in Istanbul and Ankara, which work in close collaboration with local universities to encourage innovation in industry. And Israel's Ministry of Industry and Commerce co-ordinates the "Technological Incubators", which provide the country's SMEs with technical assistance.

Widespread technology support systems for SMEs in MPCs are not commonplace, although initiatives have been implemented recently by Egypt, Tunisia, Turkey and Israel

It has become commonplace to hear several arguments for the adoption of a restricted group of measures to promote the diffusion of technology among SMEs, e.g. (i) establishing a closer and more efficient collaboration between universities, research centres and SMEs; (ii)

keeping SMEs abreast of new technologies being used in the various industries; and (iii) gaining a better understanding of the technological needs of SMEs.

By contrast, the attention is here focused on the impact of technology-oriented foreign direct investment (FDI) linkages to SMEs. Since the amount of FDI has been increasing very rapidly over the last decades in MPCs, we believe this issue may play a key role in the near future.

Foreign direct investment will be of primary importance to SMEs in MPCs mainly through the transfer of technology

The suggestion here is that FDI could be at the root of two different kinds of mutual advantage gained by both parties in the process.

The first, already well-known in economic literature, is based on the classical technology transfer concept. On the one hand, by investing in MPCs, multinational corporations could take advantage of both local cheap labour and gain close access to host countries' markets. On the other hand, local firms may improve as foreign firms enter the local market, use new technologies, provide technical assistance to their local suppliers and customers, and train local employees. As a consequence, relevant technology spill-overs may arise locally from the FDI of multinational corporations.

Advantage for direct foreign investors in MPC SMEs include cheap labour, access to local markets and acquisition of the SMEs' R&D results

The second type of mutual advantage, certainly less widespread in comparison with the first, stems from the possible benefits which foreign holdings could gain by controlling local high-technology firms. These basically lie in the profits which multinational corporations could make by acquiring the results of SMEs' R&D. A symbiotic relationship is thus created. Local SMEs need foreign investors in order to grow and to access global networks, while the latter can obtain important benefits from SMEs' know-how. Evidence on a significant number of Israeli small high-technology firms, which succeeded in penetrating global markets and networks, thanks to direct foreign investments financing their R&D expenditure, is presented by Felsenstein[2]. FDI are of considerable help to small firms in high-technology sectors which are likely to need relatively large financial means to invest in R&D in order to survive. At the same time, large foreign establishments could take advantage by exploiting local technology and thus creating a - two way flow, with a major technology output component from the MPC.

The importance of increasing the presence of foreign investment to boost local innovation is also strongly supported by Egypt. This country has been opening its doors further to foreign trade and aggressively seeking foreign investment, especially in the field of electronics and information technology (IT). Among its efforts to encourage investment, particularly in the field of IT, the government has launched a Technology Development programme offering highly attractive incentive packages to national and foreign investors.

The policy implications of this situation are that MPCs should adopt measures aimed at attracting FDI, thereby reducing the costs borne by foreign investors. In this context, important elements include stability of the macroeconomic environment, productive and efficient infrastructure and effective intellectual property protection systems.

Exporting the industrial district model

The industrial district model, mainly found in north-eastern Italy, is a system of production embodying small and medium businesses located in the same area and specialised in differing yet interconnected steps of the same production process. This sort of 'perfected' division of labour (from a socio-economic standpoint) enables SMEs

of a given district to benefit from external economies whose main effect is to reduce average overheads by lowering the costs of information without increasing the costs of co-ordination. This 'intra-mural' co-operation enables SMEs in the same industrial park to undertake a series of joint initiatives, as for example, in the fields of R&D and employee training, which helps to enhance their competitive profile in the global marketplace.

Several governments of the early industrialisers (mainly West Germany and Denmark), which rely on the widespread presence of SMEs, have pursued policies designed to reinforce inter-SME co-operation, using as a model the Italian industrial district system. For instance, the Danish government implemented a three-year, US $15 million programme (1989-1992) to promote the networking of numerous small businesses in terms of both production and organisation. Credit concessions for firms willing to co-operate in joint activities with other businesses, the introduction of the so-called network broker and the promotion of local business associations were the key provisions in pursuing the declared goals. Official Danish government data indicate that the programme helped to set up 150 networks involving over 1,000 firms.

Moreover, leaving aside the legitimate question of whether districts are to be seen as the 'natural' product of individual creativity and/or to what extent they are the result of public sector promotion, some doubts remain as to whether the district approach can be exported to the countries on the southern rim of the Basin. Basically these doubts arise from the following considerations:

- SMEs in MPCs are highly concentrated in manufacturing and therefore very few in services. Evidence from the European experience outlines the fundamental contribution of services-oriented firms to the industrial district's success. The success of the district is strictly dependent upon the presence of a relatively high number of service enterprises, the activities of which are complementary to those carried out by other firms located in the same area. An increase in the number of SMEs active in services in MPCs is needed to export the industrial district model.
- Since producer associations in MPCs, the historical evolution of which was hampered by the colonial power, re at present relatively young and therefore weak in most industries, the practise and culture of the association, which is one of the pillars of the districts' genesis, lags behind the European model.
- The relationship between large companies and SMEs in Europe is extremely different from that in MPCs. Historically, the establishment of a large number of SMEs in north-east Italy stems from the restructuring process of the Milan-Turin-Gênoa industrial triangle. This was based on a concentration of large plants shifting to a grouping of SMEs linked among themselves, but also with the large establishments. Most entrepreneurs of these small companies were former employees of the large firms and they took advantage of their past work experience to become major suppliers or subcontractors to their former enterprises.

The introduction of the industrial district model of production in MPCs does not seem likely to benefit SMEs, due to their primary concentration in the manufacturing sector

The strategic importance of sub-contracting to employment in Europe's manufacturing industry can be seen in a 1991 survey conducted by Eurostat, which shows that firms in the textile and aerospace industries linked to large companies through sub-contracts accounted for over 30 per cent of the total work force in both sectors.

In MPCs, on the other hand, many large companies belong to foreign-based multinationals which, apart from limited capital investment and the hiring of an often

Inter-SME co-operation in MPCs also appears restricted due to the lack of extensive links between SMEs and large enterprises as compared to that existing in the EU

small indigenous work force, are completely disconnected from the socio-economic fabric of the host country. Indeed, their organisational and production relations remain predominantly with the parent company's country or other industrialised countries. Because the foreign investors offer little assistance, the SMEs are forced to seek support almost entirely in the public sector, especially in strategic areas such as R&D.

- Despite all efforts by MPCs to date, the state of their infrastructures is often inadequate. There is little doubt that without their upgrading, especially in transport and telecommunications, it will prove particularly difficult for MPC governments to pursue policies targeted at creating integrated systems of SMEs, in which cross-over communications are of vital importance.

Integrated systems of MPC SMEs will also be difficult to pursue due to the their inadequate infrastructure, particularly in transport and telecommunications

Conclusion

To sum up, it is argued here that in MPCs (i) the dearth of SMEs in services; (ii) the relative weakness of producer associations; (iii) the absence of an interdependent relationship between SMEs and large establishments; and (iv) the inadequate state infrastructure, could lead to the ineffectiveness of policies aimed at reinforcing inter-SME co-operation in an attempt to transfer the industrial district model to MPCs.

As an alternative to the industrial district model, it is suggested here that the 'network approach' might be useful in strengthening MPC SMEs' competitiveness. Advances in information technology and transport are making it easier and cheaper for SMEs both to contact and establish relations, even if located in geographically distant areas. Thanks to technological progress, the division of labour, vertically and functionally, can also be achieved between SMEs situated in any location within the Euro-Mediterranean zone. The interplay of varying aptitudes for innovation and change of the networked firms, coupled with their productive specializations, may generate important economic advantages for SMEs.

Policies for strengthening MPC SMEs competitiveness can be based on a 'network approach'

In a recent study[3] on the evolution of trade relations between MPCs and the southern regions of Italy in traditional industries, it is argued that the significant enhancement in trade that occurred in the past five years can be interpreted as the result of the increased co-operation between SMEs located on the two rims of Mediterranean basin. Trade flows show that SMEs in MPCs increasingly produce finished labour-intensive goods, marketed on the final market by EU firms, as well as intermediate goods for EU firms.

Attention within the Euro-Mediterranean partnership should be oriented towards the identification of policy measures, e.g. the process of deregulation in MPCs, capable of stimulating the creation of international networks, one of the pillars of the possible co-operation strategies between the EU and MPCs. Furthermore, one would welcome examples of co-operation between the EU and MPCs, in which the activities with less value added are allocated to the richest regions, while the ones with more added value are located in the poorest areas.

Keywords

Mediterranean Free Trade Area, small/medium enterprises, technology transfer, competitiveness, regional development, industrial zones, training

Notes

1- Industrial enterprises only.

2- Felsenstein, 1997.

3- Schiattarella, 1998.

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Integrated water planning and management in the mediterranean

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Issue: In the Mediterranean, the annual availability of water resources is very imbalanced between the relatively rich and even overabundant North, and the poor to extremely poor South and East. A unique feature of this area is that water is one of the limiting conditions for sustainable development, increased quality of life and peace. Recognising the severity of the situation, it is necessary to consider the development of appropriate solutions while working on all of the factors liable to reduce pressure and avoid irreversible damage.

Relevance: The natural nonuniformity of water supply and water demand is increasing in the Mediterranean region, both as a result of population growth and of the intensification of human economic activities, notably in industry, thermal energy production and irrigated agriculture. This will affect the successful creation of the Euro-Mediterranean Free Trade Area, as well as the region's development perspectives. Appropriate responses and action plans from the European Union are urgently needed.

Water, a finite resource

Water is of primary importance in the Mediterranean region because, as a resource, it is scarce, fragile, unequally distributed and widely exploited

Water scarcity is often accompanied by poor quality

Water is certainly at the centre of ecosystems and human development. But in the Mediterranean region, water is all the more important because it is so scarce, fragile, unequally distributed and widely exploited. The hydrographic basins are broken up and also, several basins are crossed by national borders, making the resource common to several countries. Furthermore, some considerable water volumes stored in large deep aquifers in Libya, Tunisia, Egypt and Algeria are non-renewable resources and their use is consequently not sustainable.

Scarcity is often accompanied by poor quality, especially in the South, where water is often highly saline, reducing its utility. In Tunisia, 26% of surface water, 90% of water pumped from water tables and 80% of that from deep aquifers have a salinity of more than 1.5 g/l. Over-pumping has caused seawater intrusion into Israel's coastal aquifer, a substantial freshwater source. Some 20% of the aquifer is now contaminated by salts and nitrates from urban and agricultural pollution, and water officials foresee that a fifth of the coastal wells may need to be closed over the next few years.

Natural and renewable water resources are unequally distributed between Mediterranean countries. The four richer countries in water resources, France, Italy, Turkey and the former-Yugoslavia, account for 825 km^3/yr, over 2/3 of the water resources of the region (1179 km3/yr). But within each country, water resources are also unequally distributed. In Spain, 81% of resources

are located in the Northern half of the country; in Tunisia, the North (which covers 30% of the territory) provides 80% of the country's resources; in Algeria, 75% of renewable resources are concentrated in 6% of the land in the Mediterranean coastal border.

In terms of population (1995), the annual availability of water resources per capita is very imbalanced between the relatively rich and even overabundant North, and the poor to extremely poor South and East. While Albania and the former-Yugoslavian countries have over 10,000 m3/yr/inhabitant, figures for Gaza, Malta and Libya total less than 100. Eight countries, with a total population of 115 million inhabitants, now lie below the desirable resource threshold of 1,000 m^3/yr/capita. Naturally, tensions appear between needs and resources, particularly when irrigation is necessary. In six countries, with a population of 28 million (Israel, Jordan, Malta, Tunisia, Libya, Gaza and West Bank), water resources are below the extreme poverty threshold of 500 m3/yr/capita.

With rapid population growth and possible re-allocations between countries in the region, the availability per capita is likely to be further reduced in the region. For Israel, the availability per capita will be reduced to 190 m^3/year by 2030, including some 65 m^3 of recycled waste water. In many countries, water withdrawals exceed the limits of natural resource renewal and deplete the stock that cannot be renewed. Thus, Libya is making massive use of its "fossil" groundwater.

It is not only that the Mediterranean basin faces environmental problems of significant severity, but also that the ecological, economic and social changes are happening very rapidly. Increasingly, the challenge is one of how to accommodate competing and conflicting water demands in a rather "stressed" environment, and also to provide considerable improvements to the region, a subject to be developed in the context of this paper.

Hydro-policy requirements

All nations in the Mediterranean region have paid increasing attention to both streamlining existing administrative mechanisms and to introducing innovative institutional arrangements with regard to quantitative and qualitative aspects of their water resources. In the context of conceptual, methodological and administrative developments and policy initiatives, particular emphasis is placed on the need for integrated approaches; the mobilization of resources, personnel and facilities; in incorporating new or emerging professional practices and technological innovations.

A series of trends and developments are viewed as the backdrop to the crisis regarding water supplies and their utilization. Factors underlying this context of urgency include:

a) the high variance of water supply, resulting in dramatic fluctuations, exacerbated by periodic droughts or floods;
b) decreasing groundwater availability, coupled with contamination of a large number of aquifers;
c) deterioration of water quality, the result of intensive agricultural practices and of urban and industrial uses;
d) expanding agricultural uses and intensive irrigation developments;
e) increasing environmental concerns and ecosystemic considerations, including natural changes and anthropogenic disturbances in the surrounding environment;
f) rapid population growth and significant consumptive demands, especially as a result of shifts from rural to urban areas, and;
g) trans-frontier water dependencies, and challenging questions of overlapping and shifting political and administrative boundaries affecting shared water bodies.

The unequal distribution of natural and renewable water resources concentrates over two thirds of the region's total in only four countries

Faced with the rapid ecological, economic and social changes in the region, the challenge becomes how to accommodate competing and conflicting water demands in a 'stressed' environment

Factors underlying the context of urgency include: variance of supply, decreasing availability, deterioration of quality, expanding uses, environmental concerns, increasing demand and trans-frontier dependencies

In the context of the increasing Mediterranean water resources complexity, interdependence and vulnerability, there is an urgent need for intergovernmental integration, through co-ordination, co-operation and consolidation, of:

- **hydrological interdependencies** in terms of uses (rural, urban, industrial, recreational, etc.) and water regimes (i.e., surface and ground water, quality and quantity); and
- **political interdependencies** both in terms of horizontal co-ordination in space and vertical co-operation between levels of government units as well as across national boundaries.

There is an urgent need for intergovernmental integration, through co-ordination, co-operation and consolidation of hydrological interdependencies (uses, systems) and political interdependencies (governmental and trans-frontier co-operation)

If we were to summarise the on-going transformations in water resources, we should emphasise:

- ***conceptual breakthroughs***, including paradigms in terms of ecosystems, sustainability, complexity, predictive management, uncertainty, and interdependence of surrounding environments;
- ***methodological advances***, especially multi-purpose/multi-objective approaches, Decision Support Systems, Risk Analysis, and the implications of rapidly expanding computational prowess;
- ***organisational mobilization***, in terms of new administrative mechanisms, institutional arrangements, renewed interest in river basins, contingency planning, Alternative Dispute Resolutions, etc.; and
- ***contextual changes***, signifying the entire range of on-going and future quantity and quality problems, new areas of concern, shifting priorities, as well as potential socio-political intervention mechanisms (including pricing and water demand policies).

The end result of all such considerations can be summarised in *three interrelated Cs*: **complexity** or an entwining process of causes and effects resulting in the near inability to cope with any problems at all; **conflict** and the presence of increasing numbers of competing stakeholder groups and constituencies; and **control** or the need to cope with and adjust to complexity, interdependence, turbulence, uncertainty and large systems' vulnerability. Thus, developments in any environment can be seen as part of a cluster of threats and opportunities for developing water resources policies which recognise the needs for balancing three important dimensions:

a. **efficiency** or the growth in material development, so that a solid basis of economic sufficiency may be maintained;
b. **equity** or fair access of resources and consumption to different segments of the population at the nation's level and also across water sharing countries;
c. **effectiveness** or the overall significance of any policy *vis à vis* the pursuit of certain larger social goals.

The three fundamental tenets of water resources policies will have to be efficiency, equity and effectiveness

The water management "regime": a challenge for the European Commission

In the Mediterranean, demands for water will continue to expand as a result of both continued economic development and population growth. At the same time, broad questions of environmental preservation will persist and allocation patterns, especially of shared water resources, will continue to be demanding and controversial. Present water management arrangements are not well equipped to deal with the new planning spaces. There is simply a need to mobilise resources above and beyond the standard frontiers of countries, to emphasise the questions of interlinkages and trans-

Mediterranean dependencies, and an underlying quest for implementing action rather than making continuing diagnostic studies.

The creation of a water management "regime" may facilitate the emergence of mutually beneficial agreements among the local or regional actors, ensuring that friction does not lead to conflict. Simply stated, trans-national water agreements in the Mediterranean will become more prominent and urgent in the near future. Similarly, integrated management across water uses and jurisdictional boundaries is the key to sustainability. And the key conditions for successful water sharing remain those of equity of any agreement and of control by affected parties of their own water resources.

The threat of recurrent critical water shortages led to many official declarations, such as the Genoa Declaration of the Mediterranean Action (1985) and the Mediterranean Charter for Water in Rome (1992). During the 1990s, at least two more ministerial conferences on water were held with the participation of all Mediterranean countries. More recently, other efforts include the coming together of the European Union in co-operation with its Mediterranean partners in Barcelona, in November 1995, establishing the "Euro-Mediterranean Partnership Policy". These principles and objectives are an extension of earlier Declarations at the European Council level (Lisbon, Corfu, Essen and Cannes), as well as part of the European Commission's program of international co-operation through the Fourth and now Fifth Framework Programme for Research and Technology Development (RTD).

Water-related research and technology development has been a high priority, as expressed in scientific co-operation efforts in programmes such as AVICENNE and INCO-DC. Three lines of action have emerged in the context of scientific and technological co-operation between the European Union and the Mediterranean Partner Countries, namely: capacity building, joint research projects, and technology transfer. Most of the RTD projects implemented in this context address comprehensive management approaches directly or indirectly. These would include a mix of such considerations as natural conditions (e.g. aridity, global change); variety of uses (irrigation, municipal uses, water quality, effluent control, etc.); sources of supply (surface, groundwater, mixed); technological considerations (waste water treatment and reuse, desalination, use of renewable energies, etc.) and socio-demographic conditions (such as population growth, urbanisation, industrialisation, etc.).

RTD on the efficient use of water resources, as well as on the optimisation of water uses by the different users, is largely promoted by these programmes. Important results have been achieved so far and more research is undoubtedly needed. At present, however, the main weakness in most countries of the region is not a lack of knowledge, rather of planning, education and training, transfer of new technologies and implementation of existing regulations.

Conclusions

Essentially, water resources planning and management should combine a space-time-quantity-quality balance. To simply repeat that the Mediterranean Basin is a water-stressed area requiring consideration of both natural and socio-economic factors is no longer sufficient. What must be considered is a joint approach to the problems of water quantity and quality, as well as addressing the unique characteristics of arid or semi-arid climates, which make surrounding environments much more vulnerable to environmental assaults. In addition,

Integrated water management will be the key to policy sustainability, based on trans-national water agreements in which parties retain control of their own water resources

RTD projects on the subject have been promoted at the EU level and focus on comprehensive management approaches, including consideration of natural conditions, variety of uses, sources of supply, technological considerations and socio-demographic conditions

At present, the main weakness in most countries of the region is not a lack of knowledge, rather that of planning, education and training, transfer of new technologies and implementation of existing regulations

integration should reflect concern with trans-boundary water challenges and with policies and implementation mechanisms that transcend artificial administrative boundaries. No country in the region can be economically and socially stable without an adequate water supply. But supplies in the region are so tight *that only an equitable share of water resources will permit sustainable development.*

Sharing of knowledge, transfer of technology, and international co-operation at all possible levels are essential ingredients of visionary, anticipatory and co-ordinated water policies

Sharing of knowledge, transfer of technology, and international co-operation at all possible levels are essential ingredients of visionary, anticipatory and co-ordinated water policies. It is clear that water management must now integrate new ecological values and broader criteria of sustainability. Both new socio-ecological values and the search for sustainable development require more information, knowledge and wisdom, which, in many regards, are forcing us to consider the challenges of risk and uncertainty involved in rapidly changing environments. Three main issues in RTD planning and policy have become apparent and require further development:

The three main issues in RTD planning and policy are the need for new paradigms, the understanding of new concepts and the emergence of new technologies

1. The need for **new paradigms** that would incorporate increasing preoccupation with sustainability, social indicators of development and ecosystem maintenance; the shift from multi-disciplinary integration; a perceived transformation from crisis to risk management; and imaginative approaches to complex considerations, rather than exclusive preoccupation with hierarchical, linear systems.
2. The understanding of **new contexts**, reflecting complexity and rapidity of change, new trans-frontier regimes, globalization and interdependence; global change and climatic anomalies requiring new conceptual models and theoretical propositions;
3. The emergence of **new methodologies**, addressing cumulative, synergistic, diachronic impacts and consequences of natural and human factors; emerging Decision Support Systems (such as GIS and expert systems) that combine data, information and judgement; benefiting from rapidly-increasing computational prowess and new complex multi-factorial models; improved risk assessment and vulnerability analysis; integrated, comprehensive management schemes, network analysis and organisational mobilisation; and anticipatory scenarios, contingency planning, and expanded policy options.

This is the policy context. The water initiatives of the European Commission in the Mediterranean, combined with the Fifth Framework Programme's International Co-operation activities, could serve as an efficient tool providing dynamic leads for future research in integrated water management.

Keywords
EU policies, integrated water management, water policy research, sustainable development, equitable water share, policy initiatives, Mediterranean water policy

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Mediterranean Co-operation and the new Information and Communication Technologies

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Issue: Information and Communication Technologies (ICT) are a particularly important means of catalyzing the three primary objectives adopted in the Euro-Mediterranean Conference of Foreign Ministers (Barcelona, November 1995): improved political dialogue; strengthened social and cultural ties; and enhanced economic and financial co-operation in support of the creation of a Free Trade Area.

Relevance: Co-operative actions between the EU and SEMCs in the field of ICT could provide mutual knowledge and understanding in all the three areas mentioned above.

ICT at the centre of the Information Age

ICTs are the nervous system of contemporary society, transmitting and distributing sensory and control information, and interconnecting a myriad of interdependent units. Because these technologies are vital to commerce, control, and even interpersonal relationships, any change in ICT technologies has the potential for profound impacts on virtually every area of society (Grant, 1997).

Information technology is an indispensable tool in the effective implementation of socio-economic restructuring processes, particularly in respect of networking

The information technology revolution has induced the emergence of informationalism (Castells, 1998) as the material foundation of a new society. Under informationalism, the generation of wealth, the exercise of power, and the creation of cultural codes depended on the technological capacity of societies and individuals, with information technology as the core of this capacity. Information technology has become the indispensable tool for the effective implementation of processes of socio-economic restructuring. Its role is particularly important in enabling the development of networking as a dynamic, self-expanding form of organization of human activity. This prevailing, networking logic transforms all domains of social and economic life (Castells, 1998).

Filling the gap

The socio-economic profile of the gap between the EU and SEMCs has already been reported (Bonazzi and Gómez y Paloma, 1997). Although these authors stressed the economic level as the most obvious one separating the EU from SEMCs, differences in social, cultural, political and technological aspects are also of great magnitude. Emphasis is placed here on the technological gap, with particular reference to ICT. The current situation in SEMCs shows

considerable differences both in the availability and quality of ICT infrastructures and in the generalization of the use of applications and corresponding training.

If we take as an example the number of telephone lines per 100 inhabitants (Figure 1), three groups of countries are observed: (a) >30 lines, (b) 10-30 lines, and (c) <10 lines, which illustrates the existing gap in telecommunications facilities between the EU and SEMCs. In 1995, as an average, the gap could be quantified in terms of 44.2 lines for every 100 inhabitants in the EU, as against 4.2 lines in SEMCs. Infrastructures are inadequate and a high level of investment is needed to improve the situation of little and outdated equipment. The installation of new networks requires major investments which cannot be entirely self-financed (see ERCIM, 1997). The demographic growth rate is aggravating the situation further.

It seems clear that SEMCs lag behind the EU in terms of telecommunication infrastructure development. However, certain countries (Israel, Cyprus, Malta and Turkey) are not that far behind, and remarkable progress has been made in certain areas: digitalization, data transmission, mobile communications, satellite and fiber optic communication links. (See ERCIM, 1997).

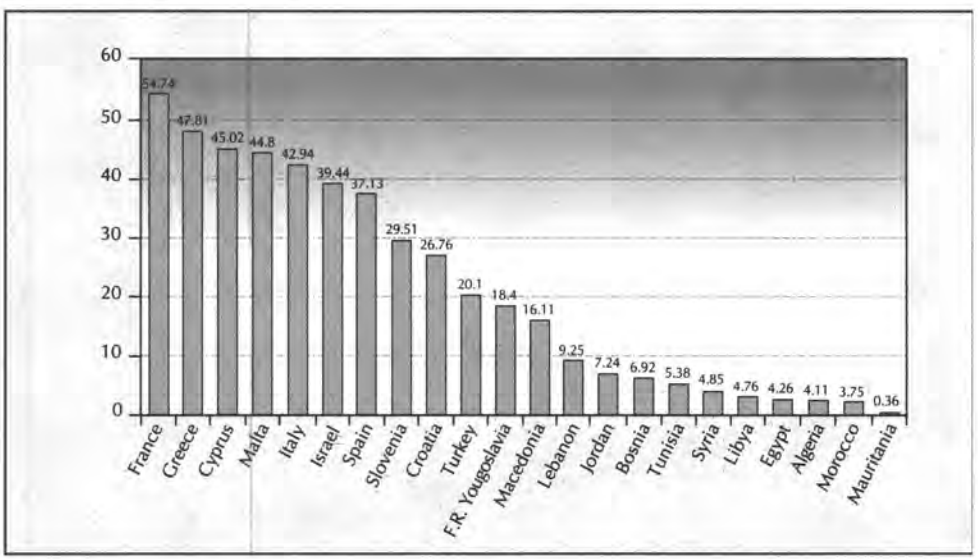
Connection to the Internet used to be very limited due to insufficient international band width and lack of connectivity between Mediterranean countries. Although the academic world pioneered the development of national networks in the 1980's, the private sector, followed by government agencies, have only recently become aware of the potential of such technologies. Internet connections have grown exponentially since 1994 and all SEMCs, with the exception of Syria, are now connected.

In general, technological dependency and technological underdevelopment, in a period of accelerated technological change in the rest of the world, make it literally impossible for SEMCs to compete internationally either in manufacturing or advanced services.

The large gap in ICT between the EU and SEMCs is reflected both in the availability and quality of infrastructures, and the level of use of applications and corresponding training

Large investments are needed in SEMC telecommunications infrastructure development

Figure 1. Telephone lines per 100 inhabitants in EU and SEMC



Source: Data from ITU, World Telecommunications Development Report, 1995.

The development of a modern and efficient telecommunications network co-operation should be focused on information and telecommunications infrastructure, regional infrastructures, access to services, and new services in priority fields of application

To date, international forums on ICT co-operation have proposed very few specific actions to be implemented for improvements in the domain

Difficulties of introducing ICT in SEMCs are mainly due to inadequate infrastructures, lack of human, material and financial means, and insufficient know-how

Technology can clearly play a pivotal role in bringing different levels of labour productivity up to par. Accordingly, the prospects for technology transfers all around the Mediterranean regions, as a supporting tool in a global process of restructuring different economic sectors, would be highly desirable, thus contributing to a broader context of the Euro-Mediterranean policy.

As specified in the Barcelona Declaration, the development of a modern and efficient telecommunications network co-operation should be focused on information and telecommunications infrastructure, regional infrastructures, access to services, and new services in priority fields of application.

Guidelines for the Euro-Mediterranean co-operation in the field of ICT

Many international forums have been held in which experts on technologies around the Mediterranean have urged more determined and precise actions to establish active co-operation on Information and Communication Technologies. However, if we analyse the contents of these meetings, most of them are focused on a general memorandum of understanding, with few specific actions for implementation. The main difficulties observed by various experts are related to:

- Unequal telecommunication infrastructures in Mediterranean countries. We must be aware, for instance, that telephone coverage in most countries of the Southern Mediterranean is more than insufficient.
- In general, there is an unequal social appropriation of ICT, with different phases of extension to society depending on the country.
- Differences in economic development, and in public and private resources allocation for providing the necessary infrastructures in preparation for the future information society.
- Small and medium enterprises (SMEs) have not yet introduced -all telematic advantages into their production, management and marketing processes. This is more apparent in SEMCs. This fact actually prevents the creation of business network-exchanging information.
- Cultural diversity would partially explain the different degrees of ICT acceptation and assimilation.
- Public authorities and administrations in SEMCs have not allocated enough material and human resources for the generalization of these technologies. This situation is also due to a distrust of new technologies, since its consequences cannot be controlled.

Faced with these problems, which prevent the generalization of ICT presence, especially in SEMCs, with the exception of Israel, many international conferences - from the Barcelona Declaration to the II Civil Forum Euromed - have agreed in establishing the advantages of ICT generalization in Mediterranean societies. We observe, among others:

- Generally, we associate ICT with an increase in competitiveness. Nowadays, automatized processes in enterprises have enabled improvement of their products, the obtaining of quality certificates, production flexibility, much more suited to SMEs and, therefore, increased competitiveness of enterprises.
- In the 1990s, economies with a higher degree of technological introduction have generated the highest number of jobs. The latest surveys show a confirmed relationship between ICT and job creation, particularly due to the increase in service enterprises. Looking to the future, creating jobs in Southern countries is an essential challenge and ICT can contribute to achieving this objective.
- In the medium term, the introduction of Southern countries to international telematic networks could mean an increase in quality of

life, as a result of this technology's contribution to net production processes. Furthermore, it favours a greater and more rapid control of human activity impact on environment. This already justifies the joint action of Mediterranean countries, since these are problems that transcend national borders. It would be self-defeating to try to seek solutions only within a national framework.

International experts have proposed working areas that would benefit from joint international planning. On the one hand, they refer to the necessity of creating and/or using basic support infrastructures for ICT, especially in SEMCs; on the other, they focus on collaboration related to the training of human resources and the creation of marketplaces which could help enterprises and, therefore, economic growth. Finally, the interconnection of territories must be promoted through telematic networks, not only on a national, but also on an international one. In this way, it would be feasible to attempt to provide joint solutions to problems that are common throughout the Mediterranean area, that do not recognise borders, such as those related to environment.

Three focal points of Euro-Mediterranean collaboration could be ICT basic support infrastructures, training and networking throughout the Mediterranean regions

In the field of human resources training, a key point of competitiveness, international recommendations have focused on:

- Basic research in ICT. This means allocating more public financing to R&D, as well as greater commitment of enterprises to R&D investment.
- Co-operation between university and enterprise, which is still an objective to be achieved in all Mediterranean countries, even the European ones. This would involve sharing information on research and technical applications dedicated to goods production and customer services.
- Education and training, creating joint education programmes and multimedia materials that could be approved and applied to all different cultural realities of Mediterranean societies.
- In business and commerce, recommendations are based on creating collaboration networks among enterprises in different countries, mainly in the fields of information exchange on products and new material applications, marketing and commercial relations.

Support to human resources could revolve around research activities, co-operation between universities and business, training and education and the creation of collaboration networks between enterprises

Examples of co-operative telematic projects

Civil society has raised a broad range of issues in the field of telematic applications. Some of the projects active in this area are the following:

- Communication and information systems based on an Internet server, to act as a gate for all available information in the network related to SEMCs.
- Development of a virtual University for Tourism and the Culture of Peace started by Club Mediterranée. Its main objective is the education of young people and specialization in subjects such as tourism, sustainable development, peace and intercultural understanding. Israel, Morocco and France are participating in this project which is due to begin in September 1998 and spread to Tunisia and Sicily.
- A Mediterranean system certify professional capabilities. The aim is the potential opening of the labour market to workers from SEMCs. Under this system, any worker could confirm his or her professional background and expertise, and be certified at an international level. The project is led by the Institut de la Mediterranée, with the collaboration of the ASCAME network, which groups together the Chambers of Industry and Commerce in the Mediterranean. The project will start during the first half of 1998.
- Since 1995, the project Alexandria Virtual Library is working on the development of a

The development of ICT infrastructures and applications could support and promote the three basic tenets of the Barcelona Agreement: political and social, cultural and human and economic and financial

documentary network of Mediterranean heritage. The aim is to create a public library and an international research centre to deal with the cultural, scientific and economic aspects of the Mediterranean region. The Library will be available via Internet or off-line via CD-ROM.

- CAPMED project is a database of Mediterranean television archives available on-line. It is based on the construction of a multilingual and multimedia database available through the Internet. Tunisia, Italy, Spain, Greece, Algeria, Jordan, Lebanon, Egypt, and Morrocco are participating in this project.
- Telemedicine project. This project deals with the telematic transmission of radiological images (teleradiology) between hospitals, so as to help in the diagnostic process and in co-operative research projects. This pilot project is being carried out between the Child Hospital of Timone (Marseilles) and a Tunisian hospital.
- Many different institutions from all over the Mediterranean are collaborating in the Telecities project. The project gathers a whole range of telematic applications useable by Mediterranean cities with a specific need: urban, transport, cultural co-operation, historical heritage, etc.
- Electronic Data Interchange (EDI) project, presented by API, deals with commercial transactions among Euro-Mediterranean SMEs. The objectives of the project are to promote a better organization of SMEs, together with making more services and products available for clients. Groups of SMEs will work together on interchanging information and experiences through the network and the EDI. The initial sectors will be textiles, automobile components and electronics.

Conclusions

All three chapters, i) political and security; ii) social, cultural and human; iii) economic and financial of the Euro-Mediterranean Partnership established in the Euro-Mediterranean Conference of Foreign Ministers (Barcelona, November 1995) can benefit directly from the development of infrastructures and applications in the field of new information and communications technologies. They would also benefit from actions:

- To strengthen the conclusions of the Istanbul Conference (October, 1996) on private participation in infrastructure in the Middle East and North Africa, in terms of supporting the efforts of Mediterranean governments to bring increased competition and private capital into the provision of infrastructure services such as telecommunications and electricity generation. Although extensive state programmes of deregulation and privatisation within the telecommunications sector have been launched, the process is far from complete.
- To promote the liberalization of ICT markets in the Euro-Mediterranean Free Trade Area: electronic mass media, computers and consumer electronics, telephony and satellite technologies.
- To financially support the development of the multimedia industry in collaboration projects between EU and SEMC institutions, promoting a whole range of applications in different fields (public health, distance learning, self-training, tourism, environment, transport, etc.)
- To support the priority training and education of human resources in ICT, as a measure to integrate SEMC users into the international context.

Keywords
information technology, telecommunications, Mediterranean Free Trade Area, information/communication policy, information/communication infrastructure

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CAP and the Euro-Mediterranean Free Trade Area: Regional Lessons

Matteo Bonazzi and Sergio Gómez y Paloma, *IPTS*

Issue: The creation of a Euro-Mediterranean Free Trade Area (FTA) by 2010 figures prominently in the policy agenda. Its implementation will affect rural areas and the associated agro-food systems, particularly in the Mediterranean area.

Relevance: Questions of agricultural policy, taking CAP reform into consideration, will have to be addressed in the context of the Euro-Mediterranean FTA. This is especially the case, since (i) local agricultural production and technological systems play a pivotal role in socio-economic realities of less-favoured Euro-Mediterranean regions and (ii) many of these areas are experiencing a phase of industrialisation which will impact on rural employment and economy, natural resources, cultural patterns and landscape diversity.

Within the framework of negotiation of the free trade area, agricultural policy will be of primary importance for its possible impacts on less-favoured Euro-Mediterranean regions

In the thirty years after creation of the European Community, it moved from an initial situation of food deficit to the current accumulation of large surpluses

EU: from agro-food deficit to CAP surplus

When the six European Countries federated themselves into the European Communities at the end of the 1950s, their economies were characterized by a food deficit, which is why the agro-food sector features so strongly in the Treaty of Rome (1957) and the focus of the Common Agricultural Policy (CAP) became so predominantly production-oriented.

The main task of the CAP was to raise farmers' income by a system of (i) 'target' prices - related to specific commodities; (ii) 'levies' - keeping the import price above the 'target' price; (iii) 'intervention' prices - fixed below the 'target' price and used to buy and store a fraction of the domestic supply when the latter is abundant and could lead to a fall in price.

This system has strongly encouraged an increase in output, so that in less than three decades, agriculture overcame the deficit and accumulated large surpluses. At the same time, criticism has been levelled at the high costs of CAP, with approximately about three quarters of the Community budget absorbed by agriculture[1].

Meanwhile, environmental problems emerged in connection with EC agriculture, e.g. the excessive use of mineral, chemical and mechanical inputs contributing to an increase in soil, water and air pollution, as well as biodiversity depletion.

Furthermore, EU labour productivity in agriculture grew faster than in any other sector in the post-war era, and reduced EU agricultural labour to less than 6% of the work force.

The CAP reform, which started in 1992, is progressively shifting from price support to direct

payment, in order to fulfil the goal of reducing surpluses as well as CAP costs. Agenda 2000 - the major EU document concerning the European future - and, implicitly, the challenge of enlargement, takes one step further by including social, environmental and cultural issues[2] and highlighting the multi-functional role agriculture should play in the future.

This approach is expected to have a great impact on the creation of the Euro-Mediterranean integrated space, as clearly manifested by the documents resulting from the Barcelona Conference[3]. These prospects raise new questions related with the possible repercussion and impacts associated with the setting up of the Euro-Mediterranean Free Trade Area.

Lessons for the forthcoming Euro-Mediterranean integration process could therefore be drawn from an analysis of the dynamics of industrialization of the EU agro-food industry that has been taking place in recent decades. In this respect, we shall proceed to examine Spain's joining of the EU in the mid-eighties.

Modernization and integration: Spanish olive oil in the agro-food context

Since joining the EU, Spain has undergone a radical modernization of its olive oil sector, traditionally characterized by a low level of capital and technology.

In fact, over the last decade, the incentive constituted by EU subsidies has been encouraging the progressive introduction of a production model characterized by strong specialization in one or few crops and high-labour productivity, without taking into consideration its negative externalities on environment and society. This has dramatically increased its competitiveness. Thanks to the increasing degree of capitalization, a clear process of "industrialization" has been taking place, i.e. the progressive substitution of technology for manpower, pushing the whole production chain towards the maximization of quality, production and productivity.

Although the income of almost all Spanish olive farmers and processors has increased through this process, the actors who have benefited most are (i) those whose higher income allowed a better access to capital and technology, i.e. landlords and large farmers; (ii) companies selling technological inputs (e.g. machinery, agrochemicals) and groups marketing olive oil, the most profitable phase of the value added chain. The result has been a growing market for larger quantities of higher-quality and relatively cheaper produce.

On the other hand, the industrialization process of the olive oil production system has developed significant negative impacts, i.e. over-production, depletion of soil fertility, rupture of traditional socio-economic balances in marginal areas, etc. Accordingly, the impacted categories can be summarized as follows: (i) olive farm casual labour, whose work is now done by machines; (ii) the over-exploited environment and landscape; (iii) small farmers, whose lower capitalization as well as poorer economic efficiency cut their access to the market; (iv) cultural systems associated with traditional production patterns; (v) EU citizens, who bear the socio-economic costs of overproduction[4]; (vi) small-medium farmers who might reconvert to less efficient systems and are still paying for significant economic investments that have not yet been amortised.

The Euro-Mediterranean agro-food

Similar dynamics could occur in the Euro-Mediterranean space following analogous patterns of industrialization within its overall agro-food sector.

Agenda 2000 envisages the multi-functional role that agriculture should play in the future, including social, environmental and cultural objectives

The experience acquired through the industrialization process of the EU agro-food industry can serve as an example for the forthcoming Euro-Mediterranean integration process

The example of Spain illustrates how EU agricultural subsidies have led to greater capitalization and industrialization in the sector

Industrialization has affected rural employment and the economy, natural resources, cultural patterns

Agro-food policy in the Euro-Mediterranean space requires the definition of sustainable agro-food production systems which incorporate political, socio-economic, environmental and cultural perspectives

Agriculture is the main economic activity in terms of employment in Mediterranean Partner Countries, 40% of the population being active in the sector in 1991

Although traditional production systems still account for the majority of the MPC agricultural structure, there is a trend towards capturing future, high added value EU niche markets with products such as citrus fruits, tomatoes, olives and cut flowers

In this regional prospect, the political, socio-economic, environmental and cultural concerns clearly indicate that alternative sustainable agro-food production systems have to be considered, especially in fragile Mediterranean agrarian contexts. Accordingly, a new impetus is required at EC, Member State and regional policy levels to define an innovative framework of goals for agriculture, which should push forward beyond the sole principle increasing production.

This issue is particularly delicate in many of the Mediterranean Partner Countries (MPC): Southern and Eastern Mediterranean Countries involved in the FTA Barcelona process. Despite the assessment given by traditional indicators of development based solely on economic parameters[5], other socio-economic indicators show significant degrees of poverty, comparable with Cuba, Vietnam and the Philippines. These new indicators[6] integrate economic information with the degree of education and nutritional state which characterizes a given population. The inference is that there will be urgent needs to increase food consumption as populations grow and life styles improve.

Additionally, MPC agro-food export has been strongly decreasing over the last three decades; in 1970 it was the first export industry, becoming the fourth, after energy, manufacturing and minerals in the 1990s in several countries. Nevertheless, MPC agro-food still remains the pivotal economic activity in term of employment, 40% of the total MPC labour force being occupied in agriculture in 1991[7].

It is important to highlight, in quantitative terms, that micro and SMEs are clearly an important production structure in this part of the Mediterranean. This is witnessed by the fact that in several MPC such as Turkey, Algeria and Tunisia, a large proportion of farms (between 32% and 41%) manage less then 20 hectares. The vast majority of them involve dry-farming, using a modest quantity of chemical and mechanical inputs in comparison with Southern Europe[8].

As a consequence, the 'traditional' production system still seems to be the main actor in MPC agriculture, although it has been partially replaced by more modern approaches during recent decades. In fact, an analysis of the current trend shows that MPCs are progressively orienting their agrarian policies to strengthening selected high added value agri-food production, in order to exploit the few new niches of the EU market which the Euro-Mediterranean Free Trade Area is supposed to open, e.g. citrus, tomato, olives, flowers. This is expected to induce a progressive industrialization of the associated production systems and to increase competition between MPC and EU producer countries as well as among MPCs themselves.

Multi-functional agrarian space in the Mediterranean?

This shaping of industrialization processes of the agro-food sector extended in both the Mediterranean EU and MPCs will lead to benefits as well as negative impacts. In fact, agro-food output is expected to increase, together with pressure on human, natural and cultural resources.

Alternatively, it is clear that 'multi-functionality' could become the main challenge and forthcoming focus for agriculture in the EU as well as in the Euro-Mediterranean space[9]. This implies the development of (i) joint multi-crop and animal husbandry production systems; (ii) agriculture-complementary income sources in the rural space, e.g. thematic tourism; (iii) agri-industrial micro, small and medium activities; (iv) cultural,

recreational, leisure and environmental functions; and (v) producer-marketing bodies, e.g. co-operatives and associations[10].

Accordingly, a set of strategies could be outlined to fulfil the multi-objective function that agrarian systems are expected to supply to human societies. The guiding principle should become adding value to the social, environmental and cultural functions often demanded of agrarian space.

Furthermore, in the framework of this new approach of a strategy of incentives, the involvement of young people from less-favoured sectors becomes a pivotal issue. In fact, the promotion of job creation could constitute an excellent opportunity to exploit the reservoir of know-how and skills of young people coming from the rural environment. In this light, a new scenario could be outlined for decision-makers to promote sustainable agriculture and agri-processing industry in the Euro-Mediterranean agrarian integrated space.

Firstly, departing from the fact that income coming from subsidies is significantly lower than that from sales, as witnessed in the case of Spanish olive oil, it becomes clear that promotion of the creation of sales-enhancing skills is crucial. Dedicated actions and systems should be designed to promote vocational and professional training to help producers of agricultural commodities to become more active in marketing their products. This could help them to improve their income level, especially in marginal areas.

Secondly, complementary actions represented by simplified subsidy systems could be introduced, whose cost could be financed after a transitional period by the progressive reduction of current subsidies proportional to production.

The proposed subsidy system could be oriented to support agri-food systems that maintain or increase production and which follow two main patterns, from which both farmers and processors could choose when receiving subsidies: (i) environmental-friendly, structured according to specific cropping patterns and agro-ecological requirements; (ii) job-friendly, employing labour rather than machinery, as well as designing and promoting new job profiles, e.g. tourist services, such as industrial archaeology, cultural, gastronomic, agri-ecological tourism.

In this light, the challenge is to couple the multiplicity of production and consumption needs with the promotion of economically viable and self-sustaining systems associated with agri-food production systems. There is also a technology and training challenge in increasing the food supply in a way friendly to the environment and to cultural development.

Finally, it is possible to highlight that persisting discrepancies between richest and poorest regions, at EU as well as Euro-Mediterranean level, are pushing the policy agenda to re-examine the question of development, shaping it in the broader perspective of sustainable development and improvement of the quality of life. This debate involves, for future Euro-Mediterranean scenarios, the new role that techno-economies, environment, societies and cultures in the agrarian space are required to play in their dynamics and relationships in order to fulfil objectives of intra- and inter-generational equity and social justice.

Multi-functionality could become the main challenge and objective of agriculture in both the EU and the Euro-Mediterranean space

Job-creation for the young from less-favoured areas could form one of the pillars of new strategies in a sustainable Euro-Mediterranean agricultural policy

Training and vocational rehabilitation activities could play an important role in promoting the marketing of agricultural commodities

The new policy could have a dual focus: environment-friendly and job-friendly, in order to combine production needs with the promotion of self-sustaining systems

Keywords

Mediterranean Free Trade Area, EU policies, Common Agricultural Policy, olive oil production, sustainable agriculture, agricultural technology

Notes

1- Mazoyer and Roudart, chapter X, 1997.

2- European Commission, *Agenda 2000*, Agriculture, Full Text, Rural Policy, pp. 2-4.

3- European Commission, *Barcelona Conference*, Programme de Travail, pp. 19-22.

4- For the time being, the "industrialization" of the Spanish olive oil production system is already creating significant political and economic burdens to the EU, due to overproduction. Accordingly, the EU is trying to shift the current subsidy system towards new mechanisms in order to foster the reduction of Spanish production potential, which has been largely exceeding expected levels. This is provoking strong reactions from the whole sector in Spain, which is reluctant to change, due to the relatively high level of investments in machinery and equipment that have been made (small-medium farmers face particularly difficult adjustments).

5- The Index of Human Development (IHD), elaborated by the UNEP to represent the vision of development strongly dependent on economic development. Accordingly, poorest countries were identified as "developing countries".

6- Index of Human Poverty (IHP) and the INdex of Minimum Income (IMI).

7- Bonazzi and Gómez y Paloma, 1997.

8- Gómez y Paloma, chapters II and III, 1993; Medagri, 1997.

9- EC *Agenda 2000-Agriculture*, 99. 2-3 and 5, and *On an EC Biodiversity Strategy* (COM 1998) 42 final, Brussels 04.02.1998, pp. 9-12, 19-21.

10- About an interesting initiative based on promoting this type of action for olive producers in Morocco, see *Fair Trade*, March 1998, pp. 3-7.

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- DTU - University of Denmark, Unit of Technology Assessment - DK
- ENEA - Directorate Studies and Strategies - I
- INETI - Instituto Nacional de Engenharia e Technologia Industrial - P
- ITAS - Institut für Technikfolgenabschätzung und Systemanalyse - D
- NUTEK - Department of Technology Policy Studies - S
- OST - Observatoire des Sciences et des Techniques - F
- SPRU - Science Policy Research Unit - UK
- TNO - Centre for Technology and Policy Studies - NL
- VDI-TZ - Technology Centre Future Technologies Division - D
- VITO - Flemish Institute for Technology Research - B
- VTT - Group for Technology Studies - FIN