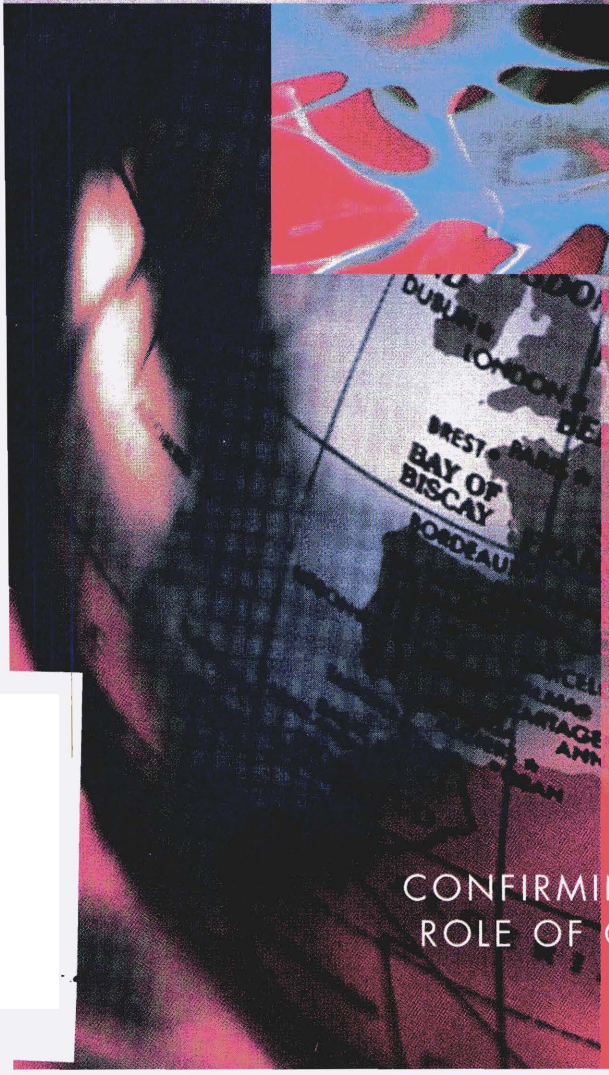
European Commission

INCO Programme
1994-1998

European Research Open to the World



CONFIRMING THE INTERNATIONAL ROLE OF COMMUNITY RESEARCH

EUR 18767

European Commission
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responsible for Research, Innovation, Education,
Training and Youth

DG XII - International role of Community research

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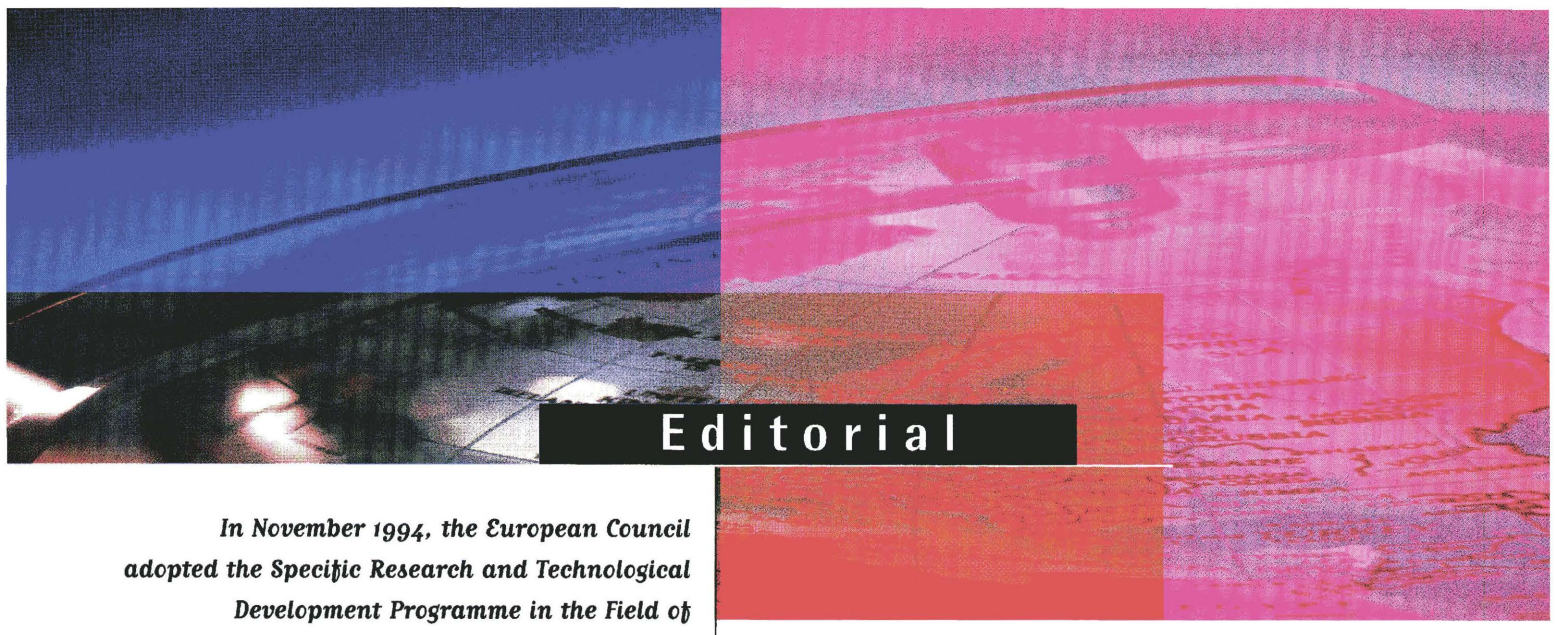


Editorial

In November 1994, the European Council adopted the Specific Research and Technological Development Programme in the Field of Cooperation with Third Countries and International Organisations — known also more simply as INCO (International Cooperation). The objective of this initiative was to provide the Fourth RTD Framework Programme with a tool with which to react to the growing globalisation of science and the economy.

INCO has permitted the successful linking of European scientific efforts with those undertaken outside the Union or outside the Community framework. In response to internal concerns (the desire to use cooperation as a way of strengthening the Union's scientific and technological bases, of boosting the competitiveness of its industry and increasing the impact of other Community policies) but also external ones (the concern to find answers to problems rising in partner countries or at the global level), INCO has played a significant role in anchoring European research solidly and permanently within the scientific and technological networks which are shaping up at the dawn of the 21st century.

As the first Community programme specifically dedicated to integrating and coordinating the Community's RTD activities directed at third countries and international organisations, INCO has been the interface of S&T relations between the European Union and the rest of the world.

With RTD activities often providing a bridge for relations in other areas, INCO has also contributed effectively to other policies of the Union, like preparing applicant countries for membership, rapprochement with Mediterranean countries, development policy, and strengthening ties with both industrialised and emerging economy countries.

Moreover, INCO has played a pioneering role in promoting cooperation and coordination between the specific European research programmes, thereby pre-figuring an important aspect of the innovative approach of the Fifth Framework Programme (1999-2002).

Edith Cresson,
Member of the European Commission, Responsible for Research, Innovation, Education, Training and Youth

Contents

An international cooperation programme in science and technology – Why?

The interest shown by the European Commission in international cooperation in RTD reflects the growing importance of the international dimension in those sectors and activities linked to scientific research.

The reasons for this ever-present internationalisation are many. The growing interdependence of large economic blocks and the globalisation of trade, coupled with the disappearance of the ideological opposition between East and West has had, and is still having today, a knock-on effect at the scientific level. Research poles have multiplied, both in emerging countries and in those which have freed themselves from the clasp of the former Eastern block. Sectoral and political partitions in the world of science and research have tended to disappear – all the more quickly because the decentralisation of RTD activities has been facilitated by the opportunities for borderless cooperation offered by the new information technologies.

Parallel with this, it is becoming clearer day by day that vital problems – in particular those involving health, the environment and nutrition – can be effectively solved only at the global scale.

Finally, the trend towards stronger global scientific and technological cooperation is also dictated by the need to share the costs, the human and technical resources, and also the risks attached to RTD innovations in the coming years. The scientific challenges involved in the exploration and exploitation of space, in finding sustainable solutions for energy consumption and in mastering biotechnological issues, can be met only through a vast international mobilisation.

Table 1.1

The place of international S&T cooperation in the Fourth RTD Framework Programme (1994-1998)

First action	Community research, technological development and demonstration programmes • Information and communication technologies • Industrial technologies • The environment • Life sciences and technologies	Euros 10,045 m
Second action	**Cooperation with third countries and international organisations**	**Euros 575 m**
Third action	Dissemination and optimising of results	Euros 352 m
Fourth action	Stimulating the training and mobility of researchers	Euros 792 m
	Global amount allotted to RTD in the Fourth FP	**Euros 11,764 m**

Maastricht takes a new step forward

This "globalisation" of research – and of its imperatives – has led the European Union to provide an explicit legal basis to its international RTD policy in the Treaty of Maastricht signed in February 1992. Article 130 G of the Treaty on European Union specifically lists the "promotion of cooperation in the field of Community research, technological development and demonstration with third countries and international organisations" as one of the four essential activities of Community RTD policy. The three others are the specific Community research programmes, the dissemination and optimisation of results, and stimulating the training and mobility of researchers in the Union (see table 1.1).

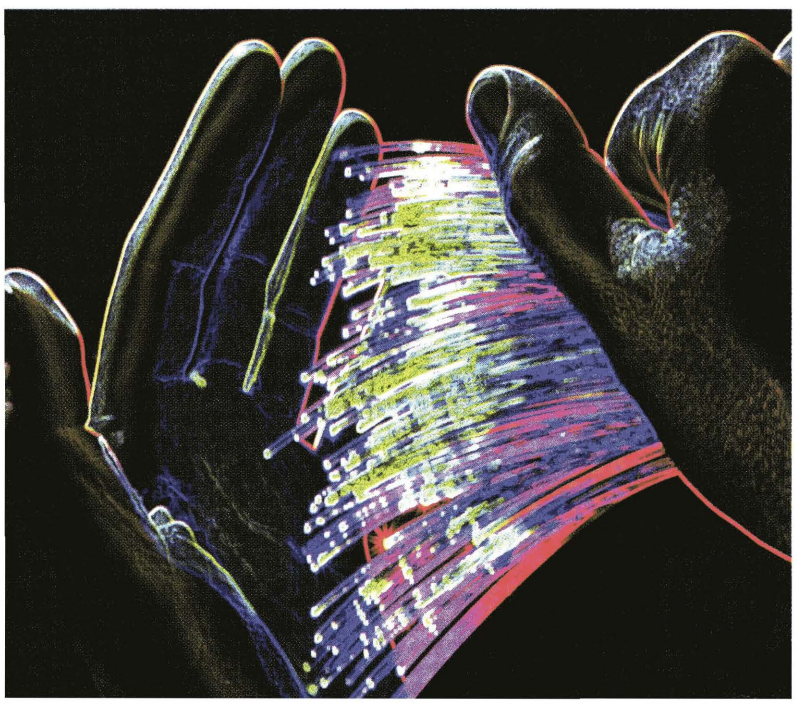
Adding value to the Union's objectives

Conceived to provide integrated management of all relations between the Community's research efforts and outside players, the INCO programme has, during the past four years, been implemented along two lines:

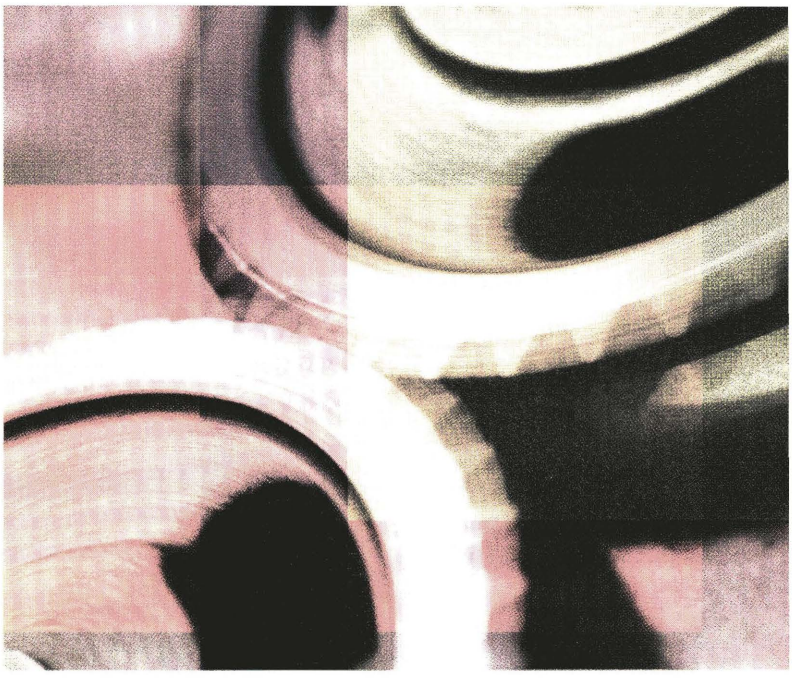
- it has supported and supervised numerous research projects combining EU and non-EU partners in specific areas within the programme itself (see table 1.2);
- it has also supported the participation of non-EU scientific and technical partners in certain RTD projects undertaken under other specific Community research programmes (actions 1, 3, 4 – see table 1.1).

In both cases, international cooperation in the RTD area has played an integral part in implementing the priorities of the Union's technological research and development policy. These are:

- strengthening the competitiveness and the position of the European economy in international trade;
- creating jobs inside the Union;
- supporting the implementation of major European Union policies.

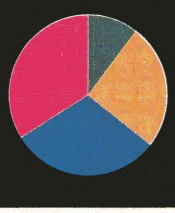


In this perspective, the INCO programme has provided a specific added value to the Community's research activities. Scientific cooperation, largely international in nature, allows Europe's research scientists to meet and work together with partners with different S&T training and cultural backgrounds, and enables them to access new networks and to work in laboratories and with equipment developed in scientific research poles elsewhere in the world. As well as contributing to the worldwide dissemination of Europe's own science and technology, these links strengthen the Union's innovative capacity, with the ensuing benefits in terms of competitiveness and employment within the Community.



Graph 1.1

Development of INCO commitments 1995-1998



Indicative figures (September 1998)

The principle of mutual benefit

This type of transnational – and transcontinental – cooperation is based obviously on a principle of "mutual advantage". It is beneficial and sustainable only in so far as it takes on board the mutual interests of the different partners involved and provides them with the scientific and technological returns which they expect from it. These expectations vary significantly according to the different areas of RTD cooperation in which the European Union is involved. For this reason, the INCO programme has been designed to target those forms of cooperation that are specifically adapted to these partner groups.

This "variable geometry" approach has also enabled INCO to make an effective contribution to European Union policies which fall outside the strictly defined field of RTD. For example, cooperation with industrial countries has been steered partly towards the objectives of telecommunications policy (DG XIII), energy policy (DG XVII) and transport policy (DG VII). It has of course been possible to coordinate joint research activities with developing countries with the objectives of EU development policy (DG VIII). Finally, as part of the eastward enlargement of the European Union, cooperation with former Eastern block countries has been carefully coordinated with the objectives of DG I, which is responsible for external relations.

A programme adapted to partner diversity

The structure of the INCO programme reflects its cooperation objectives, which vary from one group of countries and organisations to another. In each of the four major fields covered by the programme (see table 1.2), European RTD cooperation policy responds to a specific logic, organised to suit the particular characteristics of the partners concerned, depending on whether they are from:

- The industrialised world, both other European fora and international organisations (area A1), and non-industrialised European countries (area B)
- Central European countries and countries of the former Soviet Union (area A2)
- Developing countries (area C).

The considerable size of the budget resources which the Union has allotted to scientific cooperation with Central and Eastern European countries (area A2) and with developing countries (area C) is explained by the fact that, in these two groups, INCO supports joint research projects – an arrangement that does not exist in the two other areas. These projects are co-financed by the programme following calls for proposals in research areas which reflect problems in the concerned regions.

Table 1.2

Areas of international cooperation in RTD

Area A1 *(details on p.10)*	Cooperation with other European S&T cooperation frameworks (COST, EUREKA, International RTD organisations) • RTD association agreements for third countries (EEA) to participate on a "project by project" basis in all the EU's specific RTD programmes • secretariat of the inter-governmental COST programme	Euros 49 m
Area A2 *(details on p.14)*	Cooperation with Central and Eastern European countries and with the Newly Independent States (NIS) of the former USSR • INCO-Copernicus (financing and management of joint research activities and joint initiatives) • "project by project" participation in certain Action 1, 3 and 4 RTD programmes and possibility of financial assistance • EU participation in INTAS and ICST	Euros 247 m
Area B *(details on p.12)*	Cooperation with non-European industrialised countries • S&T cooperation agreements with third countries (Canada, Israel, Southern Africa, USA) "project by project" participation in certain RTD strands of specific EU programmes • Japan/Korea research grants	Euros 32 m
Area C *(details on p.22)*	Cooperation with developing countries • INCO-DC (financing and management of joint research activities and joint initiatives) • "project by project" participation in certain Action 1 RTD Programmes • possibility of financial assistance	Euros 247 m

When it comes to relations with other European cooperation partners (area A1) and the non-European industrialised countries, the financing of research activities strictly speaking is not covered by the INCO budget (except in the case of Japan/Korea research grants). In these areas of cooperation with scientifically and technologically advanced countries, the programme plays primarily a catalyst role, by implementing RTD cooperation agreements with certain non-EU countries (area B), and a coordination role, in particular by providing the secretariat for the European COST Programme (area A1).

Table 1.3

Results of calls for proposals for INCO projects*

		Area A2 INCO-Copernicus	**Area C** INCO-DC	**Area B** Japan/Korea grants
Projects	Proposals received	3,231	3,357	393
	Projects selected	**503**	**391**	**315**
	Success rate	16%	12%	80%
Budget	**Overall expenditure** (1)	**Euros 138,5 m**	**Euros 196 m**	
	EU average financing per selected project	Euros 243,600	Euros 501,400	
Participants (2)	Proposals received	17,905	16,048	
	Projects selected	**3,028**	**2,449**	
	Average participation by selected project	6	6.3	

(1) Including accompanying measures
(2) Total number of participants involved in the projects (institutes, centres, research groups, laboratories, etc.)

* Indicative figures (September 1998)

Scientific and technological Europe within the world

As an acknowledged leader in many areas of technology and understanding, the European Union plays a major role on the world stage. But competition is fierce. Other major industrial powers (the United States, Canada, Japan, Australia and others) have a level of S&T expertise that is comparable, if not superior, to that of EU countries. Competition does not, however, exclude cooperation. Establishing sustained and mutually profitable links with the main poles of world research constitutes a priority objective for the EU's science and technology policy. In order to preserve and improve the effectiveness and "added value" of its own RTD programmes.

During its four years of activity, the INCO programme has been the main tool for opening up and "mooring" European research policy to other major international centres of science and technology. This has taken the form of a double approach:

- coordinating the research activities of the fifteen EU Member States with other international S&T cooperation organisations, both those at the pan-European level such as COST and EUREKA, and the main world-wide networks which depend on the United Nations or other frameworks (area A1);
- establishing specific scientific and technological cooperation agreements with other industrialised countries [1] (area B).

In each of these two approaches, INCO's primary objectives have been to create synergies between Community research efforts and outside efforts in what are considered to be priority areas. Unlike in A2 areas (Central and Eastern European countries) and C areas (developing countries), the European support is aimed not at financing scientific activities, but ensuring essential coordination.

The enlarged frameworks of S&T cooperation (area A1)

The European Union is involved in different European scientific and technological cooperation frameworks in which various non-EU countries also take part. Using resources provided under area A1 of the INCO programme, the Commission has made a major effort to develop effective interaction between COST, EUREKA and the Framework Programme, with a concern to promote the optimal use of the results of European research.

The Union has also maintained close cooperation with various major research bodies, such as the European Laboratory for Particle Physics (CERN) in Geneva, the European Molecular Biology Laboratory (EMBL, in Heidelberg), the European Space Agency (ESA), etc.

(1) Special mention should be made here of the particular status of "associate" cooperation, which is currently being re-negotiated preparatory to the launch of the Fifth Framework Programme. This will enable three countries belonging to the European Economic Area – Norway, Iceland and Liechtenstein – to participate in all the Union's R&TD activities. A specific association agreement is also right now being concluded with Switzerland (see Table 2.1.)

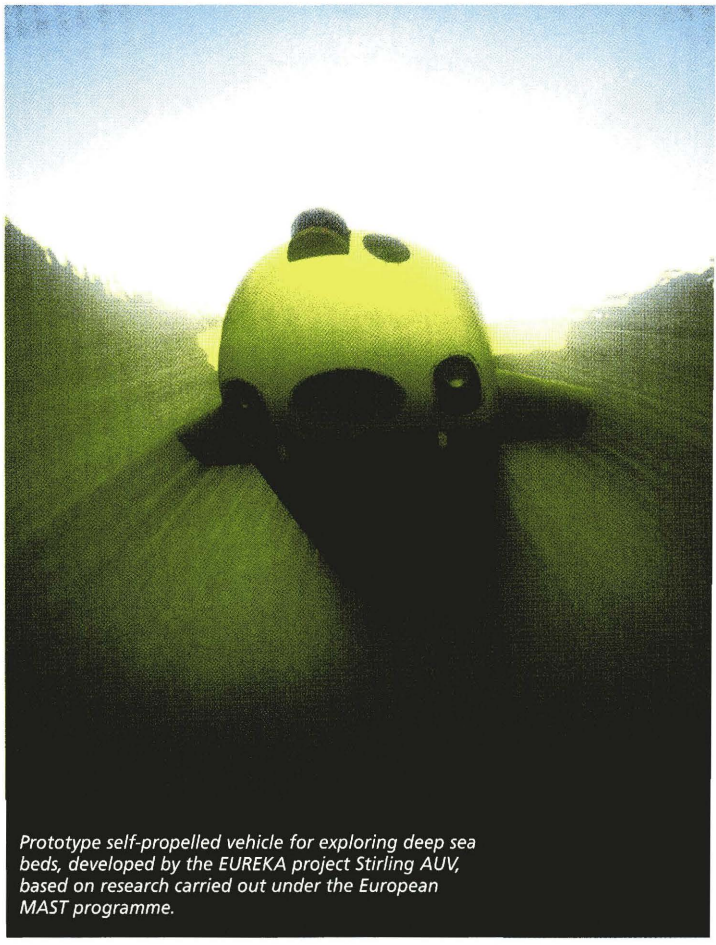
COST: 28 European countries coordinate research

Since it was first set up in 1971, the inter-governmental COST initiative (European Cooperation in the area of Scientific and Technological Research) has coordinated a vast range of S&T activities carried out and financed nationally by its 28 member states. With an estimated cumulative cost of around Euros 1 billion a year, the volume of research enjoying COST support has more than tripled between 1990 and 1997. 170 "COST Actions", involving some 10,000 research teams, make this programme one of the major instruments of scientific cooperation in Europe.

The research undertaken within the COST framework covers both the exact and human sciences, including various leading edge technologies. Many synergies exist between the 17 scientific areas covered by the initiative and the research areas covered by the Community's RTD programmes. Despite not being not a member in its own right of this inter-governmental initiative – though it expects to join soon - the European Commission is responsible for the scientific coordination and administrative management of COST. Overall responsibility lies with DG XII, in consultation with DG VII and XIII for all research activities which relate to transport and telecommunications respectively.

COST provides a holistic approach to urban problems

A relatively new COST action combines town planning, urban design and civil engineering so as to contribute more effectively to the management and operation of the physical urban environment. Traditional approaches to civil engineering in the urban context tend to be determined by sectoral and investment interests. The approach adopted in COST by contrast is more holistic and innovative in that it sees the urban context in terms of an interrelated system. Indeed, it is the only programme of its type in Europe. There are clear links too with the transport sector and with some of the work being undertaken in COST in both the environmental and social science sectors.



Prototype self-propelled vehicle for exploring deep sea beds, developed by the EUREKA project Stirling AUV, based on research carried out under the European MAST programme.

EUREKA: a "bottom-up" approach

This inter-governmental initiative, launched in 1985, and in which 25 countries and the European Commission are now involved, is aimed principally at combining the financial support provided by the different States in order to create transnational European R&D partnerships directed towards developing advanced technologies in all industrially strategic areas. The essential originality of EUREKA is to have placed the accent on a so-called "bottom-up" approach: it is the industrial, technological and scientific partners themselves who define the content of the R&D projects presented for funding. These projects all carry the EUREKA label, which is granted by the national governments of countries taking part in the initiative.

Certain "pre-competitive" research required in order to carry forward various EUREKA projects has met the scientific and technological objectives of the European Union and has therefore enjoyed active support from Community research programmes. The Commission has intervened financially to support research linked to around 40 such projects. It has also helped finance the running of the initiative's International Secretariat as well as various activities promoting the initiative, financed out of the INCO programme budget.

EUREKA has been a prime mover in the setting up of vast strategic R&D networks, such as the JESSI mega-project and its successor MEDEA for developing new generations of micro-electronic chips. In this area, cooperation with the Community's ESPRIT programme, as well as EU co-financing of the two projects, has proved particularly fruitful, illustrating the synergies which can be achieved between the various types of support which are available to researchers working in various frameworks.

Cooperating with non-European industrialised countries (area B)

The present globalisation of knowledge and skills is intimately linked to the globalisation of trade and financial flows. Within this double movement, industrialised countries – such as the United States, Japan, Canada or Australia – are both potential scientific partners and commercial competitors of the European Union. The cooperation activities undertaken with them, within the framework of INCO, bear the mark of this duality.

These activities are based on the principle of reciprocity between partners situated on an equal footing. Admitting "advanced" outside partners into the Community's RTD cooperation system – and participation by European institutes in these countries' research efforts – facilitates access to the S&T results which they have achieved, thereby imparting additional value to the Union's RTD, and improving its economic competitiveness. By enabling the Union to benefit from its partners' experience, this cooperation also contributes to the better definition of certain other EU policies (for example, transport, energy and fisheries).

This scientific cooperation with industrialised countries is also aimed at promoting the acceptance of jointly developed technology on these countries' markets.

Given the many possibilities for RTD partnerships with these countries, topics offering balanced and selective synergy have been carefully identified in the light of the Union's different policies and of Member States' individual relationships with these countries.

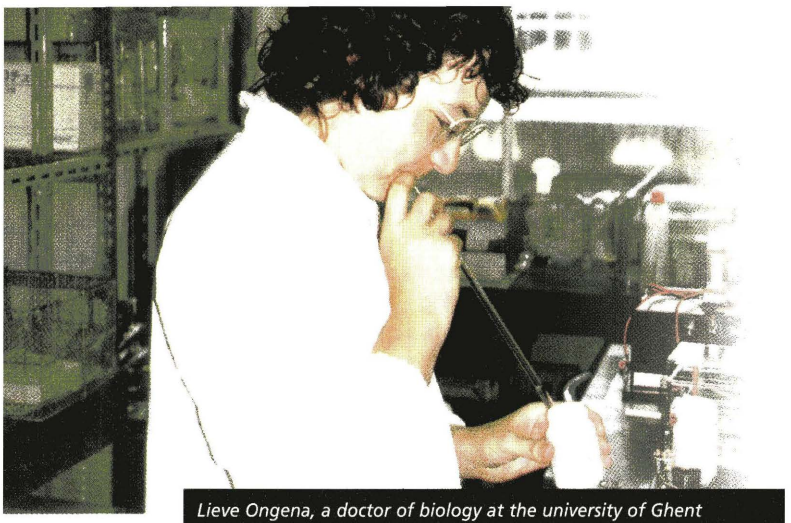
In this perspective the scientific and technological cooperation agreements that the EU has negotiated with the non-European industrialised countries play a key role. The initial agreements with Australia and Canada, signed in 1994 and 1996 respectively, have proved the effectiveness of this approach. Far from duplicating the many bilateral agreements already signed with these countries by most Member States, they have marked the way forward for cooperation which reflects the specific experience of partner states and the special nature of the areas involved, by opening up certain European research programmes to projects from these countries, and by ensuring that Community legislation on the protection of intellectual property rights is respected.

Table 2.1

S&T cooperation agreements negotiated between the EU, industrialised countries and emerging economy countries

	RTD areas concerned
NON EU-EUROPEAN COUNTRIES	
Norway, Iceland, Liechtenstein Associate cooperation within the EEA framework Re-negotiation under way for the 5th FP	All the Union's RTD activities (excluding the nuclear field)
Switzerland Associate cooperation under negotiation at end 1998*	In principle, all the Union's RTD activities
NON-EUROPEAN COUNTRIES	
United States Agreement signed in December 1997, came into force in October 1998	The environment (including climate), bio-medicine and health (including AIDS, infectious illnesses, drugs), agriculture and fishing, engineering research, non-nuclear energy, natural resources, materials technologies and standardisation, telematic applications, marine science and technologies, research in social sciences, transport, science and technology policy, management, training, researcher mobility
Canada Agreement concluded in 1996 for an indefinite period Amendment under negotiation end1998	Agriculture, fishing, forestry, bio-medicine and health, non-nuclear energy, environment (including earth observation), information and communication technologies, telematic applications, ore processing
Agreement EURATOM concluded end 1998	Nuclear energy
Australia Agreement concluded in 1984 for unlimited period Amendment under negotiation end 1998	Biotechnology, bio-medicine and health, marine science and technology, the environment, information and communication technologies
Israel Agreement concluded in 1996 New agreement under negotiation end 1998	RTD areas concerned: all areas of EU RTD research programmes (excluding the nuclear field)
Argentine (EURATOM Treaty) Agreement concluded in 1997 for an unlimited period	Nuclear energy
S&T cooperation agreement in preparation end 1998	Research areas of Action 1 and developing countries research activities of Action 2 (excluding the nuclear field)
South Africa Agreement concluded in 1997	RTD areas concerned: all areas of EU RTD research programmes (excluding the nuclear field)
Russia Agreement under negotiation end 1998	Not yet determined
China S&T cooperation agreement concluded end 1998	All the research areas of the EU RTD programmes (excluding the nuclear field)

(*) However, Switzerland already participates in the controlled thermonuclear fusion programme



Lieve Ongena, a doctor of biology at the university of Ghent (Belgium), had the possibilty of pursuing her work at universities in Chiba and Kyoto.

Better managing new global challenges

As part of the cooperation with those countries whose RTD potential is comparable to that of the Union, INCO contributes to the multidisciplinary research which is vital for meeting a certain number of major global challenges. Joint work has been carried out, for example, on climate change, preventing earthquake damage, nuclear safety and population growth. Particular attention has been paid to research into the human genome, as well as controlled nuclear fusion (via large-scale funding of the research being carried out in and around the ITER thermonuclear reactor).

The various S&T cooperation agreements presented above constitute a cooperation framework *par excellence* for handling all these programmes of common interest. The regular monitoring meetings offer many opportunities for exchanges of views on partners' respective RTD policies, in this way enabling them to be more effectively inter-connected.

Trans-Atlantic biotech

Today research into life sciences represents a strategic dimension for the whole world's scientific community. For this reason the European Union and the United States set up a joint "biotechnology task force" in September 1990 to serve as a consultation framework on the major directions of S&T on both sides of the Atlantic. Its mandate was subsequently extended for five years on 26 June 1996. This task force has arranged a host of symposia and workshops to facilitate the exchange of information on priority topics of mutual interest. Joint studies and recommendations have also been submitted to the European Commission's Biotechnology Coordination Council (BCC) and the US National Science and Technology Council (NSTC).

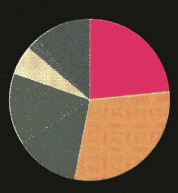
Programmes for research grants in Japan

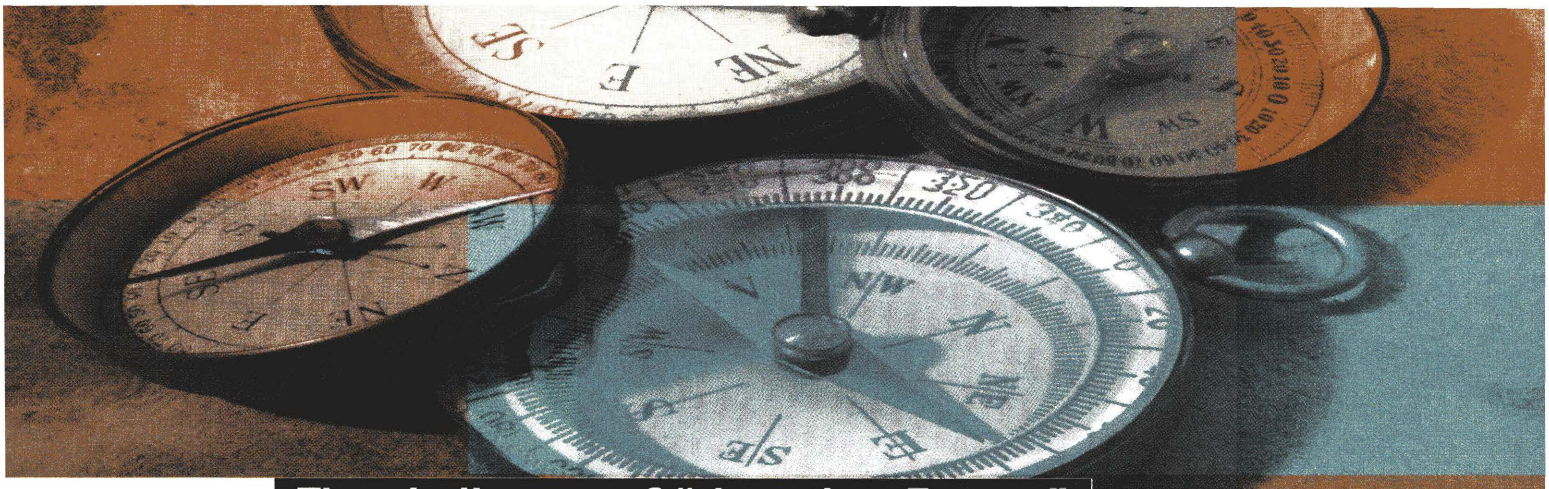
Aware of the major potential of cooperation, given Japan's experience in many areas, the European Union launched in 1986 a grant programme to allow highly qualified European research scientists to visit Japan for periods of between six and twenty-four months. By the end of 1997, 322 European scientists had been sent to Japan with the help of Community financing in order to perfect their know-how. In 1998 the EU awarded an additional 76 grants, and Japan in turn financed more than 170 European researchers working in its country.

In this way, 568 European scientists have familiarised themselves with the way in which their Japanese partners approach RTD questions. This individual experience also enriches the European scientific community when former grant holders return.

Graph 2.1

Scientific areas for Japan research grants (1986-1997)





The challenges of "the other Europe"

The collapse of the Berlin Wall in 1989 led to a complete redefinition of relations between the European Union and the former Warsaw Pact countries of Eastern Europe. It soon became clear that the considerable S&T capacities developed in a closed system by these countries, particularly in the military-industrial complex, did not allow them to respond effectively to the new challenges posed by their gradual incorporation into the market economy. This scientific potential was also threatened by the difficulties inherent in the transition. Several European initiatives to maintain and adapt the RTD capacities of the Central and Eastern European Countries (CEEC), as well as those of the New Independent States (NIS) that formerly were part of the Soviet Union, were started from 1992 onwards. After 1995 these were integrated into and coordinated within the INCO programme.

In the ex-Soviet Union and its former Central and Eastern European satellites, scientific and technical progress was seen as a decisive and prestigious element in their ideological struggle against the West. In this context, the mission of the scientific sector consisted mainly of permitting the development of certain technologies, primarily in order to achieve military superiority and demonstrate the supremacy of communism. Highly advanced skills were thus developed in fields such as aeronautics and space exploration, mathematics, theoretical physics, mechanics, chemistry, optics and biology.

The scientific heritage

The RTD system of the Eastern European Warsaw Pact countries was organised with aims that were different from those governing contemporary scientific research in democratic countries with market economies. As a result, this system was completely unable to meet the new requirements created by the transition. The governments concerned made radical cuts in scientific expenditure, especially in the NIS. It soon became clear that it would be difficult to restructure S&T activities, however necessary, even for the Central and Eastern European Countries, whose scientific potential had nevertheless remained more diversified and better integrated into their national industrial and socio-economic fabrics.

From 1990 onwards, the European Union devoted particular attention to the problems created by this destabilisation of the S&T sector in the countries of the "other Europe". After launching the structural assistance programmes PHARE[1] (1990) and TACIS[2] (1991), the Union began gradually to establish a specific policy of scientific and technological cooperation based on three priority objectives:

(1) Poland - Hungary: assistance for the re-structuring of their economies
(2) Technical Assistance to the Commonwealth of Independent States and Georgia.

- preserving these countries' research potential;
- re-developing it to help in resolving the major and immediate social, economic, and ecological problems facing these countries;
- establishing mutually advantageous relations in those RTD areas in which these countries are world leaders.

The main instrument established in order to attain these objectives was Copernicus, started in 1992. This action permitted the rapid financing of a large number of research projects associating partners from the Union with others from Central and Eastern Europe. It was also opened to the countries of the former USSR in 1994.

INCO, the East-West interface

With the launch of the 4th Framework Programme in 1994, the whole of the S&T cooperation with the CEEC and the NIS was coordinated in the INCO Programme. This integration greatly improved the clarity and the efficiency of the Community's scientific cooperation policy towards these countries.

The partnerships established under the Copernicus Programme - the spearhead of the European Union's S&T cooperation with the CEEC and the NIS between 1992 and 1994 – were considerably strengthened thanks to the possibilities of financing now granted via INCO, in three forms:

- the joint research projects, proposed by multinational teams, in domains chosen by both the EU and the partner countries on the basis of their priority needs;
- concerted actions to establish networks and to disseminate S&T knowledge and skills among the research teams in these same domains;
- accompanying measures, aimed at maintaining and exploiting the results of the RTD cooperation activities after their conclusion.

As a complement to the action now known as INCO-Copernicus, the other specific RTD programmes established in the 4th Framework Programme [3] were also opened to CEEC and European NIS research bodies. This "project by project" participation was funded by the INCO Programme budget.

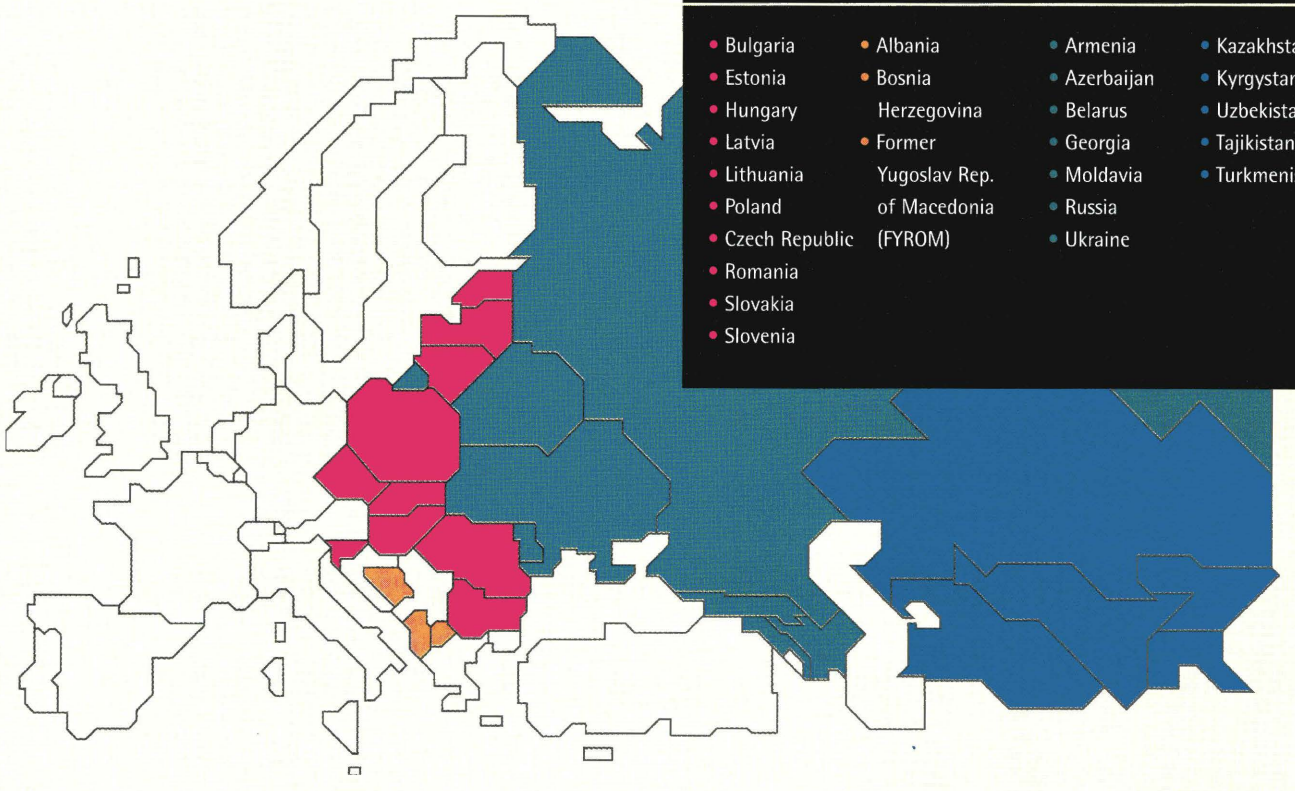
Finally, specific support was organised in 1993-1994 in response to the particularly critical situation experienced by research scientists in the former Soviet Union countries. The INCO Programme took an active part here in the creation of the International Association for the Promotion of Cooperation with the Scientists of the NIS (INTAS).

(3) Actions 1, 3 and 4 of table 1.1 page 16.

Table 3.1

The EU's 25 CEEC/NIS partners in RTD cooperation

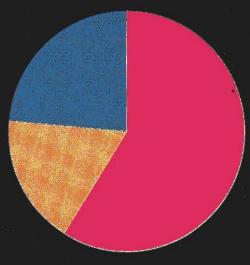
Associated CEEC (candidates for membership)	Non-associated CEEC	European NIS	Non-European NIS
• Bulgaria	• Albania	• Armenia	• Kazakhstan
• Estonia	• Bosnia Herzegovina	• Azerbaijan	• Kyrgystan
• Hungary	• Former Yugoslav Rep. of Macedonia (FYROM)	• Belarus	• Uzbekistan
• Latvia		• Georgia	• Tajikistan
• Lithuania		• Moldavia	• Turkmenistan
• Poland		• Russia	
• Czech Republic		• Ukraine	
• Romania			
• Slovakia			
• Slovenia			



Graph 3.1

S&T cooperation with CEEC/NIS countries - financial resources made available

(INCO 1995-1998)
Total 233 million Euros (CEEC: 121, NIS: 112)



		in millions of Euros	
INCO-Copernicus (including accompanying measures)		**138**	**(59%)**
	CEEC	88	
	NIS	50	
Participation in the specific programmes of the 4th FP		**40**	**(17%)**
	CEEC	33	
	NIS	7	
INTAS		**54**	**(23%)**
	NIS	54	

The strategic options of INCO-Copernicus

The experience acquired during the first phase of Copernicus (1992-1994) showed that the policy of scientific cooperation with the CEEC/NIS needed to be judiciously targeted on the real problems encountered by these countries if it were to become more effective. Efforts were therefore strengthened to focus some of these countries' research capacities towards the major social, economic and ecological problems they were experiencing.

In this perspective, specific emphasis has been placed on correcting the most manifest shortcomings - inherited from the past - of the RTD of the CEEC/NIS, in which industrial production had been organised without concern for questions of environment or energy economy, in particular because public health requirements were never a priority. Parallel to this, the desire strictly to control public freedom had considerably hampered the development of communication and information technologies.
The weak and rigid links between the world of RTD and the economic and industrial structures represent another major limiting factor. Interaction between the nascent market and social needs on the one hand and applied research on the other remain particularly fragile. In both traditionally privileged sectors (aeronautics and space research, materials technology, etc.) and neglected areas, research is not efficiently linked to production activities. One of the priority objectives of the INCO-Copernicus Programme has been to find a remedy for these structural deficiencies, which considerably slow down the movement of social and economic restructuring. The two calls for proposals organised in 1995 and 1997 helped to establish partnerships in two main areas:

- improvement of living conditions and public health;
- modernisation of industrial procedures in the sectors of energy, food, and information.

Furthermore, mutually advantageous relations continue to be established in the fields in which the CEEC/NIS lead the world. The interest shown in concerted actions leading to the formation of operational networks in high tech sectors, has been confirmed throughout the European scientific community in both West and East.

Pharmaceutical company LEK, Ljubliana

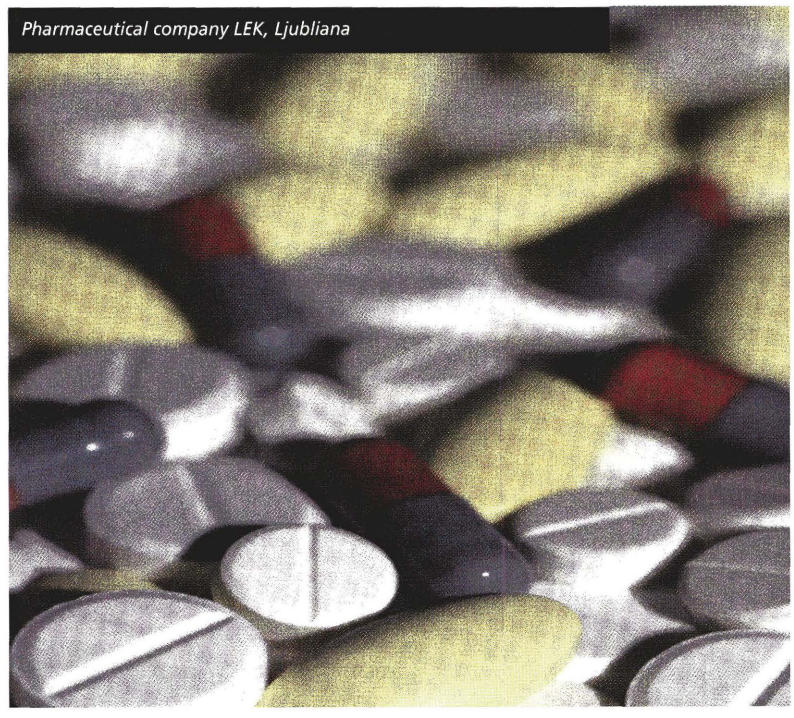


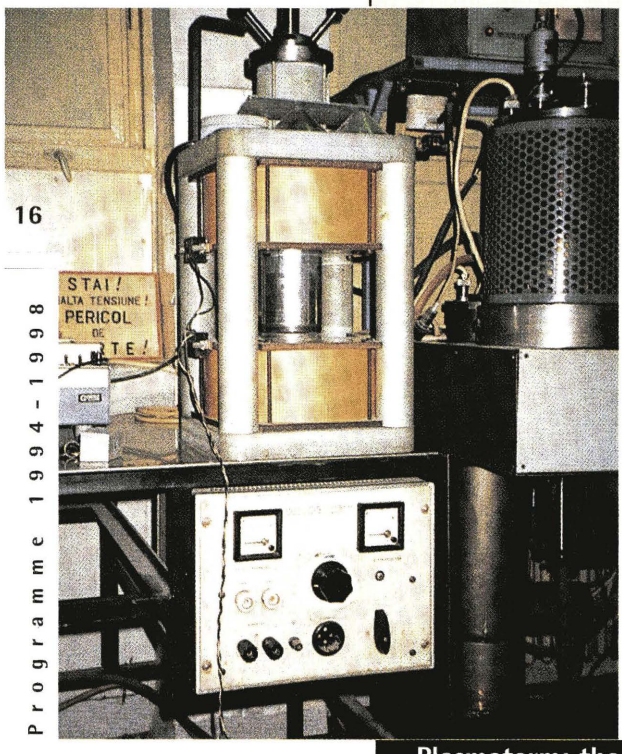
Table 3.2

Results of INCO-Copernicus

	Proposals received	Projects selected	INCO financing (in Euros millions)
1st call for proposals (95-96)	**1,931**	**299**	**92**
2nd call (97): total	**1,300**	**204**	**46**
• environmental protection	316	47	11
• environment & health (1)	134	18	4
• health	201	34	8
• non nuclear energy	199	23	6
• IT, telecommunications, telematics	157	39	11
• industrial and materials technologies	119	20	3
• agriculture and food processing	118	13	3
• social sciences	56	10	2
Total	**3,231**	**503**	**138**

(1) ionising radiation

Indicative figures (September 1998)



Plasmaterm: the second life of a Romanian technological firm

When the Ceaucescu regime fell in 1990, state funding was suddenly cut off to the Romanian undertaking Plasmaterm, which specialises in surface treatment. This threatened the jobs of 200 employees, as well as their unique skills and knowledge and the very high quality machinery the firm had developed. Thanks to its participation in three research partnerships in a Copernicus project involving British, Hungarian, Polish and German research scientists, this SME was able to diversify its technologies and its products. Its reopening has saved 70 jobs and Plasmaterm now exports 90% of its production.

S&T cooperation: a tool for successful enlargement

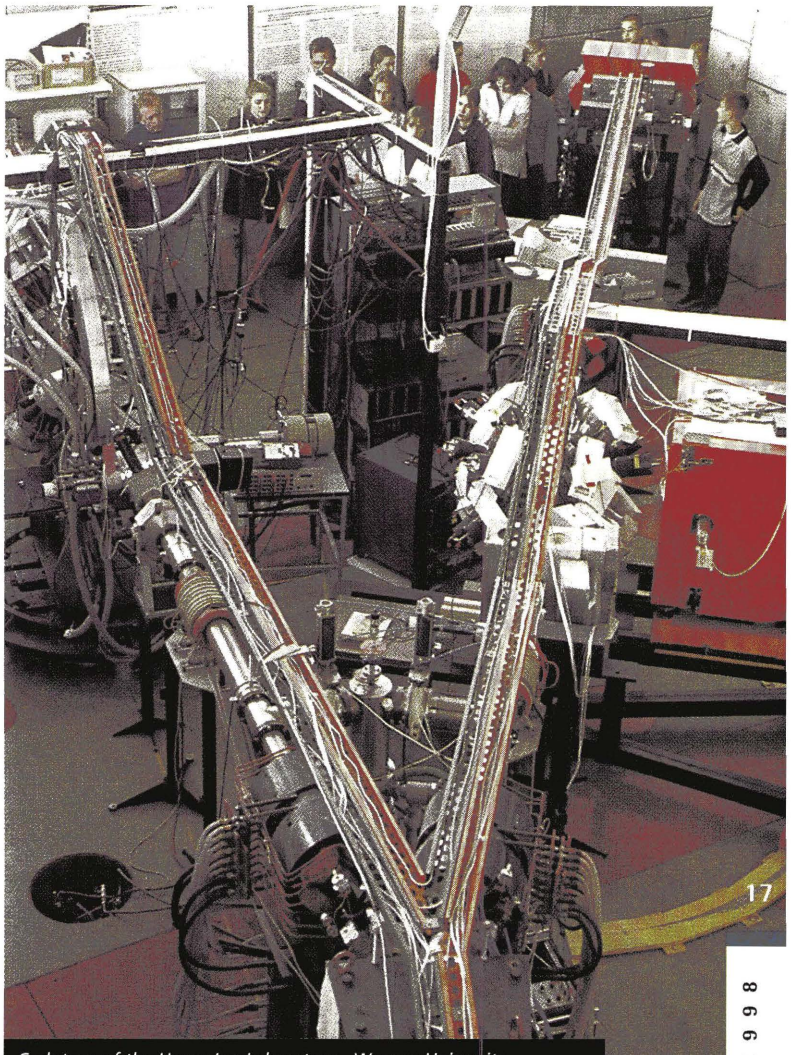
Between March 1994 and June 1996, seven Central European Countries (Hungary, Poland, Romania, Slovakia, Bulgaria, the Czech Republic and Slovenia), which were already associated with the EU by "European agreements" in the field of S&T, and the three Baltic republics applied for membership of the European Union. Their internationally recognised S&T expertise now opens up the perspective of considerably boosting Europe's scientific and technological potential on a global level. Thus, beyond its overall geo-political upshot, this expansion has, in the shorter term, introduced a new dimension into S&T cooperation relations with these countries since 1992.

After the Council of Madrid's call in December 1995 for "equal treatment of candidate countries", the objectives of the Community S&T cooperation policy were adapted to the possibility of their membership in the near future. In INCO-Copernicus, particular priority was placed on common research projects aimed at accelerating the modernisation of the industrial sector and making it more effective. Improved protection of the environment and conformity of production technologies with European environmental norms were another priority.

At the same time, the specific research programmes of the 4th Framework Programme were already open to these new countries. The high entry requirements (conditions of eligibility, the level of scientific expertise required, etc.), acted as a catalyst for enhancing the RTD sector in the associated countries. To promote this closer cooperation, INCO has played its part in funding their participation to theses programmes, in this way supporting the activities of several hundred research bodies in the CEEC in high technology sectors (4).

The high level of participation on a project-by-project basis by scientists from CEEC in specific programmes of the 4th Framework Programme foreshadowed the decision to associate these countries integrally into the 5th Framework Programme in 1999.

Research institutes, industrial laboratories and university centres of the associated countries will, where their governments contribute directly a fixed amount to the budget of the Framework Programme under specific arrangements, be able to participate in all Community research activities on a strictly equal footing with the Member State organisations. This active cooperation can be seen as an essential instrument for better preparing associated countries for membership of the European Union, hastening the integration of their research potential into the scientific community of the EU and helping them to adapt to the requirements of a market economy. This adaptation will considerably strengthen the development capacities of associated countries' economic and industrial structures.



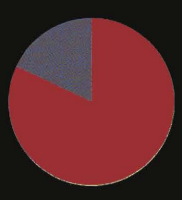
Cyclotron of the Heavy Ion Laboratory - Warsaw University

(4) Part of the INCO financing line for this participation in the EU projects has also been made available to the NIS, though with limitations applicable to the non-European NIS (see graph 3.2).

raph 3.2

INCO support for CEEC-NIS Participation in the EU's specific RTD programmes

(in Euros millions)

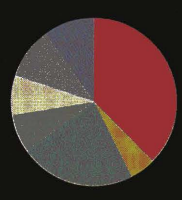


Total: Euros 40 million

Central European Countries	33 (82%)
Newly Independent States	7 (18%)

INCO support for CEEC-NIS participation in the EU's specific RTD programmes

(in Euros millions)



IT, communications, telematics	15
Industrial technologies	2
Environment, climate, marine S&T	9
Life sciences	3
Non nuclear energy	3
Transport	4
Social and economic research	4
Total	**40**

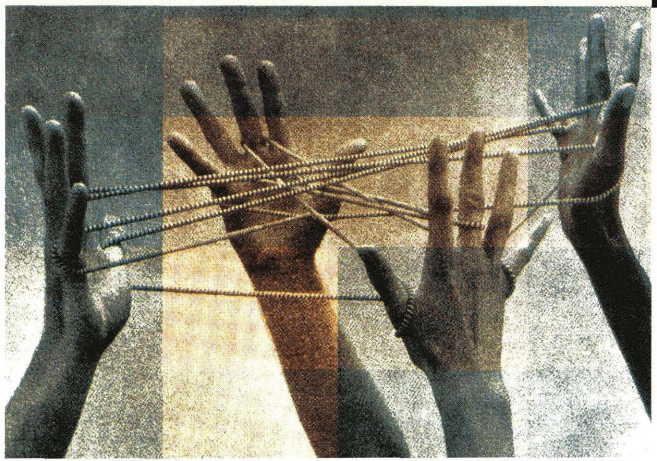
Indicative figures (September 1998)

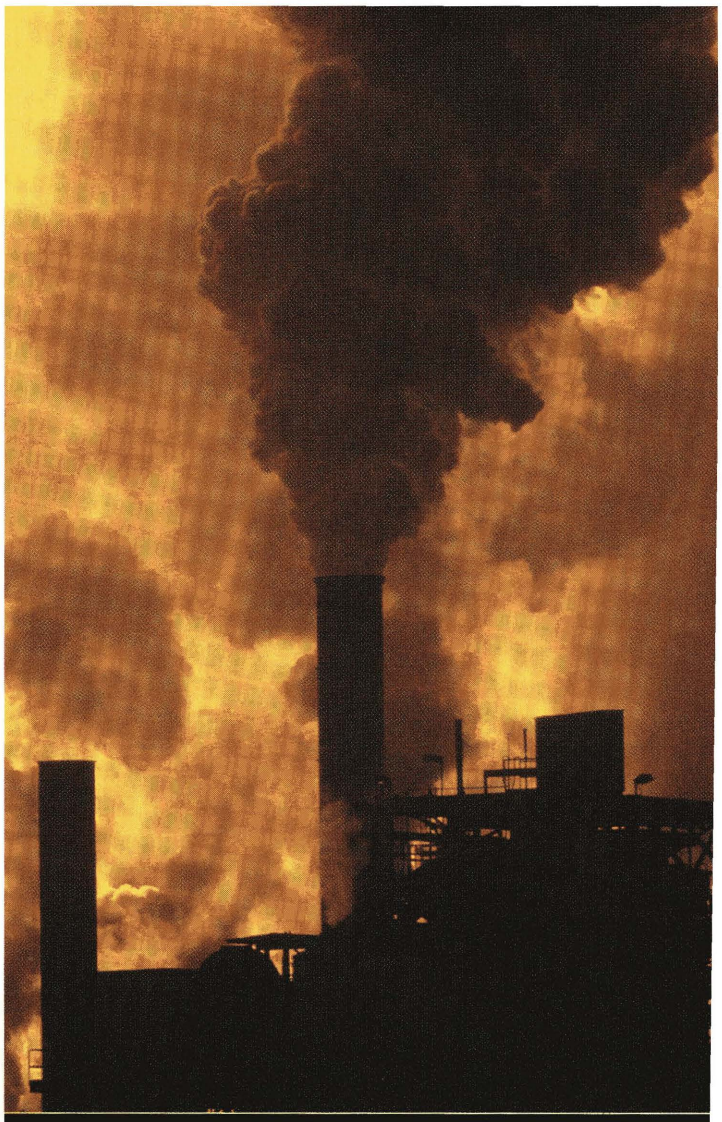
Specific initiatives for research scientists from the ex-USSR

S&T cooperation between the European Union and the former Soviet Union has taken a variety of forms. Calls for applications for INCO-Copernicus programmes have been opened up to participants from the NIS, and in November 1997 the European Union also opened negotiations with Russia with the aim of concluding a specific agreement on scientific and technological cooperation. This agreement is intended to outline more clearly the domains of S&T cooperation with the Russians during the coming years.

Establishing an integrated information system for European RTD

Before the fall of the Berlin Wall, and prior to the political changes that took place in Europe in the early 1990s, East-West "links" between research scientists were extremely limited. The disorganisation of the communist economic systems and the political changes also considerably fragmented the scientific community in Eastern Europe. The ESATT (European Science and Technology Transfer Network) and INDIS (Information Dissemination) in European RTD projects of the Copernicus programme have laid the foundations for a new integrated information system which is indispensable in order to develop cooperation in the field of RTD between Eastern and Western European research scientists. In particular, this initiative has made it possible to create a Web site giving extensive information on research institutions and programmes in European countries (http://www.iief.fta-berlin.de).





Cross-border pollution control

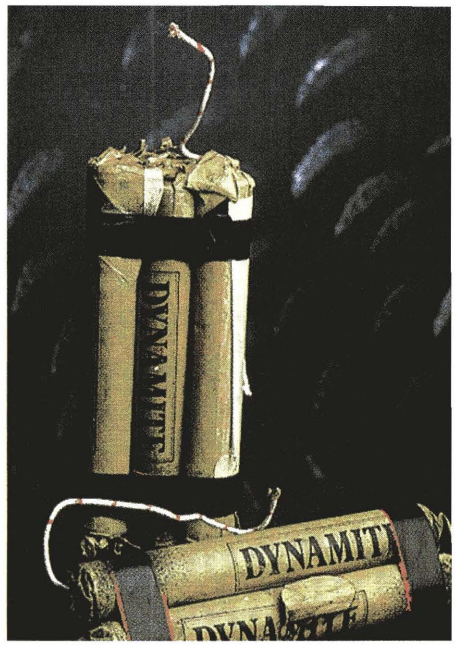
The EASE project has combined the expertise of both Eastern and Western European countries in investigating cross-border sulphur pollution in the 'Black Triangle' area, which is found at the border of the former East Germany, the Czech Republic and Poland.
An extensive monitoring and modelling programme has led to the development of integrated assessment models which can be used for exploring cost-effective abatement strategies, and has shown which forest areas are particularly susceptible to sulphur pollution.

INTAS

Jointly financed by the EU and its Member States, plus Norway, Switzerland and Israel, the INTAS initiative (International Association for the Promotion of Cooperation with the Scientists of the NIS) was established in 1993 in order to respond to the serious difficulties many scientists from NIS countries were finding in obtaining funding and to permit them to continue their research activities in their own countries. Priority was given to research projects presented by the most competitive teams, in the light of the respective interests of the EU Member States and the NIS beneficiaries. Almost one thousand INTAS projects corresponding to these criteria were financed by the INCO budget during the 4th Framework Programme, at a total cost of Euros 54.4 million.

The very constructive partnership established between INTAS and the Russian Foundation for Basic Research should also be mentioned. This institution, which is responsible in particular for co-financing, for joint selection of strategic priorities and for assessment of the research results obtained in INTAS-financed projects, also plays a decisive role in the overall restructuring of RTD in the former Soviet Union.

Previously, because of the gravity of the crisis affecting the RTD sectors of the ex-USSR in the first half of the 1990s, the EU had, from 1993 onwards, established and actively supported more specific instruments. In the NIS countries, the RTD sector was particularly inflated, with an average 12.9 research scientists for 1,000 workers in 1989, as against 4.2 in the EU at the same time. The sudden collapse of public funding for scientific research in the early 1990s (diminishing from 3.5% to less than 0.5% of GNP between the late 1980s and 1995) produced a major crisis. The major scientific potential developed during the 70 years of communism was directly threatened. The international community, concerned to preserve this original research expertise in certain high tech areas (aeronautics, materials, space research), and to avoid a proliferation of military experts, launched two initiatives: INTAS (1993) and ICST (1994). Both of these receive decisive support from the European Union (see boxes).



Redeployment of military RTD in the NIS for civilian use also involves recycling one million tonnes of TNT. Simply stocking this puts the environment in serious danger. Three years' research (from basic chemistry to materials synthesis) should make it possible to process the TNT for use in materials with applications in advanced technologies (polymers used in microelectronics or aeronautics) or the development of new products - particularly in the field of biotechnology.

ICST

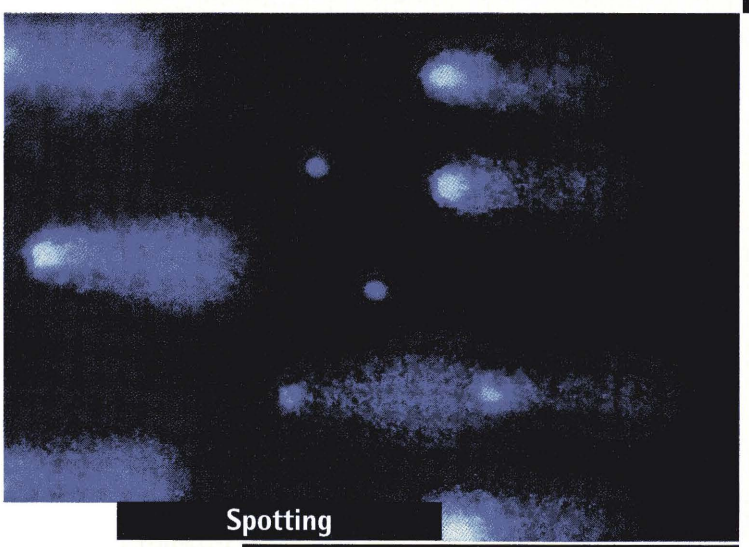
The future of advanced technologies produced by the military-industrial complexes of the ex-Soviet Union quickly became a problem at the beginning of the 1990s. The economic crisis and the almost absent demand for high technology products in the new countries that had once been part of the Soviet Union meant that there were practically no opportunities for spontaneously converting these complexes to civilian activities. A high-level scientific potential was thus threatened with disappearance, not to mention the risk for the international community of potentially dangerous military-industrial skills proliferating out of control.

In response to these concerns, the ICST (International Centre for Science and Technology) was founded in Moscow in 1994 under the terms of an agreement between the EU, the United States of America, Japan and the Russian Federation. This international cooperation programme has enabled more than 20,000 scientists and engineers from the military-industrial complexes of the former Soviet Union to receive support for working on over 400 projects in various areas such as nuclear reactor safety, radio-active waste management, the recycling of armaments, aeronautics, the development of new materials, etc.

The European Union has made a particularly important investment in the activities of the ICST, with the TACIS programme putting up the Community share of the funding for the Centre and DG XII providing the assessment and scientific monitoring of the joint projects.

Telecommunications for waterways

Europe's inland waterways are a key part of its transport and commercial networks. With the opening up of the borders between East and West, their potential to provide efficient, environmentally-friendly transportation has never been greater. If this potential is to be realised, highly efficient communications systems are required. COMSINE has brought together a consortium of commercial companies and research institutes, which have successfully designed a satellite-based communications infrastructure, specifically designed to satisfy the needs of the European inland shipping industry.

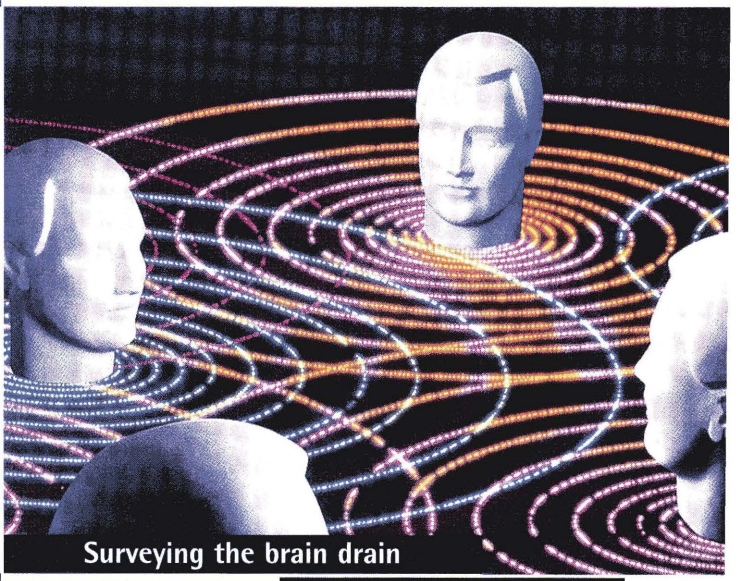


Spotting DNA damage earlier

Research initiated in Britain, and now applied to a variety of fields in research institutes in the Czech Republic, Germany, Poland and Slovakia, has developed and refined the comet assay, which enables DNA damage to be estimated at extremely low levels. The technique is a major advance over other methods as it enables DNA damage from disease, exposure to toxins or diet to be identified significantly earlier than before.

Breaking down language barriers

An existing European research project has been extended to encompass several CEEC (Central and Eastern European Countries). MULTEXT-EAST will provide these countries with language translation systems, software, data and tools. The project will make translation between Eastern and Western Europe easier and more precise than has been possible before, helping to develop economic and scientific links between the two parts of the continent.



Surveying the brain drain from Eastern Europe

When communism collapsed many feared that the resulting 'brain drain' from these countries would cripple the economies of the former Eastern block.
A COST collaborative survey carried out in ten Central and Eastern European Countries, however, has revealed that the brain drain was much less serious than once thought. It shows that the EU RTD cooperation is very important by its contribution towards greater stability and encouraging scientists to remain in their home institutes.

Research at the service of development

Since 1982, European scientific cooperation with developing countries has represented a vital element of the EU's RTD Framework Programmes. Initially, these North/South research partnerships were mainly limited to the domains of agriculture and health. From 1995 onwards, the INCO-DC (Developing Countries) programme has broadened the priorities of cooperation, particularly in the perspective of long-term development. Certain fields of mutual interest, such as the gradual spreading of information technology, have also been included. INCO-DC's new orientations have also focused on the regional dimension, whilst seeking to adapt the cooperation tools to the growing diversification of the partner countries.

Social and economic development is closely linked to the capacity of a society to employ appropriate and efficient scientific and technical resources. In this way the profound economic crisis at present afflicting the majority of developing countries is both the expression and the result of the delay they have accumulated with regard to scientific and technological progress. This delay is accentuated in a world in which the societies of knowledge and innovation occupy an ever more prominent place. It holds back the developing countries from integrating into the world economy and hinders their capacities to manage in the long term the natural resources that are indispensable for their development.

Specific partnership for science

In close collaboration with the Community's development aid policy, the cooperation in the field of research established between the EU and less developed countries has been trying to break this vicious circle for the last fifteen years or more. The promotion and funding of research projects presented jointly by research scientists from the North and the South are the main instruments to this end. This policy pursues three priorities:

- Enabling research bodies from developing countries to be associated in the development of innovative knowledge and technologies appropriate for the solution of the problems of development. The notion of *transferring* science is of less importance here than that of supporting scientific *cooperation*. A very special effort has been made in this way to make sure that the European scientific and technological expertise made available be based more on a structured formulation of its needs by the South itself and on sufficient acquisition of expertise by its research scientists.

- Helping to strengthen quality RTD capacities, thereby generating long-term development, as well as the human capital necessary for this ambition. The cooperation that has been achieved has favoured the emergence of a certain number of centres and of top level networks by enabling them to break out of their isolation, to reach a critical volume of S&T, and to benefit from the training dimension linked to these programmes.

- Enabling Europe, by means of joint projects between research scientists from North and South, to maintain high level scientific competence in the domains that represent global challenges for the whole of the international community.

While the principle of partnership has been maintained, two new directions have gradually come to the forefront during the 4th Framework Programme. First, a principle of *differentiation,* in other words, taking into account in RTD activities the diversity of needs and manners of cooperation that are specific to each country or region. Thus by integrating to a greater extent the sociological, economic and cultural "admissibility" of scientific and technological innovations, the INCO-DC programme has considerably strengthened the effectiveness of the solutions developed in partnership.

Table 4.1

Origin of the participants from the Developing Countries in the INCO-DC projects

	Asia	Latin America	ACP	Mediterr.	Total
In proposals received	2,212	2,815	1,931	1,836	8,794
In projects selected	276 (20%)	393 (28%)	466 (34%)	257 (18%)	1,392
Nationality of the participants in the projects selected (20 main countries)	China (104) India (41) Thailand (24) Indonesia (19)	Brazil (82) Argentina (45) Mexico (38) Colombia (33) Chile (22)	South Africa (47) Kenya (45) Senegal (32) Tanzania (31) Zimbabwe (30) Mali (23) Cameroon (21) Burkina Faso (20)	Morocco (44) Tunisia (40) Egypt (26)	

Indicative figures (September 1998)

Table 4.2

Results of the INCO-DC programme (1995-1998)

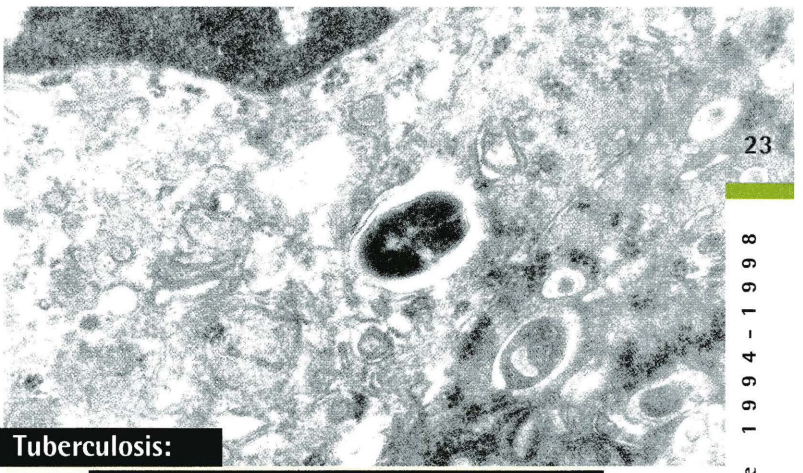
	Projects received	Projects selected	Total funding by the EU
• health	891	154	63
• agriculture	989	116	63
• management of natural resources and sustainable development	1,092	118	65
• biotechnologies,	9	-	-
• industrial materials and technologies	11	3	1
• information technologies	36	6	3
Total	**3,028**	**397**	**195**

Indicative figures (September 1998)

Political dialogue at the core of effective cooperation

The relations of cooperation established between the EU and developing countries are the result of a pragmatic attitude, adapted to the development of the partners' respective situations.

For each of the three INCO-DC calls for applications launched during the 4th Framework Programme, the research topics selected were the subject of consultation between the developing countries and the European Commission.
In support of the general development cooperation policy, INCO-DC concentrated on projects of regional interest. In this way, research scientists in several countries within the same agricultural and climatic area were associated in working on resolving problems that know no borders, such as the AIDS epidemic, desertification, or the long-term exploitation of biodiversity. These priorities have been established in political dialogue with structures such as ASEAN (Association of South-East Asian Nations) or the Andean Pact, or on the basis of the Indicative Regional Programmes (IRP) instituted by the European Development Fund for the ACP regions.
The profound economic changes and the major industrial development which characterise the recent history of certain developing countries - mostly those situated in Asia and in Latin America - have gradually led to a reassessment of the possibilities of scientific cooperation with these emerging economies.

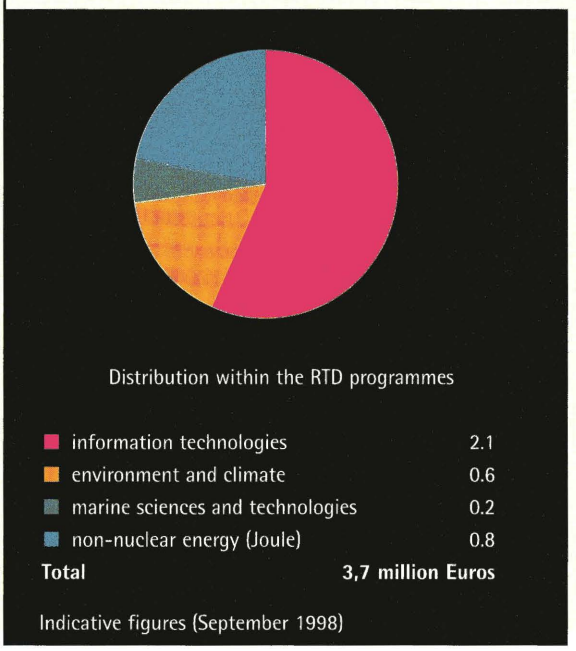


Tuberculosis: a new vaccine is urgently needed

Three million people die every year from tuberculosis in developing countries, and the reappearance of this pandemic is closely linked to that of AIDS. The point is that in the case of immuno-deficiency, use of the traditional bacterial vaccination BCG is not only ineffectual, but downright dangerous.
A cross-discipline team of European and Ethiopian research scientists has therefore set to work on developing a prototype bacteria-free vaccination, whereby only the proteins produced in vitro are injected. The development of this vaccination of the future continues, especially in Ethiopia and Malawi, before being tested in areas in which the pandemic is particularly rife, and in which many people suffer from tuberculosis.

Graph 4.1

Support given to the research activities of the DCs participating in certain projects RTD programmes (1994-98) (actions 1, 3 and 4)
(in millions of Euros)



Another encouraging result is the success achieved by the thematic networks established by joint actions, especially in the field of health. Through their multiplier effect, these networks are playing a catalysing role for the research capacities of the developing countries in numerous domains.
Alongside the funding granted to research projects in the three priority domains of the INCO-DC programme, the developing countries have also been eligible to participate in projects of the specific RTD programmes of the 4th Framework Programme, particularly in sectors such as information and communications technologies, as well as industrial technologies and materials. However, the DCs have taken little advantage of this opening, despite the opportunities to obtain funding for these research activities as part of the INCO budget (see table).

Organisation and results of INCO-DC

Apart from the domains of health and of food production and processing, the programme has also been considerably extended to include long-term development. More specifically, INCO-DC has promoted projects concerning the management of renewable natural resources, desertification, food security, and the effects of farming practice on global warming.

Each of these three priorities - health, farming and long-term development - has received equal funding (30% of the total INCO-DC budget). A fourth area, covering topics of mutual interest defined by consultation (information and communications technologies, non-nuclear energy, industrial technologies and advanced materials, in particular) has been allocated the remaining 10%.
During the three years from 1995 to 1998, the three calls for proposals have enabled 1,392 research bodies in developing countries to participate in the projects selected by the Commission. The progression is to be compared with the 1,473 participations recorded over the twelve years from 1982 to 1994, during the first three STD programmes (Sciences and Technologies for Development).

Apart from the direct results of the 400 research projects supported by the INCO-DC programme, an important spin-off has been the training and the strengthening of scientific capacities, both for the Northern partners and for those from the South. Numerous institutions in the developing countries have also been equipped or have benefited from improvements in their scientific material during the projects.

EIRAD: a network for long term food security on a world scale

The earth will have 8 billion inhabitants in 2025. In order to assure long-term food security for this population, current agricultural production will need to double in less than 30 years. This challenge requires a considerable effort in order to coordinate research on productivity in farming and long-term resources management. In 1995, INCO-DC was closely associated to the start of the European Initiative on Research in Agronomics for Development (EIRAD), in which the 15 Member States are collaborating with Norway and Switzerland. The objective is to improve the impact of the RTD investments made by each of these countries. An agronomic survey aiming at responding to the crucial problem of global food security is being undertaken in this framework.
In particular EIRAD has set up an information and communication system on Internet called Infosys, giving access to the numerous European data banks that exist in the domain of agricultural research for development.

Euro-Mediterranean partnership

All the countries bordering on the Mediterranean Sea are today faced with the pollution of this inland sea which is surrounded by megapoles and industrial centres. Drought and an increasingly arid climate are also leading to exhaustion of drinking water resources and gradual deterioration of the overall ecosystem.

In so vast an area sharing common problems, all research into solutions must involve a regional approach. Supplementing the framework agreements signed with 12 non-EU Mediterranean countries, the Avicenne initiative was established in 1992 at the request of the European Parliament, in order to strengthen environmental research on regional priority themes. Since 1995, this initiative has been financed by the specific funds made available for the Euro-Mediterranean Partnership.

Scientific cooperation between the Union and the other countries bordering on the Mediterranean Sea also takes place in other domains. For example, the MEDA project gives support to education and training, as well as to the improvement of scientific and technological research potential.

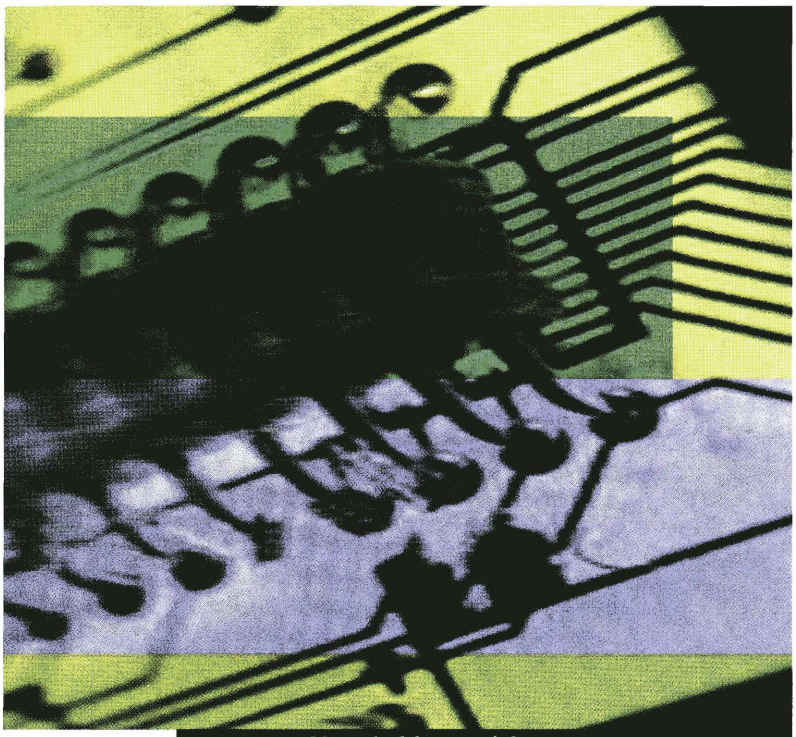
South-East Asian deltas: improving the diversification of agricultural crops

Economic growth, agricultural development and population increase have considerably endangered the ecosystems of the three great deltas of South-East Asia (the Red River and the Mekong in Vietnam, and the Chao Phraya in Thailand). The DELTAS project, grouping seven pluridisciplinary teams from Europe (Germany, Belgium and France) and from Asia (Vietnam, Thailand), is making a comparative study of the effectiveness of the existing irrigation methods and of the specific problems created by crop diversification. This is more precisely an analysis of the effects of the technique known as the "Chinese ridging", which is being held in ever-increasing esteem. This involves developing raised crop beds in irrigated systems, and permits interesting forms of diversification - especially for market gardening and fruit crops, which are greatly appreciated on the international markets. One major objective of the project is to define the hydrological and economic conditions in which this technique can continue to develop without threatening the general ecological balance of the deltas.

The emerging economies

Over the last few years, new emerging economies in Asia and Latin America have appeared on the financial map. As a result, S&T cooperation by Europe with countries such as India, China, Brazil and Argentina takes on a dual aspect. On the one hand, the long way they still have to go in the social or environmental spheres, as well as that of health, places them in the category of developing countries. On the other hand, the vitality of their research structures makes them very active participants in the INCO-DC programme. At the same time, they exhibit a remarkable economic and technological dynamism and are often formidable commercial competitors.

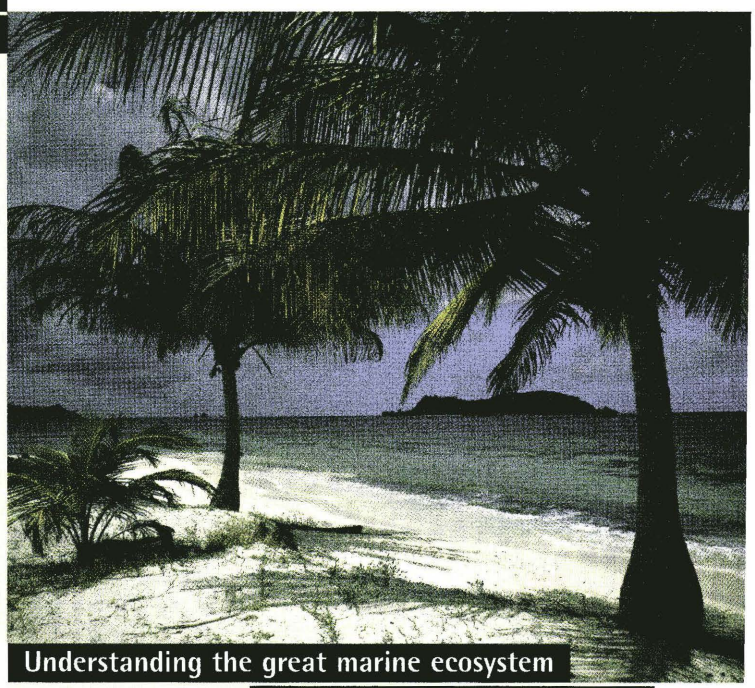
It is therefore legitimate to ask whether the European policy of S&T cooperation with these emerging countries is always appropriate. By limiting its thrust to the priority sectors of development, does it not pass by more extensive and more interesting research partnership possibilities? With a view to addressing partners' mutual interests in an optimal fashion, the INCO programme has recently conducted surveys in order to establish, with each of the countries concerned, a list of promising sectors and new forms of cooperation (see table 2.1 page 11).



Hence the importance for European industry now to take an active part in RTD cooperation with these countries. But exploiting the opportunities is not conceivable without the necessary respect for mutual interests. The desire to penetrate these new markets, starting with the RTD phase, must be accompanied by opening up the Community RTD Framework Programme to these countries, to enable them to pursue comparable objectives. This is why the Commission is heading towards a form of mixed S&T cooperation. Selective S&T agreements, similar to those at present in effect with the industrialised countries (area A2) will complete the activities currently carried out under the INCO-DC programme.

New bridges with Indian technology

With 128,000 research scientists and engineers and an annual budget of over Euros 2 billion in 1995 (0.72% of GNP) at their disposal, India is today a scientific and technical centre of the greatest importance on the global level. Apart from its capacities in space and nuclear technology, this country possesses high-level expertise in computer science. Indian applications are exported to industrialised countries, especially for air and rail traffic control.
RTD cooperation with India must therefore be largely devoted to industrial questions. With this in mind, the Commission and the Indian Government have recently established the 3SE centre (Software Services Support & Education), aimed at promoting closer relations between European and Indian companies.



Understanding the great marine ecosystem of the Gulf of Guinea

The traditional *problem-solving* approach needs to be completed by another perspective, directed towards *exploitation of the opportunities*, which are particularly abundant in these countries, whose enormous potential for economic development brings with it a considerable demand for equipment and high technology products.

Over the last few years, a proliferation of small sea fish has been interfering with traditional catches in certain areas of the Gulf of Guinea. In order to understand this imbalance on the overall scale of the great marine ecosystem (GME) covering the area from Guinea Bissau to Gabon (including a dozen countries), laboratory research scientists from the Fisheries Directorate (Ghana), the University of Warwick (UK) and ORSTOM (France) are at present studying the impact of environmental pressure on marine biodiversity and the long term exploitation of traditional and industrial fishing. This work on the Gulf of Guinea GME is part of a vast pluridisciplinary network - there are altogether another 50 or so GMEs throughout the world - in which specialists are collaborating, particularly in the fields of oceanography, genetics, sociology and economics.

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