



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 25.04.1997
COM(97) 174 final

COMMUNICATION FROM THE COMMISSION
TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

*Scientific and Technological Research - a Strategic Part
of the European Union's Development Cooperation with Developing Countries*

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Introduction

The importance of research in helping the developing countries to meet both the global challenge of trade liberalisation and their own specific development problems were highlighted at the meeting of development ministers on 1st June 1995. The Council and the Member States asked the Commission to draw up proposals on ways to step up Community aid for developing countries in the research and technology development (RTD) sector.

In November 1995, research ministers approved a Commission communication on the prospects for international cooperation on RTD, which acknowledged the need to improve coordination between development aid and research policy.¹ A communication dealing with the specific objectives of scientific cooperation with the developing countries was promised.

This communication is the response to these two demands.

Before drawing up any proposals, the Commission embarked on an evaluation of its official development assistance (ODA) activities relating to RTD, and undertook a strategic review of the whole area of science and technology for development.

To better assess its own approach and compare it with that of the Member States, the Commission hosted a meeting with Member State experts on 3 and 4 December 1996 to discuss development and international scientific cooperation.

It also took into consideration the proposals and recommendations of the symposium on international RTD cooperation held on 19 November 1996, which it organized with the European Parliament, and of the Conference "Research Partnerships for Sustainable Development" it organized with the Dutch presidency, held in Leiden (NL) from 11 to 13 March 1997.

¹ Perspectives for international cooperation in research and technological development, COM(95) 489. N.B. RDT cooperation including research activities, technological development and demonstration.

1. THE DEVELOPMENT PICTURE: RISING TO THE CHALLENGE

Developing countries constitute a non-homogenous group with varying economic conditions. Even those which enjoy rapid economic growth in certain sectors, remain confronted by problems of sustainable development and chronic poverty. These countries, especially the least developed among them, are faced with serious difficulties, some of which stem from their own specific constraints and some of which are world-wide phenomena.

1.1 Immense challenges

The developing countries are facing three main type of challenges.

(i) Problems of society, which mainly concern the participation of civil society in decision-making and the choices affecting it. The access citizens have to information and knowledge conditions progress towards democracy and the rule of law, themselves crucial for the emergence of a modern economy and society, which is one of the overall objectives of the Community's development policy.

(ii) Those concerning the capacity of these countries to improve people's standards of living in terms of food, health, housing and education. These are legitimate basic needs and satisfying them is a world-wide challenge because there cannot be progress in managing the global environment nor in political stability while more than half the world's population is living precariously and unable to manage sustainably the resources it uses.

Major international conferences, from Rio to the World Food Summit, have looked at the global challenges posed by these problems and outlined policies to tackle them. For the EU, the aims of poverty-alleviation and supporting sustainable development are a contribution to this effort.

(iii) Those concerning the ability of developing countries to seize the new opportunities arising from the globalization of trade and the move towards more transparent economic competition, not only in the agriculture and agro-industry sector, but also in other relevant sectors.

Globalization is also affecting knowledge and technological know-how. If these countries are to gain easy and speedy access to various sources of scientific and technological information, they will have to greatly increase investment to allow them to make the necessary technological advances. It is widely acknowledged that countries without access to know-how and unable to master these constantly evolving technologies will lose out in the course of globalization.²

² ISAD, Midrand (South Africa), May 1996.

1.2 RTD in the developing countries

For all countries RTD is an ever more crucial tool of economic, social and cultural development, nourishing as it does a spirit of scientific inquiry and a culture of innovation that societies need to understand and master change. Economists recognise that a growing comparative advantage accrues to societies which are knowledge-based, and that others risk rapid marginalisation.

Most developing countries, especially the poorest among them, have lagged so far behind in this field that they cannot hope to join tomorrow's world without considerable scientific and technological investment. There do exist, however, niches of scientific excellence on which they can draw. Further more, local economic actors have an increased awareness of the demands of globalization and of the necessity of developing technological partners in order to take part in the ongoing process.

1.2.1 RTD investment not up to the challenge

The low interest and even suspicion, harboured by many developing country governments about science and technology, plus the burden of debt and structural adjustment constraints, have combined to push RTD to the bottom of their list of priorities. In many countries investment has remained structurally weak and has in some cases declined over the last decade.

The figures speak for themselves. The share of GDP allocated to RTD ranges from 2.8% in Japan and the US to next to nothing in some countries in the South. On average, developing countries (other than emerging economies) devote 0.5% of GDP to it.³

The EU spends an average of 2% and, with a view to convergence, is aiming to bring about a rapid increase in the countries devoting less than this average.

The figures for human resources are even more striking. The EU has 40 researchers/R&D personnel per 10,000 of the active population, whereas the number is 0.5 for the developing world, excluding Asia.⁴ Furthermore, researchers who remain at, or return, home often find themselves without the means to do high quality research.

Box 1: human RTD potential in different countries

In 1991 the figures for researchers/R&D personnel per 10,000 active persons were: 78 in Japan, 69 in the US, 40 in the EU, between 2 and 6 (estimated) in India and China and less than 0.5 in the (non-Asian) developing world.

³ Sources: MERIT, EUR 5897 EN Report and UNESCO 1994 Year Book.

⁴ India and China are investing in training and have ratios of 4 to 6/10 000.

RTD investment in the South also comes largely (exclusively in the case of the least-developed countries) from the public purse, which, because public spending in most of these countries is low and unpredictable, reduces its effectiveness and long-term impact.

In many developing countries research has not been sufficient to make a real contribution to understanding, solving or predicting of economic, social or political problems, or above all to help anticipate obstacles.

However, there are capacities which can provide economic relay mechanisms, and also developing country partners with comparative advantages to exploit them.

1.2.2 Insufficient capacity for speedy improvement

Research capacity in the South is insufficient to tackle a wide range of problems and has remained confined to a few sectors (often as not agriculture) and a few disciplines (biological and physical sciences). Even in these cases, efforts are often too fragmented and too isolated to make any real impact. However, certain countries (China, India and South Africa, for example) or regional groupings in Asia and Latin America are exceptions.

It is worth highlighting the main weaknesses without going into excessive detail.

The first is the lacuna in the field of economics and social and political sciences, something which is also true of countries with an otherwise considerable RTD potential. This lack reduces these countries' capacity to diagnose problems, formulate future scenarios and establish the public debate which is indispensable for any participatory and democratic process.

A second major deficiency is in the engineering sciences leading to shortage of engineers and technicians and, more generally, to a limited technological culture, which in turn causes continuing dependence on external assistance. The provision of opportunities for appropriate forms of cooperation can contribute to limiting this deficiency, as certain recently established bilateral cooperation activities have shown.

These first two weaknesses are closely linked to the often dramatic situation of many universities in Southern countries.

Furthermore, ignoring or even rejecting traditional forms of knowledge in the scientific approach taken has often led to opposition between the old ways and modern technology, the new replacing the old instead of complementing it. The cause, partially at least, is a cooperation that has focused on a "science transfer" approach rather than "aid for science".

Even in the more advanced developing countries, there is a division between research and industry, which diminishes the economic impact of scientific findings.

RTD investment in economic and social sectors for the purpose of responding to and anticipating developments through detailed planning is all too rare. Urbanization is an example of this failure to anticipate events.

2. LESSONS OF THE PAST

2.1 Europe

The Community's contribution to RTD has been made, on the one hand, under the international cooperation component of the research and technological development framework programme and, on the other, through ODA. The conception and implementation of the two, however, have tended to remain quite separate.

2.1.1 Significant scientific cooperation confined to a few areas

Since 1982, the implementation of scientific cooperation with the developing countries in the Framework Programme has been mainly implemented as a thematic approach (STD⁵ followed by INCO-DC⁶) addressing all developing countries in the same time. They did, however, only cover those development issues common to all: sustainable management of natural resources, agriculture and health.

BOX 2 SCIENTIFIC AND TECHNICAL COOPERATION WITH THE DEVELOPING COUNTRIES UNDER THE RDEP										
			STD 2 (1987-91)		STD 3 (1991-94)		INCO-DC (1994-98)			
Amount	ECU 42 m		ECU 85 m		ECU 125 m		ECU 247 m			
% RDEP	1.1		1.6		1.9		1.9			
Breakdown	Agri	Health	Agri	Health	Agri	Health	Nat. res.	Agri	Health	Other
%	75	25	70	30	65	35	30	30	30	10
Number proposals	1940		2527		2030		partial(*) 1068			
Number contracts	411		339		297		132			
Number partners	n.d.		EU	DC	EU	DC	EU		DC	
			303	327	787	585	305		303	

(*) 1st of three calls for proposals

Until 1994 this programme was supplemented, for non-ACP countries and outside the Framework Programme, by the International Scientific Cooperation initiative (ISC), which offered a more individualized approach, and covered themes other than those concerning development. For the period 1991-1994, the amount spent on this initiative represented a Community contribution of 103 million ECU.

⁵ Science and Technology for Development.

⁶ International Cooperation with the Developing Countries.

The evaluations made of these various actions have been largely favourable, emphasizing the relevance of the themes chosen and the extensive mobilization of research teams in the EU and partner countries in the South.

From the developing countries' point of view, they highlight the fact that these programmes have kept the best research teams in the developing world in contact with the international scientific community. The scientific gains have been substantial and they have often made a real contribution to understanding and solving the development problems of the countries and regions concerned.

From the EU's point of view, the programme has offered European scientists the chance to work on problems linked to biological and physical environments different to those in Europe, so broadening their professional experience. In turn, this has built-up knowledge of development problems that is needed to improve sectoral development policies.

The verdict is thus satisfactory and continuation of this work meets the needs of both the EU and the developing countries. However, some shortcomings have been identified.

The main one is the lack of any strategic framework for this work. As a result, in the EU there is little synergy between scientific cooperation actions and development aid projects. In the developing countries the programme has had a low profile and limited legitimacy arising from difficulties in really involving their political leaders in prior consultations on objectives, priorities, selection criteria, monitoring and evaluation.

Other weaknesses concern the frequent asymmetry in the partnership, to the detriment of the partners in the South; the fact that cooperation is confined to three areas, mainly for budget reasons (2% of the Community research budget); the difficulty of establishing clear geographical priorities; insufficient private-sector involvement (especially industry) and dissemination of the findings linked in part to inadequate opportunities and modalities in the Framework Programme.

The disappearance of the flexible formula provided by ISC, which also offered fellowships, has undoubtedly heightened the dissatisfaction felt by the emerging countries in particular. It has not been compensated by the opening to these countries of certain specific programmes (action 1 of the 4th Framework Programme) because even the most technologically advanced among them were unable in reality to take part in the absence of proper preparation for such participation.

2.1.2 Official development assistance, without adequate long term vision has given insufficient attention to RTD

The amount of Community ODA invested in RTD has remained very low and operations have been disparate in nature with no common thread.

Box 3: some findings of an inventory of RTD activities under the European Development Fund

An inventory of the 6th and 7th EDFs identified 166 research projects, or development projects with an RTD component, that accounted for spending of ECU 120 million. Of these, 57 were regional (50% research) and 109 national (10% research projects and the rest projects with an RTD component).

The sectoral breakdown is:

	Regional	National
Agriculture	21	63
Livestock	10	9
Forestry	5	11
Environment/ natural resources	7	9
Fisheries	8	4

Other sectors (mining, industry, health and institution building) account for the remaining 19 projects.

The sectoral approach developed for transport has revealed a need for RTD input, which will be done in future.

The main findings are:

- 80% of projects are designed to offer "immediate solutions" (improved plant varieties, etc.) without any component to build up local research capacity;
- most projects call on external scientific expertise;
- fewer than 5% of agricultural research projects cover economic aspects.

There has also been a marked tendency to look for short-term, "technical" answers to specific problems ("consultancy firm approach") without placing the actions undertaken in an institutional research context. The evaluation also points to the heavy dependence on external scientific and technical expertise, which does not allow local research capacity to build up.

Although significant regional programmes for agricultural research have been mounted under the EDF and interesting programmes such as ALFA (university cooperation in Latin America) and MED-CAMPUS (Mediterranean) have been created, ODA has not given RTD the attention it merits as a strategic element of sustainable development. Technology transfers have been preferred over aid to generate technological innovation locally.

To sum up, despite individual projects of high quality, especially in agricultural research, the evaluation of RTD projects has highlighted a lack of overall strategy. However, the place given to research in the new Community food security policy is a welcome recent development.

2.2 Developing countries

Over the last thirty years the newly industrializing countries of Asia have steadily both increased and diversified their financing of RTD so that it now stands at some 1.8% of GDP. The developing world as a whole could only manage a rise from 0.35% to 0.50% on average, and some sub-Saharan countries even fell back.

Box 4: contrasting trends in different groups of countries

Annual growth in RTD spending in three key sectors over the period 1983-90			
	<i>Private sector</i>	<i>Public sector</i>	<i>University research</i>
EU	+4.7%	+3.4%	+6.1%
Dynamic Asian economies	+23.6%	+14.1%	+13.8%
Developing countries	-1.5%	+1.1%	+6.5%

Box 4 illustrates the coherent effort undertaken by the Dynamic Asian economies for creating knowledge continua on which they base their technological development. The differences in these figures highlight the existence of two development strategies, one based on innovation and the other merely exploiting existing means.

Specialized research centres have seen their operating budgets slashed to levels at which they can no longer function properly. Some national agricultural research centres, for instance, have no operating budget other than external project aid, which means that their “cycles” of work are governed successive project cycles, with periods of practically no activity in between.

Universities are undoubtedly in the most critical state, their research role dwindling in importance, which also weakens their educational role. Instead, training of researchers is sought in the universities of the developed world, which widens the gap still further.

The civil society starting to emerge in the developing countries, has only rarely been involved in the choice of research priorities, with the result that the priorities are perceived as “academic” and without obvious practical use. Furthermore, the way in which results are disseminated, has made only a very limited contribution to the development of any “national” technological culture.

Recently, there have been some positive experiences, often based on actions involving both South-South regional cooperation and North-South cooperation in combination. Notably, at the international level in agricultural research, with the emergence of a global research system or the regional experiences acquired from cooperation undertaken by the EU and by certain Members states.

2.3 Conclusions

The main lessons learnt are:

- Most activities suffered from a low political profile and a lack of dialogue on sectoral policy upstream of the action. From this situation there results, in part, an absence of adequate methodology for allowing a real association of researchers and entrepreneurs with RTD in developing countries.
- ODA operations:
 - with rare exceptions neither the donors nor the countries themselves had any clear vision of the key role that RTD could play in supporting sustainable development policy and consequently the level of investment allocated to it was quite inadequate;
 - the failure to consider institutional aspects reduced the impact of dispersed actions;
- Scientific cooperation:
 - despite some excellent work, the lack of an appropriate political framework, an unequal partnership disadvantaging the South, the absence of specific mechanisms for valorising results and the limited number of research areas have muted its impact on development.

The new strategy must take on board these lessons and define a coherent overall framework to articulate its various elements and coordinate the actions undertaken.

3. OBJECTIVES, PRINCIPLES AND SUBSTANCE OF AN OVERALL STRATEGY

The complexity, scale and urgency of the challenges of development call for new solutions that can only be found through a major research effort.

The overall objective is to use RTD for development as a strategic tool to help the developing countries, within an acceptable timescale and at a reasonable cost, narrow the growing technological gap between themselves and the industrialised countries that is marginalising them in world trade.

To do this, a proper strategy of support for RTD has to be drawn up which allows the coordinated mobilisation of efforts of the European Union and the developing countries themselves.

3.1 General principles

The strategy will be based on the following principles:

Partnership will be the guiding principle of the whole strategy for both the joint definition of priorities and the implementation of EU actions. This principle is especially important in RTD because of the need to enter into long-term reciprocal undertakings.

Differentiation is a principle that complements partnership, the aim being to take account of the diversity of needs and cooperation arrangements in individual countries and regions resulting from their economic, social and cultural circumstances. It is already enshrined in the new international

scientific cooperation policy⁷ and is a new element in the thinking on “post-Lomé” cooperation set out in the Green Paper.

This principle should help to increase the efficiency of RTD cooperation, to give it more legitimacy and political profile. It should also guarantee that, as well as the general objective assigned to RTD cooperation, a specific objective should be carefully defined for each of the instruments concerned.

An integrated approach to solving specific problems, based on clarification of the respective roles of the production of scientific knowledge, on the one hand, and the generation or transfer of technologies, on the other. It will entail a great deal of interdisciplinary collaboration and close liaison with those involved in civil society and various socio-economic groups.

3.2 Substance of the strategy

Development of an RTD policy will call for coordinated action on three different fronts:

- (i) **institutional**: the formulation of RTD policies as well as the taking of legislative and regulatory decisions necessary for creating a propitious environment for the development and impact of RTD, especially those aimed at facilitating the involvement of the private sector. Action here is a prerequisite for any type of support since it affects effectiveness and viability other activities;
- (ii) **research capacity**: this refers, in particular, to the infrastructure, human resources, etc. needed to meet the needs of society and the economy, and constitutes a new priority since it will be the basis for the partnership that will take the place of “scientific and technical assistance”.
- (iii) **scientific and technical cooperation**: this provides contact with the outside world and is necessary to ensure access to external knowledge bases and for strengthening scientific excellence. Current reflections on technological innovation should lead to the development of appropriate methodologies for “market-oriented” cooperation.

Because of the interaction between all parts of this strategy, coordination is vital, to ensure coherence.

3.3 Defining the roles of the various actors

To make this partnership work, the role of those involved at various levels and at different stages needs to be spelled out clearly.

⁷ [COM(95 489) Perspectives for international research and technological development cooperation.

3.3.1 Public authorities in the developing countries

Their main role is to formulate and implement a domestic policy to encourage investment in technology (i.e. regulations concerning intellectual property rights, telecommunications, etc.) and to plan and finance efforts in the public sector, preferably in association with private investments when this is viable. As the regulatory framework falls into place, regional cooperation will be facilitated.

The EU will have to adapt its own position on these issues and specify the conditions attached to its interventions under the Lomé Convention, and the ALA and MEDA Regulations.

States are also involved in RTD themselves; this role is more significant in the least-developed countries, where publicly financed research has a proportionately more important role than in more developed countries.

Public efforts should focus on strategic research, science-related training and encouraging interaction between public and private research and relations with users under mobilizing national programmes. The choices made should be consistent with a long-term financing commitment.

3.3.2 European donors

On the basis of these common principles, the EU will enter into dialogue with its partners in the South with the aim of achieving agreement on the principles and priorities for action.

The Commission should focus on (cf. chap. 4 below):

- establishing or strengthening the basis of political dialogue on RTD, in liaison with Member States;
- support for institutional reforms at both national and regional levels (facilitating cooperation and the establishment of priorities, for example);
- stepping up scientific cooperation and technological innovation at national, regional and international levels;
- better coordination of the EU's positions in the relevant international fora (WHO, UNCTAD, the World Bank, the Consultative Group on International Agricultural Research (CGIAR), the Global Forum on agricultural research, etc.).

In the spirit of strengthening complementarity, the Member States could focus, as they often already do, on bilateral cooperation actions concerning scientific and technical capacity building which tackle national scientific and technological requirements.

3.3.3 Civil society and the private sector

All actors in civil society and the private sector, whether producers or consumers of knowledge and technology, should play an active part in the establishment of priorities and the implementation of research actions. As from now they should also provide, directly or indirectly, a larger share of

RTD financing, and organize themselves for the purpose of identifying their problems and needs.

In Europe, the mobilization of public and private expertise should be encouraged with a view to developing innovatory forms of scientific and technological partnerships on the basis of jointly agreed EU-developing country priorities. A prerequisite for this is that the potential partners get organized to coordinate cooperation possibilities. Examples of such coordination are the SHARED initiatives in the field of health research, and ECART and NATURA covering higher education and agricultural research.⁸

4. IMPLEMENTATION: INSTRUMENTS AND AREAS OF WORK

The proposed strategy constitutes a qualitative leap forward in comparison to previous practices and is based on the principle of scientific and technological “mainstreaming”, the aim of which is to take account of scientific and technical aspects in the preparation of cooperation programmes, which, if done systematically, will radically change attitudes to RTD among both donors and recipients.

4.1 Two complementary instruments that should pull together

Two instruments exist for Community cooperation with developing countries in the field of RTD:

- economic and technical assistance operations to achieve external policy objectives that are implemented under a number of different financial instruments (the Lomé Convention, the ALA and MEDA Regulations, etc.) that are specific to particular regions;
- international scientific cooperation actions in pursuit of Community research objectives which are managed under the RTD framework programme.

These operations should correspond to the specific objectives of each instrument and also be consistent in terms of general principles with the overall strategic objective.

4.1.1 Enhancing the role of RTD in EU economic and social cooperation

RTD should now assume a much more important place in EU cooperation, to be achieved in two ways:

- substantial financial support for institution building and strengthening research capacities (including rehabilitation of universities);
- “mainstreaming”, meaning that an RTD component is included in focal sectors of programming and which could be lead to a proportion of the

⁸ SHARED = Scientists for Health and Research for Development.
ECART = European Consortium for Agricultural Research for the Tropics.
NATURA = Network of European Agricultural Universities and Scientific Complexes Related with Agricultural Development.

funds (possibly 3% to 5%) being devoted to science and technology actions.

The adoption of these objectives will send a strong signal to the developing countries and encourage them to enter into dialogue on RTD.

Actions for supporting RTD capacities will vary in nature depending on the country or region concerned. The Community will be particularly interested in regional actions since it has suitable financial instruments and acknowledged experience at that level.

Differing priorities may emerge from the policy dialogues with different regions as a result of the level of development of the countries concerned and the EU's objectives. Some areas, however, would seem to be of common interest to all countries.

4.1.2 Consolidation and diversification of science and technology cooperation with the developing countries

S&T cooperation with the developing countries comes under the international scientific cooperation policy and as such must be of mutual interest. It should also underpin development and economic cooperation with these countries and be an integral part of the new strategy.

The Fifth Framework Programme, currently being drawn up, should contain a specific action covering themes relating to development issues, enabling scientists of Europe and the developing world to work together on true research projects, and associating young scientists by an appropriate fellowship mechanism. The programme should be drawn up taking account of the lessons learnt and in accordance with the objectives and principles of the new overall strategy. This will give it a legitimacy and profile that have been limited up to now.

The strengthening of the institutional framework and research capacities in the South will help to bring about a more balanced and enduring partnership.

Concertation with the public authorities and civil society will ensure better identification of regional priorities and strengthen the impact and use made of the results.

To complement the thematic approach embracing all developing countries, more flexibility is needed in cooperation so that the individual needs of countries and regions are taken into account. Special arrangements will be needed, particularly in respect of the emerging economies, to prepare and facilitate their participation in the vertical thematic programmes of the 5th Framework Programme.⁹

⁹ [COM(96) 344] Promoting RTD cooperation with the world's emerging economies (communication for the Mediterranean currently being drafted).

The financial allocation for S&T cooperation with the developing countries must be sufficient to accommodate this double-pronged approach and be coherent with other instruments used to achieve the objectives of this overall strategy.

4.2 Areas of work

Application of the principle of partnership will entail joint decision-making concerning the areas to be covered by the EU and its partners, taking into account cultural differences. This means that the EU must clearly establish its own priorities before entering into serious dialogue with its partners.

These priorities should be established by the EU, in accordance with the following criteria:

- the key political and cultural objectives, such as the provisions on development cooperation of the Treaty on European Union;
- the likelihood of speedy impact on development and/or on integration into the world economy;
- the existence of European scientific know-how that could be sustained or developed through scientific cooperation;
- commercial potential to be realised (communications technologies, some spheres of industrial complementarity, etc.) and strengthening the presence of economic actors in expanding and competitive markets;
- the need to gain access to physical, biological or social environments that is essential for the progress of knowledge and of use to Europe itself.

These criteria will help identify the right priorities to meet the challenges faced.

Without being exhaustive, a number of priorities may be cited that satisfy these criteria in the main sectors concerned by development cooperation, implementation of which will involve one or both Community instruments.

- *Management of natural resources and agriculture, fisheries and agro-industry.* These are areas where there are existing partnerships that can be reinforced and where two major challenges have to be met: the sustainability of development and food security. Adaptation to local/regional (urban) demand and to the international market will be a key objective of the actions chosen and might concern primarily:
 - at the institutional level, support for (sub)regional cooperation mechanisms to be built up in the framework of the global system of agricultural research for development;¹⁰
 - at the operational level, priority for supporting regional programmes;

¹⁰ National agricultural research systems (NARS) have grouped themselves together in regional forums (FARA for sub-Saharan Africa, LAC for Latin America and the Caribbean, APAARI for Asia and the Pacific and AARINENA for North Africa and the Middle East). Two of these forums are related to regional subregional associations: CORAF, ASARECA and SACCAR in Africa, and PROCCIs for Latin America.

- at the operational level, priority for supporting regional programmes;
- for S&T cooperation, greater focus on subjects likely to have real impact and mobilize the private sector.
- *Health* is a sector where aid is increasing. Biomedical research remains urgent (less than 2% of research done concerns tropical diseases!) and should be supplemented by fresh efforts on the public health front.
- *Demography and population* issues linked to urbanization and land-use problems, as well as related problems such as transport and mobility, must have greater prominence than in the past.
- *Energy* matters are crucial for any prospect of sustainable development in the developing countries and must find its rightful place in development cooperation.
- *Information and communications* must underpin any development policy nowadays¹¹. They play a central role in RTD in allowing the connection of researchers to networks, and in reducing the effects of dispersion of teams. Technology cooperation actions will derive from proposals made pursuant to the draft communication on "the information society and development".

Cooperation at a pre-competitive level in other technological and pre-industrial domains (including information and communication technologies and energy) will take place where there is mutual interest. Mechanisms for Community cooperation should take into account the interests of European industry, whose participation should be encouraged, in particular in regard to countries or regions with strong growth. These mechanisms should find a satisfactory balance between efficiency and visibility and its modalities should be accordingly defined.

The Community should provide support to local research institutions and on-the-spot training in research as a cross-cutting priority. Another is to revive the role of universities as producers and transmitters of knowledge, especially in the least-developed countries, where the situation is dramatic. The conclusion of long-term contractual relationships between universities of Europe and the developing world and their economic partners, on the one hand, and contributing to strengthening South-South links between universities, on the other, are of major political importance for the EU. They allow the development of cultural links with the South while at the same time controlling the number and duration of stays made by postgraduates and trainee researchers in Europe. This can also contribute to maintaining or re-settling doctoral students and researchers in their home countries after training overseas.

5. GREATER COHERENCE AND COMPLEMENTARITY THROUGH EFFECTIVE COORDINATION

The proposed strategy must be implemented in accordance with the provisions of the Treaty in respect of coherence and complementarity.

¹¹ cf. COM "Information society and development" in preparation.

5.1 Coherence between Community policies

By setting a common overall objective and complementary actions based on priorities agreed with the countries concerned, the strategy provides a coherent framework for both the external policies and the research policy with the developing countries.

Its implementation will call for ongoing coordination between departments. The Commission has already started to do this during implementation of the fourth Framework Programme and preparations for the fifth by organizing consultations between the departments involved on the international side. These efforts have to be extended and put on a more permanent footing.

To be really effective, internal coordination will have to be stepped up and doubtless take on a more institutionalized form with clear terms of reference. One possibility is a scientific "forward planning unit".

The recruitment of more RTD skills at Commission headquarters would make for more efficient coordination.

5.2 Complementarity with the Member States

The strategy is based on a complementarity of operations undertaken by the Commission and the Member States, both internationally and in the developing countries. This supposes that the Member States have also taken action to increase coherence of the various RTD steps they are conducting with developing countries.

The effectiveness and visibility of the EU will emerge strengthened from this.

In this context, the European Initiative on Agricultural Research for Development (EIARD)¹² is a coordination mechanism that, among other things, has made the EU's contribution to CGIAR more visible (the Commission and the Member States combined provide 40% of its budget) and raised the European profile. This coordination effort must continue.

Mechanism of a similar type to coordinate the EU's international contribution in other areas (e.g. health) should also be considered.

The complementarity vis-à-vis Southern countries starts with more transparent and better structured exchanges of information. The INCO-POL study is a good example.¹³ The Commission proposes to set up this type of coordination in some regions designated strategic by the Council.

¹² There is a Communication [COM(97)126] reporting on this initiative

¹³ INCO-POL is a study financed by the Commission (and agreed by the Member States) to make an inventory by region of the Member States' policies on aid for research.

5.3 Political dialogue on RTD with the South

The choice of such an integrated overall approach calls for political dialogue with the developing countries, in coordination with the Member States, to establish a framework for action at regional and national levels which is coherent within the overall scope of European Union external relations.

The Commission proposes to help conduct this political dialogue, which should establish a common coherent framework for Community RTD activity and a basis for bringing about greater complementarity with the Member States.

The experience of the Euro-Mediterranean scientific partnership, both in its achievements and in its limits, provides a useful starting point which might be adopted for other regions in the South.

Conclusions

In view of the complexity, scale and urgency of the challenges facing us, the Commission underlines the strategic role that RTD has to play in promoting sustainable development in the developing countries and achieving the Community's development cooperation objectives.

The lessons learnt show that only a comprehensive approach based on aid for science can ensure a coherent and effective implementation of both development and research policies.

The Commission regards the drafting of the fifth Framework-Programme, and the debate opened by the Green Paper on the future of cooperation with the ACP States, as two crucial opportunities for putting into practice what has been learnt.

It proposes that RTD now be systematically taken into account in sectoral approaches.

It underlines the need to consolidate specific scientific and technological cooperation activities for development within the international cooperation component of the Fifth Framework Programme to make them an integral part of this strategy. In addition, it also underlines the interest in implementing measures which permit improved access of "emerging economies" countries to the Framework Programme, and to develop scientific and technological cooperation actions which facilitate access of European enterprises to rapidly growing markets

Finally, the Commission proposes that political dialogue in this strategic sector be strengthened, in coordination with the Member States, with a view to establishing a true partnership with the countries and regions concerned.

ISSN 0254-1475

COM(97) 174 final

DOCUMENTS

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11 15

Catalogue number : CB-CO-97-163-EN-C

ISBN 92-78-18770-4

Office for Official Publications of the European Communities

L-2985 Luxembourg