

Research Cooperation between Sweden and Uruguay 1986-1995

An evaluation and some general considerations

**Oswaldo Goscinski
Mikael Jondal
Claes Sandgren
Per Johan Svenningsson**

**Department for Evaluation
and Internal Audit**

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Sida Evaluation 99/14

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and Internal Audit**

Evaluation Reports may be ordered from:

Infocenter, Sida
S-105 25 Stockholm
Telephone: (+46) (0)8 795 23 44
Telefax: (+46) (0)8 760 58 95
E-mail: info@sida.se, Homepage <http://www.sida.se>

Authors: Osvaldo Goscinski, Mikael Jondal, Claes Sandgren, Per Johan Svenningsson.

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SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
Address: S-105 25 Stockholm, Sweden. Office: Sveavägen 20, Stockholm
Telephone: +46 (0)8-698 50 00. Telefax: +46 (0)8-20 88 64
Telegram: sida stockholm. Postgiro: 1 56 34—9
E-mail: info@sida.se. Homepage: <http://www.sida.se>

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Executive summary

The programme

From 1986/87 to 1994/95, SAREC funded research cooperation between Sweden and Uruguay. SAREC supported nine projects in all, five in medicine (70% funding), two in agriculture (19%), one in technology (5%) and one in economics (6%). All the projects in medicine and agriculture were maintained during the entire programme period, and no new projects were added to the programme after the initial selection of projects. SAREC funds in support of the programme totalled approximately SEK 45,4 million. About 40% of this went to the Swedish research institutions involved in the programme, the rest to research institutions in Uruguay. Following an established SAREC formula for cost-sharing in programmes of this kind, the salaries of the Uruguayan researchers in the programme and other local costs on the Uruguayan side were to be paid by the Uruguay.

Projects were selected according to SAREC policy criteria at the time, and the availability of high-quality scientists with matching research interests in Uruguay and in Sweden. SAREC policy required that 1) support should go to institutions in the recipient country and in Sweden who had a common interest in a research area where the Swedish institutions could offer knowledge and expertise; 2) the research areas selected for cooperation should have a general relevance for poor developing countries; 3) the research programmes should be designed by the involved laboratories; and 4) the programme country should fund its own participating laboratories. In this case, SAREC policy criteria were met for criteria 1-3. Criterion 4 was in several cases not fulfilled.

The evaluation

The evaluation covers research cooperation in eight areas of medicine, the natural sciences and technology. The evaluation team consisted of Prof. Osvaldo Goscinski, Uppsala University (physical sciences and computing), Prof. Mikael Jondal, Karolinska Institute (bioscience), Prof. Claes Sandgren, Stockholm University (methodology, policy), and M. Eng. Per Johan Svenningsson, private consultant (technology). The evaluation was originally intended as a “benchmarking”, where SAREC’s programme would be set against a programme for Science and Technology (S&T) in Uruguay supported by the Inter-American Development Bank (IDB), and managed by Conicyt, Uruguay’s national research council. Because of the considerable differences between the two programmes in several ways this approach proved less than sensible. The IDB/Conicyt programme, however, which the team evaluated as a separate exercise for the Bank, has served as a very useful frame of reference when evaluating the SAREC programme. The purpose of this evaluation is partly to summarize the results of the Uruguay programme, partly to draw useful lessons that SAREC can apply in the development of future programmes.

The evaluation is concerned with the results of SAREC’s programme in relation to the development of science and technology in Uruguay; it does not deal with the impact of the programme on research and research institutions in Sweden.

Programme results

With regard to the performance criteria set out in the terms of reference the main findings of the evaluation can be summarized as follows:

Relevance. It is obvious that SAREC’s programme has not been designed with Uruguay’s societal needs clearly in view. While the bulk of the funding has been used for medical research, nothing

was spent on technological/industrial Research and Development (R&D). A more varied approach, covering R&D in the very important agro-industrial field, would have been more relevant. Our general conclusion is that although individual *projects* were relevant in their own context, the overall *programme* lacked relevance to Uruguay's societal and S&T needs.

Effectiveness. As SAREC did not clearly define the objectives of the programme as such, an assessment of effectiveness cannot be made at the programme level. Among the component projects, however, there were several that had successfully achieved their targets and generated valuable results. The high quality of the scientific activities in these projects is reflected in the production of a large number of scientific papers, some in internationally renowned journals, a build-up of laboratories, and in the training of new researchers. Even projects that to the evaluators seemed less successful, clearly had interesting parts, and thus contributed to the strengthening of Uruguayan S&T.

Efficiency. The component projects have generally been efficiently managed, and the projects have had a reasonable output in relation to their financial resources. SAREC's own performance in the administration of the projects has been highly appreciated in Uruguay. Project leaders and other scientists almost unanimously say that SAREC's way of managing the programme was very smooth, unbureaucratic and, in their opinion, cost-effective. The evaluators agree with this and would like to add that the degree of responsibility and independence given to the scientists has been important in making sure that resources have been used efficiently.

Impact. The impact on the S&T community has been quite noticeable, at least when it comes to the directly involved research groups or departments. Some of the projects, especially those concerned with parasitic diseases and respiratory infections, have produced very useful results. A significant number of higher degrees have also been financed through the programme. The Uruguayan S&T system as a whole, however, has *not* been significantly affected by the SAREC programme. The national institutions for planning and coordination of research, i.e. Conicyt and university authorities, have barely been touched by SAREC. Also, not many resources of broader use, such as national experimental facilities or networks, have been set up with SAREC funding.

The impact of SAREC's programme on the economic/industrial sectors of Uruguay, or on the Uruguayan society in a broader sense, has been very marginal, if at all noticeable. All-in-all, the evaluators have come to the conclusion that the impact has been very fragmented and for the most part confined to some limited areas of research. In those limited areas, it has however been of significant importance. The impact, as so many other things in the SAREC cooperation, has been more project than programme oriented.

Sustainability. In most of the projects the working contacts between Sweden and Uruguay were not maintained after the funding period. In some cases, the reason for this is that the contacts between counterparts in Sweden and Uruguay were not adequate, even during the funding period (STD and AIDS and ARI in children), in other cases there have been no funds for maintaining the relationship

While in most cases the contacts with Sweden have come to an end, however, some of the Uruguayan researchers continue with research work that was initiated in the projects supported by SAREC. Research that stands the best chance of attracting funding in years to come is probably that which have a commercial potential, such as vaccine development in parasitic diseases, production of immunodiagnosics, and research related to agricultural areas. Thus, even if the scientific cooperation itself has not proved sustainable, and funding may become a serious problem for some of the researchers in the future, the results of the projects are in many cases likely to have a lasting and productive impact.

Programme design and implementation

Selection of projects. SAREC used a “project approach” in the sense that it directly contacted a number of renowned Uruguayan researchers – whether in Uruguay or in exile – and offered them the possibility of participation in research cooperation with Swedish researchers. SAREC also undertook to identify Swedish research institutions that would be suitable as partners to the research institutions in Uruguay. The official Uruguayan involvement in the process was limited – the most important element being the release of a “go-ahead” from the Foreign Minister. The participation of the ministries responsible for scientific research, the Ministry of Education and the Office of Budget and Planning, was marginal.

This approach to project selection had the obvious *advantage* of allowing the programme to be organized quickly and flexibly. There were, however, also some *disadvantages*, especially in Uruguay: (a) the relevance to Uruguayan industry, agriculture or other societal sectors in Uruguay was not included as a criterion in the selection process; (b) although the main rationale behind SAREC’s support for research in Uruguay was the generation of useful research results, the quality of the projects was not examined *ex ante* by independent evaluators; (c) the lack of involvement of central S&T authorities diluted the Uruguayan ownership and accordingly their willingness to allocate funds to the projects in the future; and, (d) capacity building in the area of policy development, research administration and the like was very limited.

Results production or capacity building? SAREC’s support to Uruguay was formally a “results-emphasising cooperation,” i.e. a cooperation directly focused on the production of useful research results, in contrast to a support primarily aiming to strengthen research *capacity*. Much of the research cooperation with Uruguay contributed, however, to the strengthening of research capacity by, *inter alia*, the training of young researchers. This was consistent with the fact that Uruguayan research capacity was limited during the military regime, and that the essence of the Swedish institutions’ contribution was meant to be the transfer of knowledge. We have also noted that several of the capacity-building activities of the IDB/Conicyt programme have contributed to the generation of research results. The Uruguayan experience has, thus, hardly confirmed that SAREC’s firm distinction between “result-emphasising” and “capacity-emphasising” research cooperation is a realistic or sensible one, the two being inter-linked.

Financing. The SAREC grant proved to be rather quick and inexpensive to administer; it was channeled directly to the participating Swedish institutions and to some degree to the Uruguayan institutions. It proved difficult, however, to uphold the requirement of cost sharing. Due to Uruguayan budgetary constraints SAREC had to cover some local costs and furnish some equipment. As SAREC’s programme was not closely integrated with the national S&T system this problem could not easily be remedied. The IDB loan, by contrast, forced the Uruguayan government to analyse its research policy and research needs and to incorporate the research funding in the state budget, all of which reinforced the efficiency of the programme and the Uruguayan ownership of it.

Higher education. Although training of young researchers was not a formal objective of the SAREC programme, it became one of its most important components. Within the framework of SAREC’s “sandwich model” many young Uruguayan scientists went to Sweden for training. We also found that many Uruguayan researchers involved in SAREC projects work as teachers at the university. We believe that senior researchers engaged in SAREC-funded research, should, in principle, also be engaged in teaching.

Linkage. The linkage between research supported by SAREC and the Uruguayan society is hardly mentioned in the preparatory documents. There was little consideration of societal relevance, let

alone interaction with industry, the service sector or other similar stakeholders. A good match between the research and societal needs could have been achieved only through a close interaction with stakeholders outside the academia. In contrast to IDB, who took great pains to involve various stakeholders and set up a specific facility for such interaction, SAREC hardly made any efforts to bring about such an interaction.

Quality aspects. The SAREC projects on average probably had a higher scientific standing on average than the projects in the IDB/Conicyt programme, the main explanation being that SAREC deliberately chose well established and qualified research groups for its programme, not that procedures for quality assurance were more demanding. This issue has not been closely examined, but it may well have been that the intense scrutiny by local and international colleagues within the IDB/Conicyt programme has led to higher quality requirements for the individual projects than the relatively easier procedures in the SAREC programme. The fact of there was no real financial competition once the SAREC programme was established, could easily have made for such a result.

The SAREC Model. As applied to Uruguay, SAREC's approach to research cooperation proved to have some serious weaknesses. The most important were perhaps that it by-passed Uruguay's national structures for support to S&T and was not based on a preceding country analysis. Once established, the programme also suffered from a certain lack of flexibility. Through evaluations by external consultants, SAREC was to some extent able to assess project progress, but this method of control may not have been sufficient. Acting independently of regular national support mechanisms for S&T imposes a great responsibility on SAREC, in terms of both professional follow-up and the overall success of the programme.

Networks. One very positive aspect of SAREC's programme has been the cooperation between research groups in different countries. Even though the direct collaboration ceased in many cases when funding came to an end, other forms of cooperation, notably different ways of networking, have continued. The Coordination of Networks for Research and Training in Biomedical and Agricultural Sciences (CORIECIBA) network co-ordination committee, presented in section 3.9 is the foremost example. SAREC should definitely consider supporting CORIECIBA, and other network activities, as these are highly efficient in extending results from earlier granting periods, both in terms of basic and applied science and in terms of science education.

Basic vs. applied research. A major difference between the programmes of SAREC and IDB/Conicyt is that SAREC's programme was oriented towards basic science while the IDB/Conicyt programme put more emphasis on applied science. Yet, both the programmes seem justifiable and relevant. As noted above, however, the SAREC programme should have been based on a preceding country analysis. Also, the burden of creating a relevant programme, applied or basic, could have been placed more with the receiving country. If a country cannot formulate its own needs and priorities, the support might better be focused on capacity building by measures that are simple, effective and easy to evaluate.

Recommendations

The following are general recommendations for SAREC that can be inferred from our study:

- 1 Before initiating research cooperation with a country, SAREC should produce or commission a comprehensive country report, describing all relevant facts for organising science support. When establishing priorities, economic/societal factors are as important as scientific tradition.
- 2 Projects should be demand-driven as much as possible. SAREC's existing approach is, generally speaking, supply-driven and linear. No interactive mechanisms are foreseen and no funding is directed towards the *demand side* to increase and improve the demand for research and thus reinforce the quality of public sector research.
- 3 SAREC should work in close collaboration with national research organisations in the partner countries, and involve them as much as possible in programmes. Training in research management at all levels, from ministry to project groups, should be offered. It can be argued that the Uruguay programme had to be started without Conicyt being fully involved. Yet what according to SAREC was initially a matter of "efficiency", resulted in the creation of a programme that had no impact on Uruguay's national S&T system, and led a life of its own, unrelated to national priorities.
4. Clearly define anticipated results and impacts, and plan for project/programme evaluations from the start, including important milestones. Be prepared to redefine or terminate projects if results fall short of expectations or preconditions change.
5. SAREC should consider the option of supporting projects that are more integrated with local industry. By supporting research programmes that address the industrial development needs of partner countries, SAREC might contribute to economic growth while at the same time ensuring the sustainability of research projects and research results. Most R&D activities in Sweden are performed by *private* entities and there is a need to stimulate R&D in non-public entities in developing countries. No non-public entities, whether in Sweden or in developing countries, have even been mentioned in the SAREC Guidelines. No new *financing* schemes have been envisaged, for example schemes that could facilitate research partnerships between companies in the South and Swedish entities and partnerships with entities in middle-income countries.
6. SAREC's policy is a science policy, not a science and technology policy. To derive full effect from its investments in science, we think that SAREC should design them within the context of a *science and technology policy*.
7. SAREC sees itself as a *financing agency*, not as an agency which could act as partner, broker and adviser in the area of research cooperation, irrespective of the source of the funding of the research. SAREC should consider the possibility of extending its role to include a wider set of tasks. Acting as a broker/adviser, it could assist partner countries in the co-ordination of support from other donors and funding agencies. It could also assist its partners with regional cooperation, and it could act as a promoter of long-term cooperation between research institutions in partner countries and Swedish research institutions, even when SAREC itself has ceased to provide any funding.
8. Educational activities – not only training of researchers, but also other higher-level education – are very important in connection with research. SAREC should put greater emphasis on educational activities, and not see them as a different part of the foreign assistance scenario.
9. SAREC should be more active when it comes to publicising and requesting research cooperation. Through the Internet all projects, and all requests for project proposals, should be made easily accessible to the entire Swedish research community.

1. Introduction and methodology

1.1 Introduction

Between 1986/87 and 1994/95, SAREC funded research cooperation between Sweden and Uruguay, including cooperation with Argentina. The following is a report on the evaluation of that research cooperation. The evaluation covers research in eight areas of medicine, the natural sciences and technology. SAREC also supported three institutes for social science during and after the military regime in Uruguay, and supported the Department of Economics at the University (Universidad de la República) between 1991 and 1995. SAREC also supported four such institutes in Argentina. The social science projects are not included in the evaluation.

The evaluation has been carried out by the following team: Prof. Osvaldo Goscinski, Uppsala University (physical sciences and computation); Prof. Mikael Jondal, Karolinska Institute (bio-sciences); Prof. Claes Sandgren, Stockholm University (methodology, policy); and M. Eng Per Johan Svenningsson, private consultant (technology).

The team has also carried out evaluations of science and technology projects financed by the Inter-American Development Bank (IDB) in Chile, Costa Rica and Uruguay. These case studies have been published by the Bank as Project Performance Reviews (PPR). The Uruguayan study, entitled PPR-8/97, was published by the Bank's Evaluation Office in October 1997. In addition, the team has submitted a final, comprehensive report to the Bank (IDB, Evaluation Office, Working Paper WP-6/98, Evaluation of IDB's Science and Technology Programmes in Chile, Costa Rica, and Uruguay. Final Report, 1998).

The present evaluation was originally intended to form part of a "benchmarking" of IDB and SAREC programmes in Uruguay. Because of the differences between the two programmes, this approach did not prove to be well-advised. The IDB programme has, however, been a very fruitful frame of reference for our evaluation of the SAREC programme.

1.2 Documentation and activities

We have studied a large number of project documents, research publications and other types of documents regarding the research cooperation. We have also received ample information and generous support from the Uruguayan authorities and from the research and business communities in Uruguay.

A conference summing up the research cooperation between Uruguay, Argentina and Sweden took place in Uruguay on November 29-December 1, 1996. Two of the team members attended the conference. The proceedings of the conference (see the list of references) have been most useful. The team visited Uruguay for two weeks (April 7-19, 1997), after which an additional visit was paid on July 22-26 the same year. A visit was also made to Argentina (November 24-26, 1996) because of the cooperation with Argentine institutions that was part of the programme. During the visits we interviewed a large number of government and academic authorities, the staff of agencies, scientific community leaders and researchers and representatives of the private sector. The major research faculties of the University were also visited during this time: the Faculties of Agronomy, Chemistry, Engineering, Medicine and Science. We also visited research centres participating in the SAREC cooperation programme in Uruguay, among them the Instituto de Investigaciones Biológicas Clemente Estable (IIBCE) and Laboratorio Tecnológico del Uruguay (LATU). In Argentina, visits were paid to the Secretariat of Science and Technology, Instituto de Investigaciones Bioquímicas Funda-

ción Campomar, Faculty of Science, University of Buenos Aires and Fundación Antorchas. All eight research areas evaluated have been the subject of site visits.

1.3 Terms of reference and methodology

We have been guided, in principle, by the terms of reference applying to our assignment for the Bank. We were also able to make use of a comprehensive and useful unofficial document (Sida/UTV, Stefan Molund 1997-09-29), presented as complementary to the terms of reference. In addition, we have benefited from very constructive dialogues with the author of that document and with Dr. Carlos Abeledo, a member of the staff of IDB who at the time was responsible for the co-ordination of the evaluation of IDB's Science and Technology (S&T) programmes.

While our evaluation of the IDB programme (see 1.1 above) could take a comprehensive loan document as its point of departure, we had no similar basis for the SAREC evaluation. We had to rely on a variety of documents, some of them of a rather sketchy nature. Our SAREC evaluation has, however, profited very much from our IDB evaluation, which was wider in scope. Many of our interviews, discussions, site visits and desk studies for that evaluation have been beneficial to our SAREC evaluation, not only because the two programmes coincide in some respects but also because many policy matters are identical. Our IDB assignment has not only given us substantive insight but has also been beneficial to our methodological thinking regarding the SAREC evaluation.

The documentation that we have drawn on, the activities that we have carried out and the methodology that we have used provide, as we see it, a firm ground for our findings and conclusions.

Broadly speaking, we have used the following *criteria* for our assessment of the cooperation. The rationality of the cooperation is regarded as coherence with Uruguay's science policy and the country's needs. Its effectiveness is viewed as attainment of programme objectives and an assessment of whether agencies acted professionally in their handling of research funding allocation. Efficiency is assessed by reviewing the management of the cooperation, including its cost-efficiency. Impact is difficult to assess. It is hardly possible to separate the impact of SAREC-financed operations from other factors, such as external pressure to increase competitiveness. Primarily, impact means good research results being used and cited. In addition, the build-up of a research capacity – such as resources, policies, institutions at various levels – is an indicator of impact. A broad and stable cooperation between public sector research and society is a good sign of impact. Sustainability, finally, coincides to a high degree with research capacity in a broad sense and with continued institutional cooperation with Sweden. The continuity of research activities after the termination of SAREC's cooperation is also an element of sustainability. Commitment to science at the political level and a continued allocation of resources for research are important for the sustainability.

2. The Uruguay Programme

2.1 Background

As a consequence of the restoration of democracy in Uruguay and at the initiative of the Swedish government, SAREC initiated a programme for research cooperation with Uruguay in 1986. At the time, Uruguay had a relatively high per capita income. As can be seen in SAREC policy documents, the rationale for Swedish support was, in the first place, the destruction of Uruguay's research capacity during the military regime (1973-1985).

The Uruguayan government was well aware of the need to restore its research capacity. Already in 1985 it launched a national programme for basic sciences – Programme for the Development of Basic Sciences (PEDECIBA) – under the authority of the Ministry of Education and the University. This programme, initially supported by UNDP/UNESCO was aimed at building up teaching and research within physics, chemistry, biology and mathematics. Furthermore, the Uruguayan government came to an agreement with IDB in 1991 on a loan for a science and technology programme (see 2.3 below).

2.2 SAREC programme

The Board of SAREC decided in April 1985 to study the feasibility of research cooperation with Uruguay. The programme started in 1986/87 and was in principle completed in 1994/95. During these nine years SAREC granted SEK 45.4 million to Swedish and Uruguayan institutions for their cooperation. As has already been mentioned, cooperation with Argentine institutions formed an integral part of the programme. Most projects started already in 1986 or 1987 and continued throughout the period, two areas being added in 1989. The project research areas were Chagas disease (1986), mental health (1986), respiratory infections in children (1986), STD/AIDS (1989), hydatidosis/parasitic disease (1986), nitrogen fixation (1986), potato research (1986), lignocellulose (1987) and economics (1989). – An overview of the projects is included in Table 1.

The research cooperation with Uruguay was governed by the *guidelines* that SAREC's Board had issued for research cooperation with middle-income countries (Board decision of April 22, 1985). The guidelines provided as follows: a) SAREC supports research cooperation between institutions in the recipient country and Swedish institutions in research areas which are of mutual interest to the participating institutions in the host country and in Sweden, and where Sweden can contribute with relevant research competence; b) the proposed areas of research shall be of general relevance also to poorer developing countries; c) the research programmes shall be designed jointly by the participating institutions; d) the host country covers local costs for participating domestic institutions, for example salaries and premises.

Table 1 – SAREC's support to research cooperation with Uruguay (SEK)

Project name	Funds 1986-91	Funds 1992-95	Total funds
Chagas disease	2,675,000	4,015,000	6,690,000
Mental health	2,060,000	1,990,000	4,050,000
Respiratory infections in children	1,595,000	1,725,000	3,320,000
STD/AIDS	1,475,000	290,000	1,765,000
Hydatidosis	7,030,000	7,850,000	14,880,000
Nitrogen fixation	3,705,000	1,350,000	5,055,000
Potato research	2,135,000	1,180,000	3,315,000
Lignocellulose	1,330,000	1,065,000	2,395,000
Economics	787,000	1,685,000	2,472,000
Total:	23,100,000	22,300,000	45,400,000

2.3 IDB/Conicyt programme

The main S&T programme in Uruguay has been the IDB-financed effort managed by the national S&T council, Conicyt. The total volume of this programme has been 50 MUSD for the period 1991-98. The funds have been made available as a loan from IDB, not a grant as in the SAREC case. The three main components have been support to restoration and build-up of infrastructure, support to research projects at the university and some other institutions, and support also to industrial technology development or acquisition projects.

Conicyt has to a large extent operated in the traditional way for a research council, i.e. with a strong component of intra-scientific decision-making and with a strong role for the academic community. IDB has not had any direct influence over project prioritisation or other academic policy issues, except when it comes to a very general level. IDB, on the other hand, has had fairly close control of financial matters and administrative regulations.

Conicyt has deliberately sponsored quite a large number of projects in many scientific areas – about 200 – within a financial volume of 17 MUSD. A large number of scholarships and long- and short-term training stipends have also been offered to mainly younger Uruguayan scientists.

There are several very clear differences between the SAREC and IDB programmes, *viz* a large investment in scientific infrastructure in the IDB programme as compared to very little of the same in the SAREC programme, and a very broad approach with smaller amounts for many projects in the IDB programme as against larger amounts for a few projects in the SAREC programme.

3. Projects

The SAREC programme has been structured in 4 areas – Medical sciences, Agronomic sciences, Technology and Economy. In each area, project groups have been established and carried out. In the following we discuss each project group in order to identify important generic aspects for the cooperation. Detailed scientific descriptions and evaluations have been published elsewhere, as an ongoing activity within the programme. Projects concerning Chagas Disease (Manning and Barcinsky, 1992), Biological Nitrogen Fixation (Solheim, 1992), Potato research (Golmirzaie, 1994) and Cross-cultural Studies of Suicide and Depression (Jacobsson, 1992) were evaluated in an appropriate way and project activities, and results, summarised in the Punta del Este report Conference summing up 10 years of bilateral research cooperation (1996).

3.1 Parasitic diseases

Projects relate mainly to three different parasites: *Trypanosoma Cruzi* (Chagas disease), *Echinococcus Granulosus* (Hydatidosis) and *Fasciola Hepatica* (liver disease).

T Cruzi is a protozoa causing Chagas disease (American Trypanosomiasis) which is common in Latin America. The bug vector deposits on the skin faeces containing infectious trypomastigotes, which invade different tissues, including muscle. Complications from the primary infection develop later (10-15 years) and result from damage to nerves in the gastrointestinal tract (megaesophagus and/or megacolon) or in the heart (right bundle branch block). Patients with early Chagas disease may be treated with certain drugs, but late complications are difficult to treat. Thus, in Chagas, there is a need to improve diagnostics, to develop new drugs and vaccines as well as a need for understanding the pathophysiology of the disease.

E. Granulosus is a tapeworm with a worldwide distribution which causes hydatid disease, especially in sheep-rearing areas. Humans ingest eggs from infected dogs. The eggs hatch in the intestine and the larvae invade tissues, from the gut, where they form cysts. Symptoms develop from local pressure from the cysts and sometimes from hypersensitivity reactions to hydatid antigens. With this disease too, there is a need for sensitive and accurate diagnosis as well as vaccine development.

The common liver fluke *Fasciola Hepatica* infect cattle, sheep and humans. It is an important veterinary disease in Uruguay, causing an estimated economic loss of around 30 million USD/year through reduced meat and milk production. There is no effective vaccine available.

The first projects discussed were vaccine development against *E. Granulosus* and different aspects of Chagas disease (Idepromemoria 2, SAREC, 22 January, 1986). After further discussions two main areas were selected for Chagas disease: 1) Immunology of the disease, and 2) Biochemical and molecular genetics in *T. Cruzi*. At the same time an effort was made to recruit some Uruguayan scientists from abroad (Pasteur Institute) to participate in a joint effort (Insatspromemoria, SAREC, 28 April, 1986). This project was further extended in 1987 (Insatspromemoria, SAREC, 22 May, 1987) and in 1989 (Insatspromemoria, SAREC, 30 May, 1989) to include two subprojects for Uruguay: 1) Molecular and cellular biology of Chagas disease and Fascioliasis, and 2) Theoretical and experimental pharmacological studies in Chagas. SAREC's support for these efforts was extended from 1989 to 1995. In both Uruguay and Argentina still further projects were defined within the area of parasitic diseases:

Uruguay

Parasite immunology (*E. Granulosus* and Toxoplasmosis)

Pharmacochemistry

Biology of oncospheres (*E. Granulosus*)

Molecular modelling

Molecular approaches to *E. Granulosus* development

Molecular and cellular biology of Chagas disease and Fascioliasis

Argentina

Biochemistry and molecular genetics of *T. Cruzi* (4 subprojects)

T. Cruzi antigens for diagnosis and experimental immunotherapy

Urinary antigen and role of cytokines in *T. Cruzi* infection

These projects are described and the report from the Punte del Este meeting, Conference summing up 10 years of bilateral research cooperation (Sida, 1996).

Rationale

According to SAREC's policy, research cooperation between Sweden and a middle-income country like Uruguay should take the form of project-based collaboration between research institutions in the two countries. The research should be mutually interesting, and it should deal with an area of research where Sweden can contribute relevant competence. The research area should also be relevant to poor developing countries in general.

Chagas disease, hydatoid disease and Fascioliasis, all represent important problems in many countries with both medical and economic significance. These projects are thus "natural" candidates for cooperation and have the advantage of allowing a broad spectrum of scientific activities, due to the complex biology of parasitic diseases. Previous to the SAREC programme, there had already been some research on these topics, by highly qualified scientists inside and outside the region, especially in Argentina, enabling SAREC to "jump-start", and extend, these efforts in Latin

America. Organised as a regional network, the cooperation could draw on Argentine resources. The Swedish participants, research institutions from the Karolinska Institute, Uppsala University, National Veterinary Institute in Uppsala and Lund University, were all highly competent.

As described above, research activities in this area were heterogeneous, including 3 different parasites and a number of different subprojects, 6 in Uruguay (and 4 in Argentina). Each of these subprojects had their own, clearly defined objectives, such as vaccine development, drug development, diagnostic kits and understanding gene regulation during different stages of parasite development. Thus the strategy adopted was that of a multi-pronged approach, covering many different questions of relevance to the fight against parasitic diseases.

In view of the bold objectives (development of new vaccines and drugs against *T. cruzi* and *E. granulosus*, for instance), the amount of resources allocated to each one of the projects was small. This, however, was somewhat compensated for by the symbiotic nature of the collaborative networks, both nationally and internationally, added to which, some groups had access to considerable funding outside the SAREC programme, especially during the later phase of the funding period.

Effectiveness

The results of the programme in the area of parasitic diseases could be evaluated with respect to different aspects, including quality and quantity of the basic and applied research, capacity building and development of human resources.

The research activity focused on *E. granulosus* in Alberto Nieto's laboratory at the Hygiene Institute generated important basic information regarding immunoprophylaxis and immune evasion, as well as the production of antigenic fractions, used for the development of diagnostic kits parasite serology testing. Dr Nieto's laboratory emerged, initially through SAREC support, as the most important in the area of general immunology in the country and also had an attached production unit for commercial immunodiagnostics.

Work by Dr Holcman with collaborators from Sweden and New Zealand resulted in effective veterinary vaccine development using oncospheres from *E. Granulosus* eggs. Likewise the research performed in the laboratories of Dr Manta (Antihelmintics), Dr Paulino (Molecular modelling), Dr Radi (Oxidative metabolism in *T. cruzi*) and Dr Carmona (Proteinases from *Fasciola Hepatica*) generated the expected scientific results, even though much work remains to be done in order to achieve final products of clinical importance. However, the commercialisation of the research results is beyond the scope of the SAREC programme even though many of these projects have potentially contributed to it.

The high quality basic research in Dr Ricardo Ehrlich's laboratory was instrumental in bringing modern type molecular biology into the country.

The effectiveness of the research into parasitic diseases is reflected by the large number of papers produced, laboratories supported and persons trained in the area, as reported (Molecular, Biochemical and Immunological Approaches to Parasitic Disease, Punta del Este conference report, 1996). With few exceptions, the quantity and quality of the publications were high.

Efficiency

For most of the projects, the scheduled research was performed within time and cost limits. Due to the low salaries in the country, the cost compared favourably with international standards.

The flexibility shown by SAREC in using funding according to developments within the projects, combined with an informal routine for yearly project reporting, was conducive to high output from the funding.

Impact

Coming as it did at a time when much academic research in Uruguay had suffered badly through mismanagement during the dictatorship years, SAREC's support had strong positive effects at many different levels. It contributed strongly to the rebuilding of the capacity in Uruguay for research in parasitic diseases. This was achieved partly by inducing prominent Uruguayan scientists abroad to return to the country, partly through the network organisation of the projects themselves, and partly through a synergistic input of funding from the IDB programme. The impact of the SAREC support may also be related to the way it was organised at the start, by the selection of a few key scientists that were already working in this field.

The intra-scientific impact of the support was thus significant, in terms of both capacity strengthening and the production of research results. The research activity also brought new techniques and methods into the country. It had few, if any, negative effects. The impact on research in Uruguay has been substantial, for instance in the build-up of immunology and molecular biology. That impact is also reflected by the increasing numbers of scientific papers produced in Uruguay (from 38 in 1986 to 170 in 1995). A major contribution in this respect stemmed from the SAREC project in parasitology.

The results from the SAREC support also generated extra-scientific benefits in terms of commercial immunodiagnosics and potential future vaccine development. For instance, a small production unit for immunodiagnosics was organised in Dr Nieto's Immunology Department, and marketed by an outside company. Dr Holcman's work with *E. granulosus* is likely to lead to a veterinary vaccine for sheep.

Sustainability

It is quite clear that many of the projects will continue with funding from other sources than SAREC, such as EU, IDB etc. Some projects will not, mostly due to the scarcity of science funding in Uruguay. Certain projects, like those related to vaccine development, might generate company-supported funding, and others grants from outside sources such as World Health Organisation (WHO), National Institute of Health (NIH) etc. (as in the case of Dr Ehrlich's laboratory, for instance).

The high quality of the research, and the number of laboratories involved in the networks, prompted a continuation of SAREC support in the form of a Network for research training in parasitic diseases at the southern cone of Latin America, active until 1998. The network includes researchers from Brazil, Paraguay, Peru and Chile and has enabled them to organise regular meetings for collaboration and training.

The participation of involved laboratories in sequencing of the *T. Cruzi* genome, a WHO supported project, should also be mentioned. Here the inputs by Ulf Petersson, Uppsala, and Argentinian scientists were important.

3.2 Sexually transmitted diseases (std) and aids

This project was funded from 1989 with a total budget of 1.8 million SEK. (Table 1, p 8).

In Uruguay, Dr Borthagaray, Chemistry Faculty, University of the Republic, was the co-ordinator and in Sweden Dr Bygdeman, Clinical Bacteriology, Huddinge Hospital, and Dr Ripa, Clinical Bacteriology, Halmstad Hospital, were counterparts. The following activities were planned: a) establishing the prevalence of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in a defined male population in Montevideo; b) establishing the prevalence of sexually transmitted pathogens in first-time pregnant in a defined population in Montevideo; c) developing a strategy for reducing the

prevalence of gonorrhoea and Chlamydia infection; d) characterising N gonorrhoea isolates. In addition, the incidence of other classical STDs, as well as HIV, was studied.

In Argentina, an AIDS-related project was established between the Department of Microbiology, University of Buenos Aires (Dr Libonatti) and Department of Immunology, Karolinska Institute (Dr Wigzell). The project studied the T-cell response to genetically diverse HIV strains and vertical transmission of the virus from mother to foetus.

There seems to have been little contact between the groups in Uruguay and Argentina, as their work relating to HIV was essentially very different - basic in Argentina and epidemiological in Uruguay. No further HIV-related work from Uruguay was reported (Punta del Este report, 1996).

Rationale

The underlying rationale of this project was a sound one. STD is a national problem of great importance, and AIDS, although relatively uncommon at the time, represents a worldwide threat to the sexually active population. SAREC funding was fairly small but adequate for the epidemiological work, mainly focused on STD.

Effectiveness

Studies seem to have been performed in a satisfactory way. The project upgraded techniques and equipment in the Uruguayan laboratory which later became part of the network for Gonococci Antimicrobial Susceptibility programme for the Americas supported by WHO/Pan American Health Organization (PAHO) and co-ordinated by Ottawa University. At national level they became a reference laboratory for gonococci disease by doing conventional and molecular typing of bacterial strains for both private and public laboratories.

Efficiency

The efficiency of the project, in terms of timing and costs, seems acceptable. On a mean level the cost was 300,000 SEK/year and a substantial part of this was spent on equipment of importance for the project. The group was also, due to the SAREC support, successful in generating grants from Conicyt, CSIC and PEDECIBA.

Impact

Apart from the epidemiological and technical aspects of the project, there was an educational programme to limit the spread of STD by the organisation of the First National Conference on N Gonorrhoea, co-supported by WHO/PAHO. The best lasting impact of the project was the creation of a well-organised laboratory for the control of N gonorrhoea in the country.

Sustainability

Collaboration between the Uruguayan researchers and their Swedish counterparts was less than optimal. After an initial training period, when several Uruguayans visited Sweden, there was little scientific exchange. According to the Swedes, the Uruguayans did not keep in touch as expected with regard to project progress. After some time Dr Bygdeman formally withdrew from the project.

As indicated above, however, the Uruguayan laboratory is now a national reference centre, participating in international cooperation and continuing its work with support from CSIC and WHO.

3.3 Acute respiratory infections in children

Acute respiratory infections are a serious cause of disease and death among children in developing countries. Better and quicker diagnosis, as well as certain epidemiological studies, are important in this area. The project was initiated in 1986 as a tripartite collaboration between the medical faculty in Buenos Aires (Dr Weissenbacher), the Central Public Health Laboratory in Montevideo (Dr Hortal), and Swedish counterparts at Statens Bakteriologiska Laboratorium (SBL, Dr Grandien) and Huddinge Hospital (Dr Lindberg). The project was maintained over the whole funding period with a total budget of 3.32 million SEK.

Project activities included both virological (RSV and adenoviruses) and bacteriological subprojects. In virology, rapid, modern techniques of diagnosis and virus isolation represented the most important terms. In bacteriology, work was made to focus on *Haemophilus Influenzae*, type B and *Streptococcus Pneumoniae*, both of them important agents in causing pneumonia and meningitis. Molecular mechanisms in pathogenesis and resistance to antibiotics were studied, as well as capsular serotypes in conjugate vaccine development.

Rationale

The selection of projects was consistent with SAREC policy in all relevant aspects: mutuality of interest between the scientists involved, high competence on the Swedish side, and general relevance to developing countries. Project objectives were clearly stated from the beginning and the activities planned were adequate for solving the questions identified.

Effectiveness

Important results were generated by the laboratory projects. Initially, Uruguayan scientists were trained in Sweden to establish techniques such as immunofluorescence and PCR. Monoclonal antibodies from Sweden were used for classification and antigenic characterisation. Bacterial polysaccharides were defined for use in conjugate vaccine development.

The quality of the research was high, as witness the number of scientific papers produced (some published in high impact journals such as *Journal of Virology* and *Journal of Clinical Microbiology*) and the academic degrees awarded as a consequence of the work (1 PhD and 2 Masters finished with 4 more to come). The numerous visits to Sweden by Dr Hortal and other Uruguayan scientists involved in the project reflect an effective research and training exchange. SAREC funding also included renewal of some minor equipment which contributed to the overall effectiveness of the project.

Efficiency

Project performance was carefully planned from the beginning and followed the initial plans in terms of time allocation and involved costs. The total cost for the project was low, considering the amount of results generated and the long funding period.

Impact

The intra-scientific impact of the projects was acceptable both in terms of training, results generated and equipment bought. The extra-scientific impact is clear as the laboratory has a central function in the national health care system. As with the other SAREC projects, funding came at the right time point in time to strengthen the Public Health Laboratory in Montevideo. The comparatively small amount of funding, which was later reinforced by IDB and other agencies, had thus a substantial impact on the whole country.

Sustainability

There are at present few contacts between Swedish and Uruguayan scientists, but the results generated within the project were clearly of future usefulness to the Public Health Laboratory. As numerous scientists and technicians have been trained within the project, it is likely to have a lasting effect within the Uruguayan research community.

3.4 Cross-cultural studies on suicide and depression

This project started in 1986 as a joint undertaking by the Department of Psychiatry and Psychology at the Karolinska Hospital on the Swedish side, and the Neurochemistry Division at the Clemente Estable Institute and the University Hospital on the Uruguayan side. The total budget allocated was 4.1 million SEK.

The project included five different activities.

1. The study of neurotransmitters in depressed and suicidal patients.
2. Psychosocial studies on suicidal patients and the correlation between these and biological variables.
3. Epidemiological studies on suicide and para-suicide in Uruguay.
4. The introduction of new methods in Uruguay.
5. The organisation of a special ward for clinical research at the psychiatric hospital.

The evaluator visited the Clemente Estable Institute and participated in the summing-up meeting at Punta del Este but did not see other parts of the project. The project was evaluated in 1992 by Professor Lars Jacobsson, Umeå University.

In the study on neurotransmitters, techniques were first transferred to Uruguay to calibrate measurements. The results then showed similar trends in Sweden and Uruguay, with low concentrations of markers in the suicide attempt groups. The psychosocial studies demonstrated that Uruguay had the highest suicide rate in Latin America, two to three times higher than other countries in that continent. Several different clinical rating scales were introduced in Uruguay and organised in a computer assessment battery available to clinicians in Montevideo. A clinical research ward was established with 10 beds in a suitable environment.

Rationale

Given the high rate of suicide in Uruguay, the project must be considered of national relevance. The knowledge generated within the project is also likely to be important for other countries in Latin America, facilitating better research in this field. More males in Latin America die from violent causes (suicide, homicide and accidents) than from organic diseases. Uruguay has the potential for becoming an important reference centre for the whole continent.

Effectiveness

Project objectives were clearly stated and project activities were adequate to the objectives.

The expected results were generated and the project activities were of high quality. In addition, the equipment bought with SAREC support also increased the efficiency of the Neurochemistry Division as a whole. The project was thus effective in introducing a quantitative aspect in psychobiology, increasing the accuracy of psychiatric diagnosis and in some aspects of psychiatric epidemiology.

Efficiency

Project activities seem to have been efficiently performed in terms of the costs entailed. The project also financed the purchase of small equipment for the Neurochemistry Division at the Clemente Estable Institute.

Impact

The project had a good intra-scientific impact in terms of training at different levels and increased research capacity at both basic and clinical levels. There were only a few papers reported in the project, but many from the Neurochemistry Group as a whole. The knowledge generated in the project was disseminated through local initiatives and also discussed with the industry in the area. The introduction of modern rating scales is likely to have an important clinical impact.

Sustainability

The research collaboration with Sweden did not continue after the funding period. However, through the application of the knowledge the project is likely to generate an important sustainable impact, at both basic and clinical levels. This is because both new biochemical techniques and diagnostic scales were introduced and because the project highlighted clinical conditions that had received scant attention in Uruguay before.

3.5 Molecular genetics and breeding for resistance and stress tolerance in potatoes

The project started in 1986 with the Divisions in Molecular Biology and Cytogenetics at the Clemente Estable Institute and the Department of Molecular Genetics at the Swedish University of Agricultural Sciences (SUAS). In Argentina, the INTA laboratory was involved. The total budget for Uruguay was 3.3 million SEK.

The potato is an important crop in Uruguay, as in many other countries. It is commonly affected by a number of diseases, including pests and climatic stresses. Uruguay has to import potato seed, at great expense.

The project focused on two areas of research, resistance to *Erwinia* spp. and plant viruses, and induction of tolerance to stress (drought and freezing). Initially, when Argentinian researchers were closely involved in the project, it was concerned with the introduction of viral resistance genes. Later on, when partnership with Sweden was more important, the research was concerned with *Erwinia* resistance genes. The leading researcher on the Swedish side was Professor Palva, an internationally recognised expert in the field.

The project was not very successful to begin with, but later on many important findings were made, such as cloning and sequencing of virulence genes, ways of inducing plant defence mechanisms, the introduction of coat protein into plants and characterisation of stress mechanisms in response to different inducers. Later work focused on virulence factors, signals involved in communication between pathogen and plants, and plant defence genes.

Rationale

All criteria for SAREC to support this project were fulfilled: importance to Uruguay and other developing countries, joint organisation of the research programme, and the presence of Swedish expertise with an interest in the research area. Project objectives were clearly defined and the planned activities relevant to these objectives.

Effectiveness

The expected results were produced in some parts of the project, but not in others, which is understandable given the basic character of the project. The research funded was of high quality, as witness the publication of some of the research findings in scientific journals of international repute (e.g. *Plant Cell and Plant Journal*). The research results contributed to the achievement of long-term development objectives in the potato industry.

Efficiency

The project seem to have been managed cost-efficiently, thanks partly to the core facilities at the Clemente Estable Institute. The project achieved improvements to laboratory equipment, and the creation of a small facility for growing potato plants under controlled conditions in addition to the basic research and to local networks formed. In view of these multiple effects, the cost of the project seems low.

Impact

The project generated several papers in international journals. It also served as a training ground, producing several MSc and PhD degrees. The collaboration between Sweden and Uruguay was productive in terms of research results as well as for capacity building at the Clemente Estable Institute. One of the groups (Dr. Stoll), concerned with molecular biology, moved to the INIA (National Institute for Agricultural Research) laboratory, thereby greatly strengthening the analytical capacity in the agricultural sector. Thus, the project has had a significant impact on both applied and basic research.

Sustainability

The results of this project, in terms of basic information, human resource training and introduction of new techniques, are likely to have a sustainable impact in the area. The intimate relationship between the Swedish and Uruguayan scientists is likely to continue for some time. While funding is uncertain for the basic research within the project, the more applied part will be maintained at the INIA Institute.

There are still two PhD students active in the project, one in Uppsala and one in Helsinki, where Professor Palva now resides.

3.6 Efficient use of biological nitrogen fixation

The project was started in 1987 and has been given 5.1 million SEK for the Uruguayan part. It started as an extensive collaborative network between departments in Uruguay, Argentina and Sweden, 10 projects altogether, some with subprojects. All projects are accounted for in the final report (Punta del Este, 1996), and were evaluated by Professor Björn Solheim, University of Tromsø, in 1992.

The Uruguayan departments taking part were: Faculty of Agronomy in Montevideo, Laboratory for Soil Microbiology and Inoculant Control, INIA and Department of Biochemistry in the Clemente Estable Institute. From Argentina: Fundación Campomar, Department of Microbiology at Universidad de La Plata and Department of Microbiology at INTA. From Sweden: Department of Microbiology at SUAS and Department of Organic Chemistry, Stockholm University.

The use of biological nitrogen fixation (BNF) is important in Uruguay, as approximately 80% of the country's nitrogen supply depends on it. The main objective of the projects was to improve the utilisation of BNF in the agricultural production. SAREC emphasised that applications should be relevant to the tropics, where most of the world's poorest nations are to be found. This led to some

crops being excluded. For the Uruguayan side this meant, in the last funding period, legume host studies and nitrogen cycling (INIA), studies on the efficient use of BNF in agriculture (Faculty of Agronomy), inoculant production and use (Laboratory of Soil Microbiology and Inoculant Control), characterisation of naturalised populations of rhizobia isolate from Uruguayan pastures, metabolic pathways essential for nitrogen fixation in rhizobium and biochemical, genetic and nitrogen fixation capacity characterisation of acetobacter diazotrophicus (Clemente Estable Institute).

In the report from the Punta del Este conference in 1996, the titles given for the Uruguayan projects are as follows:

1. Native legumes of Uruguay and neighbouring areas: Taxonomy, Ecology and forage potential.
2. Accomplishments and perspectives of the applied biological nitrogen fixation programme.
3. Studies on biological fixation in *Lotus* sp. Inoculant production and field evaluation.
4. Rhizobium: Regulatory mechanisms of gene expression in stress conditions.
5. Acetobacter diazotrophicus: New alternatives in nitrogen biological fixation in Graminae.
6. Characterisation of naturalised populations of rhizobia. Iron assimilation system in Rhizobacteria.
7. Legume breeding, nitrogen fixation and nitrogen cycling (INIA).

Rationale

The rationale behind this large collaborative project is clear. Subprojects are potentially important for agricultural industry in Uruguay and other developing countries. In Uruguay the inoculant industry can only use government approved strains of *Rhizobium*, and products are subjected to an official quality control. Preceding the SAREC support, there was research related to BNF in several institutions, from basic to applied agronomy and plant breeding. The network approach with Argentina broadened the programme considerably.

Effectiveness

The number of scientific papers coming out of the collaborative effort in Uruguay seems reasonable. The training and capacity building objectives seem to be met at a reasonable level. There have been more publications and also more capacity building at the Argentinian institutions, including ten PhDs as the outcome of the project.

There seems to have been an acceptable level of interaction between Uruguay and Argentina and the Swedish counterparts if the project is evaluated as a whole. The direct collaboration between the groups in Uruguay and Argentina has been regular, but has not covered all the subprojects. The most intensive interaction has been that between Argentina and the Swedish University of Agricultural Sciences (SLU) group in Sweden, including the presentation of a PhD thesis at SLU by one of the researchers from INTA.

Efficiency

According to an earlier project evaluation (Solheim, 1992), the scientific output had been cost-efficient. There is nothing to suggest that this statement cannot be applied to the last 3-year funding period as well.

Impact

The intra-scientific impact of the project seems to be good in terms of increased collaboration between Argentina and Uruguay, introduction of new methods, updating of smaller equipment and generally increased research capacity in the area. This increase benefits the country as a whole, as it happens in institutions that are closely connected to the agricultural system. In the long-term perspective it is to be expected that the programme will have positive socio-economic effects, through increased agricultural production.

Sustainability

The project has had a sustainable impact in Uruguay, by way of research results as well as through capacity building. A local network has been set up for scientific research cooperation in plant-bacteria interactions, with senior researchers from Fundación Campomar, Universidad de La Plata and Clemente Estable as founders. Even without SAREC funding, this area of research is strong enough to progress. There has been little contact between the researchers in Uruguay and their counterparts in Sweden after the termination of the project.

3.7 Biotechnology of lignocellulose

This is the only project in the programme that is technology-oriented. It was initiated in 1987 as a joint undertaking by the Dep. of Botany at the Science Faculty in Montevideo, the Pilot Plant for Industrial Microbiology Processes at the University of Tucumán in Argentina and the Swedish Pulp and Paper Research Institute (STFI). The scientific objective was de-lignification of cellulosic materials such as wood and agricultural residues, using fungi instead of conventional chemical methods. This so-called bio-pulping was considered a technically and economically promising new process.

The project almost immediately suffered a big loss, when the Swedish project leader, Prof. Karl-Erik Eriksson, left Sweden for a new position in USA. As his successors at STFI did not have Prof. Eriksson's interest in the project, the Uruguayan and Argentinian project leaders had to look for new Swedish counterparts. This took some time, but finally new partnerships have been formed. For Uruguay, the work continued together with the Dep. of Forest Mycology at the Swedish Agricultural University and for Argentina the new partner became the Biotechnology department at Lund University.

The scientific profile and interests of the groups in Uruguay and Argentina had from the start been quite different. Without SAREC they would not have become partners within a single project. With the exit of Eriksson their research activities diverged along each group's line of interest. In Uruguay phytopathology of eucalyptus, rotting of twigs due to fungi, became the field of study. In Argentina, bio-degradation of lignin in sugarcane bagasse using fungi continued to be the main activity.

Both the groups have been very active, with dozens of published papers and conference presentations each. Four Masters have been produced in Uruguay, three PhDs in Argentina with five more to come. In both countries the researchers have received moral support from national industry and public authorities, as well as funding from national research councils. The research cooperation with Sweden, and between Uruguay and Argentina, however, has not developed as initially expected.

Rationale

In its early years the project did not really meet any scientific or industrial demand in Uruguay; bio-pulping was never a big thing there. The subsequent change of direction has made the project more relevant to national concerns, although it is no longer a technologically oriented activity.

Effectiveness

Although the project did not develop as planned, the change meant the group in Uruguay starting work with problems that were of some importance to Uruguay's forestry sector. In both Uruguay and Argentina the scientific groups have been quite productive and show every sign of high standards.

Efficiency

The cost efficiency of the project has been fully acceptable, and the project management has been in good control of the project.

Impact

Following the change of orientation, the project seems to have had some impact on the Uruguayan forestry sector. The initial bio-pulping left no mark in the country.

Sustainability

As initially designed, the project was supply-driven, at least in the Uruguayan perspective, and not an expression of a genuine local demand. When the initial driving force disappeared, both the tripartite cooperation and the scientific orientation changed.

In the case of Uruguay, the link to Sweden is not likely to be sustained. The contacts with SLU in Sweden worked well for some time, but due to lack of travel funds they were later reduced to a minimum. No plans exist for future project cooperation between Montevideo and SLU. For several reasons, cooperation with France now seems to be a more attractive option. The Argentinian group in Tucumán, by contrast, has had very active collaboration with Lund, including frequent visits in both directions. Even when the SAREC funds dried up, cooperation continued as it was seen to be mutually beneficial. There are plans for EU applications to secure funding for future joint activities.

Due to relatively limited common interests, the cooperation between the Uruguayan and the Argentinian groups quickly diminished when bio-pulping was no longer a common concern. The group in Uruguay has instead developed links with researchers with similar interests in Brazil, although without funding from SAREC.

3.8 Project networks

In Uruguay, institutional cooperation sometimes included not only Swedish researchers but also research groups in Argentina (and in Chile) (Parasitic diseases, Acute Respiratory diseases in Children, Nitrogen fixation, Potatoes and Lignocellulose). (Mental Health and STD/AIDS were two exceptions.) As already described with reference to the different projects, institutional collaboration with Sweden was good in most cases. As the Punta del Este summing up report makes evident, the link to Argentina was clearly most successful in parasitic diseases (Chagas/Hyaditosis). Later this line of research has obtained further support in the Network for Research and Training in Parasitic Diseases at the Southern Cone of Latin America (RTPD Network) and expanded to include Brazil, Bolivia, and Paraguay. The one disadvantage to the Uruguayan research institutions in the Swedish-Uruguayan-Argentinian network could be that, being a weaker partner, they might have been dominated by stronger groups in Uppsala and Buenos Aires. In situations like this, however, some degree of asymmetry is unavoidable. We believe that in a long-term perspective Uruguay benefitted from this network.

We also found the link to Argentina very valuable in the research networks for Biological Nitrogen Fixation and Potato research, as also reflected at the Punta del Este meeting and in earlier SAREC project evaluations (Solheim, 1992, and Golmirzaie, 1994). There were also some limited, but useful contacts with Argentina through the project for Upper Respiratory Diseases in Children. In the Lignocellulose project, collaboration with Argentina soon diminished, due to a shift in project objectives. In the STD/AIDS project, the AIDS part never developed in Uruguay, and, as a result, there was little contact with the Argentinian and Swedish AIDS researchers. In the Mental Health project there were no Argentinian groups involved, although the support to Uruguay resul-

ted in the organisation of a neurobiological network within the framework of LANBIO, an initiative for research on natural products.

Summing up, we think that the link to Argentina was quite valuable, creating good long-term effects in most of the projects where it existed. In future efforts, the network approach might benefit from a more formal structure in terms of regular meetings and joint reporting to SAREC. Of course, sound background work is another crucial factor for the success of networks. Do these groups really want to work together or do they join hands merely in order to get funded? Follow-up of networks by SAREC is probably also essential. For instance, if a laboratory in Argentina detaches itself from a partner institution in Uruguay, for whatever reason, and a main objective of the project is to lend support to research in Uruguay, then this has to be dealt with during the long granting period. This is a matter of management for the granting agency.

The scientists gathered in Punta del Este in late 1996 to assess SAREC's cooperation with Argentina and Uruguay, unanimously agreed to propose the creation of a co-ordination committee that would attempt to maintain links among research groups in the region and, in addition, actively promote the recognition of these before the Research Authorities in the Mercosur. Two main purposes were defined for this committee, known as Co-ordination of Networks for Research and Training in Biomedical and Agricultural sciences (CORIECIBA):

1. To promote original research and the building of manpower in the areas of competence of the respective networks, with a multi- and trans-disciplinary component.
2. To promote recognition of these thematic areas by the respective governments and regional authorities.

CORIECIBA now consists of more than 80 groups devoted to scientific research and university teaching. Concerned with the specific problems of the region, these groups are clustered in five Ibero-American Networks, each corresponding to a particular area of knowledge:

1. Network for Research and Training in Parasitic Diseases in the Southern Cone of Latin America (RTPD)
2. Network for Research and Training in Phytopathology, Molecular Biology, Microbiology and Virology of the Potato.
3. Network for Scientific Cooperation for Research on Plant-Bacteria Interactions
4. Network for Scientific Cooperation for research on Bioactive Natural Compounds (LANBIO).
5. Programme on Neuroscience.

To a large extent, CORIECIBA is the result of Swedish cooperation with Latin American research groups through SAREC and IPICS over more than a decade. An embodiment of the idea of regional cooperation, CORIECIBA is a modern construction aiming at the capitalisation of the human and technical resources of scientific communities.

3.9 Summary

The overall performance of the different SAREC projects can be related to evaluation parameters such as rationale, effectiveness, efficiency, impact and sustainability, and to the special SAREC policy for supporting research in middle income countries.

The policy is summarised in four different points.

1. *Support should go to institutions in the partner country and Sweden that have a mutual interest in an area in which Sweden can supply knowledge and expertise.*

This was clearly the case with all of the projects, to a varying extent. In particular, the expertise in Sweden in potato and nitrogen fixation research was of interesting to Uruguay. In parasitic diseases, Sweden could offer both high-quality general immunology and molecular biology, which contributed efficiently to the project. In Swedish knowledge was also attractive in other projects.

The mutual interest can also be reflected in the sustainability of the collaboration as such. Some projects are still going on, in one form or another (potatoes, parasitic diseases and possibly nitrogen fixation), others were less successful in this respect (STD and AIDS and ARI in children).

All projects included training of Uruguayan scientists in Sweden and transfer of technology and also allowed capacity building in Uruguay in terms of laboratories and small equipment.

2. *The areas of research should be of general relevance to poor developing countries.*

This is clearly true of all the projects.

3. *The research programme should be designed by laboratories involved.*

This is also true of all projects supported.

4. *The receiving country should fund its own participating laboratories.*

This was clearly not the case in many instances. It seems as if substantial parts of the funding were used for consumables and small equipment in some of the Uruguayan laboratories.

This left, in some projects, the Swedish counterparts with limited funding for research costs.

The SAREC funding could then mostly be used for travel and administration, whereas research had to be paid for from alternative sources.

4. Programme relevance

The relevance of the SAREC programme in Uruguay has to be seen in two perspectives – whether it has been relevant to Uruguay's societal needs in a broader sense, and whether it has been relevant to the specific needs of the S&T sector in Uruguay.

It is obvious that SAREC's programme in Uruguay has not been designed with the country's general needs as a driving force. The bulk of the funding has been used for medical research. Less than 30% has been allocated to other research, mainly biological research related to the agricultural sector. Nothing has been spent on technological/industrial R&D.

The need for and relevance of research related to the large parasitic diseases that are fairly specific to Uruguay is undeniable. That these diseases were the most urgent areas for research at the time the dictatorship came to an end is not obvious. A more varied approach, including R&D in the for Uruguay very important agro-industrial field, would have been more relevant, especially taking into consideration how important the SAREC programme was, in terms of total S&T funding in Uruguay at that time.

The SAREC programme gave the selected areas/projects very valuable resources at a crucial time. Research groups could be re-established, and given means to expand. Important contacts with groups in other countries became possible. All this was of course very relevant at the time. It has also been stated by many of the Uruguayan scientists interviewed that perhaps the most important element of the SAREC support was its timing. It came when it really made a difference. But, again, for the most part it made a difference to the groups that directly benefited from the support, and hardly any difference at all on a faculty/university level. The support had little bearing on the restoration in a broader sense of Uruguay's S&T

Our general conclusion is that the individual *projects* were relevant in their own context, but that the *programme* as such lacked overall relevance to Uruguay's societal and S&T needs.

5. Efficiency

The total cost of the programme was considerably less than that of the IDB/Conicyt programme, but taking into account the more limited scope, the resources made available to "the lucky few" have been quite substantial. Whether these funds have been used in an efficient way is an important question for discussion.

First of all, it is important to mention that the project leaders and other scientists involved on the Uruguayan side almost unanimously state that SAREC's way of managing the programme has been very smooth, unbureaucratic, and also, in their opinion, cost effective. We agree with this and would like to add that the degree of responsibility and independence given to the scientists has been important in making sure that resources have been used efficiently. When a group of scientific researchers are allowed to work with a certain independence, within a given budget, then a higher degree of efficiency can be expected than under the more traditional Latin American bureaucratic regime, where a very strong and detailed administrative control is maintained.

A more efficient science management could have been an important result of the Swedish appearance on the Uruguayan research scene. Unfortunately, though, SAREC's modern style of management has had very little impact on the Uruguayan system. One important reason for this, it should be noted, is that SAREC chose to work through direct contacts with the researchers rather than through the national S&T management structure.

The projects that have been visited in connection with this evaluation have, generally speaking, had a perfectly reasonable output in relation to their financial resources. Previous project evaluations have come to the same conclusion. We have not seen anything that indicates misuse of funds or other financial deficiencies.

A large part of the money from SAREC has gone to the Swedish partners in the cooperation with Uruguay. We have not attempted to evaluate the efficiency of these institutions or their use of research funds.

6. Objectives and effectiveness

SAREC did not have any clear programme objectives for its support to S&T in Uruguay. Every project drew up its own plans. These plans, which were prepared by the researchers involved, are research plans concerning narrowly scientific matters. There were no objectives of any broader nature in the project plans, nor any targets for training etc.

The background to the cooperation, as mentioned in section 1 above, was Sweden's political commitment to supporting Uruguay and Argentina following the restoration of democracy. Research cooperation was seen as an appropriate instrument, since neither country was considered "poor enough" to qualify for regular development assistance. But as SAREC did not have any deeply felt long-term aims for the cooperation, there were no programme objectives, only a set of general guidelines for programme management. These guidelines were not specific to Uruguay: they were used by SAREC for cooperation with other middle-income countries as well.

The guidelines were as follows:

- a) SAREC supports research cooperation between research institutions in the partner country and Swedish research institutions in research areas that are of mutual interest to the participating institutions in the host country and in Sweden, and where Sweden can contribute relevant research competence;
- b) the proposed areas of research shall be of general relevance to poorer developing countries;
- c) the research programmes shall be designed jointly by the participating institutions;
- d) the host country covers local costs for participating domestic research institutions, for example salaries and premises.

When the Uruguay programme was revised in 1992, a set of complementary instructions were laid down:

- e) no new projects were to be initiated;
- f) all ongoing projects should be terminated within a three-year period;
- g) the total support for the remaining period should not exceed the existing level in real terms;
- h) a follow-up of the projects should take place towards the end of the period. For a few activities of high relevance and quality, continued support might be considered. Special consideration should be given to the possibilities of development of regional cooperation.

These guidelines and instructions do not include any measurable targets or objectives. They are rather of a bureaucratic nature, restricting the cooperation instead of identifying the benefits that it should generate.

It is not possible, therefore, to say much about the programme's effectiveness in attaining its objectives. The guidelines have been followed, although item b) above has not been strictly adhered to. The view that research should be of general relevance to poorer countries can, formally, be said to have been respected, but the largest projects – Chagas and Hydatidosis – concern diseases that are specific to Latin America. Thus, the results from almost 50% of the research funds have little bearing on Africa and Asia, where most of the world's poorest population lives and the bulk of Sweden's development aid funding is spent.

7. Impact

The impact of the programme can be assessed at the project/research area level and at the national S&T system level.

Regarding projects/research areas, it is clear that several of the medical projects, in particular those concerned with parasitic diseases and respiratory infections, have generated important and useful results both intra- and extra-scientifically. The other projects have not had quite such obvious impacts.

The impact on the S&T community has been quite noticeable, at least when it comes to groups or departments directly involved. A number of higher academic degrees have been financed through the programme – 50 Ph.D. and 25 MSc. altogether, including the Uruguayan as well as Argentinian components. 400 publications and 300 conference communications have been produced. More than 80% of the research groups have also received financial support from the European Community, the Inter-American Development Bank, the participating universities and local research councils.

At this point, it should also be recalled that the funding from SAREC came at a difficult period in time for Uruguay, when there was a crucial need to rebuild universities and other research institutions, after the difficult years of the dictatorship. This goes a long way to explain its positive impact. As pointed out by researchers involved in the programme, the usefulness of the support from SAREC was to a significant extent a matter of good timing.

While the impact of the SAREC programme on specific research areas has been significant, however, the national S&T system, has *not* been significantly affected by the SAREC programme. The overarching institutions, i.e. Conicyt and the university organs, have barely been touched by SAREC. Few resources of broader reach, such as national experimental facilities or networks, have been set up using SAREC funding.

The impact on economic/industrial sectors in Uruguay, or on the Uruguayan society in a broader sense, has been very marginal, if at all noticeable.

All-in-all, we have come to the conclusion that the impact from the SAREC programme has been confined to some limited areas of research. In those particular areas it has, however, been of definite importance. The impact, as with so many other aspects of SAREC cooperation, has been more project- than programme-oriented.

8. Sustainability

Sustainability concerns the long-term effects of a project or programme as well as the survival of a project/programme itself after the withdrawal of donor support. Sustainability can be estimated in terms of individual projects or on the programme level. In the present case the following are relevant questions: Do projects continue in Uruguay with alternative funding after the phasing-out of the support from SAREC? Are the Swedish counterparts still involved in project activities? Have projects and programme had a lasting impact in terms of the research results and capacity building generated? Have there been extra-scientific, sustainable effects on society as a whole?

It appears that in most of the projects supported by SAREC, the working contacts between researchers in Sweden and Uruguay have *not* been maintained after the funding period. One of the

subprojects concerned with parasitic diseases is an exception to this, as are research in potatoes and sequencing of the T Cruzi genome. The common denominators in these exceptional cases are high competence in Sweden, good quality of the research and availability of funding from conventional sources of scientific support. The most successful of the cases is the cooperation concerning the identification of genes in the T Cruzi genome. The success of this project derives mainly from the existence of a strong link between Argentina and Sweden (Carlos Frasch in Fundacion Campomar and Per Petersson at Uppsala University). In some projects contacts between the researchers in Uruguay and their partners in Sweden have not been satisfactory, even during the funding period (STD and AIDS and ARI in children).

In Uruguay, the projects within the programme that are likely to continue are those with a commercial potential, such as vaccine development in parasitic diseases, production of immunodiagnosics and research related to agricultural areas (potatoes and nitrogen fixation). In Uruguay there has been little funding for basic research since the last loan period from IDB, although the country is in the process of negotiating new loans. However, Conicyt aims to steer this funding in the direction of applied research, in order to generate maximum socio-economic impact for the country.

Even if the sustainability of the project activities themselves was generally low, the sustainability of the programme in terms of results already generated seemed quite good. This means that the research results produced in the different projects are likely to have a lasting impact in Uruguay in many instances. This is also true of the results of capacity building in many projects, in terms both of the strengthening human resources and of the improvement of laboratories. Examples are production of immunodiagnosics, better diagnostic procedures in many areas, introduction of new methods, both for clinical and basic use, and better processes established in agro-industry.

With regard to sustainability, comparisons between SAREC's programme and the IDB/Conicyt programme must be confined to areas in which the two programmes overlap. While SAREC only supported research projects, research-related support from IDB/Conicyt was given to service facilities and R&D research projects with a capacity for transfer to the productive sector (see Uruguay PPR 1.3). However, many of the IDB/Conicyt projects turned out, in practice, to be basic research projects. The sustainability of these projects depend directly on continued support from Conicyt, and other national sources of research funding. As the projects administered by Conicyt generally seem to be of high quality, we believe them to have a good chance of continuing, provided national allocation in the area continues. As we learned from discussions with political representatives of the Uruguayan S&T system, however, it is not clear how much money the country will be able to spend on the S&T system in years to come.

The STS part of the IDB/Conicyt programme (build-up of science and technological service centres) was by nature more clearly sustainable, but even laboratories within this part of the programme will have to be maintained and renewed by national support grants. The same can be said of the human resource part of the IDB/Conicyt programme. In the SAREC programme, the human resource part developed naturally within the different projects but was not clearly defined at the start of the support period.

To summarise, even if project cooperation with Sweden, in most instances, did not continue after the SAREC funding period, the results derived from the programme generated quite an important sustainable effect in Uruguay both in basic science and, to some extent, applied science.

9. Programme design and implementation

9.1 Selection of projects

SAREC has traditionally been inclined to channel its support through national research councils. In several instances, however, this has not been regarded as possible or desirable, and SAREC's cooperation with Uruguay is a case in point. In contrast, the IDB/Conicyt programme in Uruguay was executed by the research council, Conicyt.

In the case of Uruguay, SAREC used a "project approach". It identified and directly contacted a number of renowned Uruguayan researchers – whether in Uruguay or in exile – and invited them to take part in the research cooperation. SAREC also undertook to identify Swedish institutions that were willing to co-operate with the Uruguayan colleagues. The official Uruguayan involvement was small. In substance, its most important element was the "go-ahead" given by the Foreign Minister, who had, however, a strong position in the Cabinet. The participation of the ministries in charge, the Ministry of Education and the Office of Budget and Planning, was marginal.

The SAREC approach had the obvious *advantages* of allowing it to move quickly and flexibly. It met with a very good response in the research community that became part of the cooperation with Sweden.

There were, however, some *disadvantages* connected with the project approach as applied by SAREC in Uruguay: (a) Relevance to Uruguayan industry, agriculture or other societal sectors in Uruguay was not included as a factor in the selection process. In cases where such relevance existed, this was not because relevance had been a factor in the selection process. (b) Although the main rationale of SAREC's support was the generation of research results, the quality of the projects was not examined *ex ante* by independent evaluators. The major mechanism for ensuring quality was the selection of Uruguayan researchers with a good reputation; SAREC had expertise that assisted in the selection. The involvement of Swedish institutions that would not be keen to participate if reasonable intra-scientific criteria were not met, could also serve as a quality control in some instances, although the Swedish institutions had an interest of their own in the projects being approved. SAREC, on the other hand, commissioned mid-term evaluations of three projects at the beginning of the 1990s. In this way an examination of quality was performed when the projects were in progress. (c) The lack of involvement of central S&T authorities diluted the Uruguayan ownership and accordingly Uruguayan willingness to allocate future funds. Nor did the central authorities gain added credibility that would have enhanced the potential for acquiring project funding from other domestic sources. This was unfortunate, since non-regular money for projects was very scarce in Uruguay, as it is in most developing countries. (d) Capacity building in areas such as policy capability, research administration and the like was very limited.

IDB proceeded in quite another way. It prepared a thorough and comprehensive loan document which formed the basis of the programme and entrusted the execution of the programme to Conicyt. Its selection of projects was based on competition and peer review. In addition, the programme contained a component aimed at the strengthening of Conicyt and of Uruguayan policy capacity in the research area. SAREC's programme was a prologue to the IDB programme; IDB's work benefited from the Bank's ability to draw on SAREC's experience. IDB's way of operation was of course more time-consuming, and its disbursement pace proved to be lower.

Summing up, we find that the project approach employed by SAREC had obvious disadvantages. But we have nonetheless some understanding of SAREC's way of action, due to the pressure that

SAREC was subjected to in launching a programme without getting bogged down in administrative problems, and the limited capacity of Conicyt at the time. The establishment of priorities would have been time-consuming and the smallness of the scientific community was another obstacle to a normal *modus operandi*, although IDB overcame most of these difficulties later on. The fact of SAREC's support being formally result-emphasising (see 9.2 below) also helps to explain its way of doing things.

On the other hand, structures emerged with which SAREC could associate itself, namely the structure which emerged at the University thanks to PEDECIBA and the University's internal research council, CSIC, which came into being in 1990. In addition, the standing of Conicyt improved over the years. We think, in other words, that SAREC could have made more effort to anchor its programme in the Uruguayan official structures in the course of time. That would have been good for the sustainability of the cooperation (see 8, above). We also find that SAREC's project approach would have countervailed the strengthening of Conicyt if the Uruguayan government had not contracted the IDB loan, with Conicyt becoming the executing agency.

9.2 Capacity building or results production?

As mentioned earlier, the SAREC support was formally a "result-emphasising cooperation" as distinct from "capacity-emphasising cooperation". Much of the research cooperation helped, however, to strengthen research capacity, e.g. through the training of young researchers. This was consistent with the fact of Uruguayan research capacity being limited during the military regime and the essence of the Swedish institutions' contribution being the transfer of knowledge. We have also noted that several of the capacity-building activities of the IDB/Conicyt programme contributed to the generation of research results. Thus the Uruguayan experience not really vindicated SAREC's firm distinction between "result-emphasising" and "capacity-emphasising" research cooperation, since the two are inter-linked.

9.3 Financing

The SAREC support was conceded as a *grant* channelled directly to the Swedish institutions and to some degree to the Uruguayan institutions, which were supposed, however, to bear the local costs. The IDB/Conicyt programme was financed by IDB *loans* (USD 35 million), on the condition of an Uruguayan counterpart funding (USD 15 million). It was executed by Conicyt. The mode of financing was to some degree a reflection of the organisational approach adopted (project or council approach).

The SAREC grant proved to be fairly quick and inexpensive to administer. The cost-sharing requirement, however, proved difficult to uphold. Due to Uruguayan budgetary constraints, SAREC had to cover some local costs and provide some equipment. The IDB loan forced the Uruguayan government to analyse its research policy and research needs and to incorporate the research funding in the state budget, all of which reinforced the efficiency of the programme and the Uruguayan ownership of it.

As mentioned initially, the SAREC funding for the cooperation amounted to SEK 45.4 million. We have noted that a considerable part of that amount went to the Swedish institutions. A SAREC evaluation puts the average ratio at 40% - 60% (for Swedish institutions as compared to foreign institutions). We estimate that the Uruguayan cooperation would not exhibit much difference in its average ratio.

9.4 Higher education

Although training of young researchers was not a formal component of the SAREC programme, we have found that such training became one of the most important effects of the programme. Many of these young scientists had an opportunity to go to Sweden for that purpose. It is our understanding that the “sandwich-model” worked well in this case. Strengthening higher education in Uruguay was not among the aims of SAREC’s support, but we have found that many researchers involved in SAREC projects have teaching duties at the university. In this way SAREC’s support reinforced higher education. We are of the opinion that senior researchers who participate in SAREC-funded research should, in principle, be engaged in teaching. The teaching commitment should, accordingly, be a part of the programmes.

9.5 Linkage

The linkage between SAREC-supported research and Uruguayan society is hardly mentioned in the preparatory documents. There was little consideration of societal relevance, let alone interaction with industry, the service sector or other such stake-holders. This procedure did not fully comply with the criteria set up for SAREC (see 2.2 above) but, as has already been pointed out, the process of project selection did not afford much room for such considerations.. In addition, the SAREC programme focused on the generation of results although the major reason for supporting Uruguay was the destruction of its research capacity. This contradiction restricted the options. A good match between the research and societal needs could have been achieved only through a close interaction with stakeholders outside the academia. SAREC made hardly any efforts to bring about such an interaction. Some of the projects, nonetheless, turned out to be of societal relevance. In contrast, IDB took great pains to involve various stakeholders and set up a specific facility for such interaction.

9.6 Quality aspects

Is there a difference of scientific quality between the SAREC and IDB/Conicyt programmes? No detailed investigation has been carried out on this point, but we have seen certain trends. First of all, in our opinion the SAREC-sponsored projects on average have a higher scientific standing than the Conicyt projects. This is hardly surprising, as SAREC deliberately chose well established and qualified research groups for their projects.

What we have not been able to identify, but is still an interesting assumption, is that the groups that have worked both with SAREC and Conicyt projects may have had a different quality/effectiveness in the two categories. It may well have been that intense scrutiny by local and international colleagues within the Conicyt programme has led to higher quality requirements for the individual projects than the relatively easier procedures in the SAREC programme. The fact of there being no real financial competition, once the SAREC programme was established, could easily have made for such a result.

9.7 The SAREC Model

From its inception in 1975, SAREC has developed a model for the strengthening of national research capacity, called the SAREC Model (MR Bhagavan 1992:1, SAREC Report), which covers SAREC’s three main operational activities.

The SAREC model contrasts with the IDB model of support, in which emphasis is put on strengthening the pre-existing national S&T system, which in Uruguay’s case means Conicyt, the Clemente Estable Institute and the Faculty of Sciences. Another difference is that the SAREC support is a grant, whereas IDB support is given in the form of loans.

In Uruguay, the question thus is if the SAREC model was relevant, correctly applied and how it compares with the mode of support that IDB uses.

The relevance of the SAREC model to Uruguay, at that particular point in time, is open to debate. One argument in its is that it could be applied fast in a country whose university system was in disarray after the dictatorship years. However, Uruguay had an strong previous academic tradition, which means that some establishment must have been available, even at that time. The SAREC support was given without a preceding country report, and it is unclear how firmly the programme was co-ordinated within the Uruguayan S&T system. The additional benefits from the network approach, in relation both to Sweden and to other Latin American countries, argue in its favour. The viability of the Latin American part of these networks was clear at the summing-up meeting at Punta del Este, where specific plans were drawn up to extend and enlarge them.

The SAREC support, through its flexibility of funding practice and ease of administration, was very much appreciated by those groups that came to benefit from it. It should be pointed out, however, that there was little flexibility in terms of project selection. The same projects that were funded initially were supported throughout the whole 10-year period. This inflexibility can also be seen in a positive light, as expressing a long-term commitment. However, given the long duration of the whole granting period, it was important to identify projects that did not function well, so as either to offer additional support or terminate the support. SAREC used external consultants for evaluations in between granting periods. This was a valuable control mechanism, but it is sometimes difficult for external reviewers, given the limited time at their disposal, to fully appreciate all aspects of the different projects. For this, project-responsible personnel at SAREC might be more useful.

Clearly, a concept like the SAREC Model must be applied with caution. It seems applicable only in some countries, under certain conditions, and should be preceded by a careful analysis of each recipient country. Acting independently of regular national support mechanisms for S&T imposes a great responsibility on SAREC, in terms of both professional follow-up and the overall success of the programme.

9.8 Developing networks

One very positive aspect of the SAREC programme has been the cooperation between research groups in different countries. Even though the direct collaboration ceased in many cases when funding expired, other forms of cooperation, notably different ways of networking, have continued. The CORIECIBA network co-ordination committee, presented in section 3.9, is the foremost example. The participating Networks have all been successful in the generation of original knowledge and in the consolidation of research groups with international standing. The acknowledged prestige of many of these groups is evidenced by the continuous support of regional and international organisations, such as UNESCO, TD/WHO, IFS, Third World Academy of Sciences (TWAS), the EU, and national agencies in the different countries involved.

SAREC should definitely consider supporting CORIECIBA, and other network activities, as these are highly efficient in extending the results from earlier granting periods, both in terms of basic and applied science and in terms of science education.

9.9 Basic vs. applied research in developing countries

The role of basic research in developing countries depends on the particular country in question. It is probably true to say that, the more developed a country becomes, the greater the importance of basic research will be. In a very poor country, lacking a functional university and S&T systems, the

role of basic research seems restricted to support of education and to some well-defined priority areas of special importance to that particular country.

In the case of Uruguay, the country had an earlier strong academic tradition which was badly damaged during the dictatorship years. There was clearly a need to re-build both university research and applied research in industry. SAREC, following the model defined earlier, chose to initiate collaborative, long-term basic research projects involving strong Swedish institutions and selected groups in Uruguay. These were active in areas of general relevance to developing countries. IDB, who came on the scene later, chose to emphasise the applied character in research programmes. IDB's overall ambition was to generate a socio-economic impact by focusing research on those areas that would directly link up with the productive sector. The IDB/Conicyt programme also contained other components, such as science and technology service centres, infrastructure, training of human resources, and the strengthening of the national S&T system (see PPR "Uruguay: Science and Technology Programme, 1997, IDB").

The objectives of support to basic science projects were thus slightly different as between SAREC and IDB, although both organisations required a further, social dimension from the supported projects than just the production of high-quality scientific data. Furthermore, SAREC seems to have been more successful than IDB/Conicyt in implementing its programme, as all projects closely adhered to the criteria of being of general usefulness to developing countries. The SAREC approach – forming local and regional networks – also contributed strongly both to the production of data, the dissemination of results and the training of human resources in the area. In the IDB programme in Uruguay, in contrast to what was the case in other IDB programmes in Latin America (above all in Chile), the linkage dimension, to the productive sector, was less successful, for a number of reasons.

Was the support for basic research that SAREC maintained for 10 years in Uruguay appropriate or would some other type of support have been more meaningful? This is a difficult question to answer. Anyhow, both the objectives of the SAREC programme and those of IDB's programme seem to have been appropriate, given the country's special background and the timing of the programmes. The success of the different programmes seemed more to rely on management than on the underlying theory.

In summary, it appears as if the basic research support that SAREC gave to Uruguay was appropriate and adhered well to the underlying theory (The SAREC Model) as well as to the general strategy that SAREC has defined for this type of support. The SAREC programme could probably have been even more successful if it had adhered even more rigorously to the outlined model. For instance, there is no mention of other funding agencies in Uruguay in the initial SAREC project memoranda, which, however, appeared later. Also, there was no formal country report initially, in contrast to the detailed loan document used by IDB. In addition, there is probably always room for improvement with regard to project selection, senior scientists involved and project follow-up, although the Uruguayan programme was mostly successful in these aspects. However, this might be a question of management, which is probably a weak point within the organisation, given the limited number of persons involved in project initiation and follow-up. This raises the question whether more administrative support should be allocated or whether the model, as such, should be simplified. Overall, however, the support given by SAREC in Uruguay, was both relevant and mostly successful.

Basic research support to developing countries seems justifiable and relevant, given that SAREC has the capacity to administer it according to pre-defined guidelines. If not, the theory could be brought more closely in line with practices, which means the model could be simplified and still allow both high quality and evaluability of the support.

In simplified models, the demand side for basic research could be emphasised, which is to say that the burden of creating detailed and relevant support programmes could be placed more with the receiving country. In the present programme that would have meant giving the Uruguayans, at the national level, a larger role in the definition of project areas and also opportunity to more actively seek out their Swedish counterparts. However, in practical terms, considering the circumstances, the demand aspect was given a reasonable emphasis in the programme.

If the country cannot define and formulate its own needs, the support might better be focused on capacity building by measures that are simple, effective and easy to evaluate. Formulating the support programme together with the receiving country has a strong educational effect, as seen in many IDB programmes in Latin America. Coherence with other donor agencies and in-built, continuous evaluation mechanisms are also important aspects.

9.10 Lessons learned and SAREC's present Guidelines

We have read SAREC's new Guidelines, adopted in April 1998, with great interest, and noted that over the years SAREC has profited from its profound experience of capacity building and institutional cooperation. On the whole, our lessons from evaluating IDB's and SAREC's activities in Uruguay confirm the soundness of the policy. We have specifically been asked by our peers to raise "significant policy issues", and will do so by contrasting, in a few respects, the Guidelines with the lessons that we have learned. This should in no way be read as criticism of the way in which SAREC has handled the Uruguay programme: the Guidelines did not exist at that time. It is merely an attempt to generalise our findings and put them into a broader and more contemporary perspective.

- a) SAREC's approach is, generally speaking, supply driven and linear. Interactive mechanisms and funding directed towards the *demand side* would increase and improve the demand for research and hence reinforce the quality of public sector research.
- b) A conceptual shift of SAREC's focus from a nation's capacity to do research to a nation's *supply of knowledge* would emphasise each nation's dependence on the global generation of knowledge, its membership of the international research community and its need to form partnerships with other countries and to create favourable conditions for the acquisition and adaptation of knowledge.
- c) Although most R&D activities in Sweden are performed by *private* entities and there is a need to stimulate R&D in non-public entities in developing countries, no non-public entities, in Sweden or in developing countries, are mentioned in the Guidelines.
- d) No new *financing* schemes have been envisaged to make SAREC better equipped to vitalise its activities, for example schemes that could facilitate research partnerships of companies in the South with, say, Swedish entities.
- e) To obtain full effect from its investments in science, we think that SAREC should design them within the context of a *science and technology policy*. The Guidelines ignore the *limitations* of a science policy, since they take into account only the elements of the knowledge system as such, not important contextual factors. SAREC runs the risk of promoting the build-up of a science capacity which remains isolated. In consequence, there may be doubts on the part of the host government about the usefulness of the science capacity and, consequently, an impairment of its sustainability.

- f) SAREC sees itself as a *financing agency*, not as an agency which could act as a partner, a broker and an adviser in the area of research cooperation irrespective of the source of the funding of the research. The Guidelines make no mention of the role that SAREC could play to further Sweden's interests in the area, including its role to help Sweden use science and technology as strategic instruments in Sweden's foreign relations.

Finally, we believe that SAREC's research board would be better equipped in guiding SAREC, in the direction suggested, if it did not consist, as it does, only of public sector researchers.

10. Main findings and recommendations

The SAREC approach and swift response to the emergence of democracy in Uruguay, leading to the establishment of research cooperation with Uruguay, subsequently enlarged through networks involving partners in Sweden and Argentina, has in many ways been successful. A bridgehead was established in terms of partners and areas of support. SAREC met with a very good response in the research community that became part of the cooperation with Sweden. This enabled SAREC and Sweden to play a role in the future development of S&T in Uruguay.

The phasing-out of the cooperation has been deeply regretted by the Uruguayan S&T policy-makers that we have talked to. While sad in itself, this is a good indication of how highly the programme has been appreciated.

SAREC has, by and large, succeeded with the task it was given by the Swedish government. This can to a large extent be attributed to the swift and positive way SAREC handled the setting-up and continued management of the programme.

There have, nevertheless, been some disadvantages with the SAREC approach. The most important were: (a) Relevance to Uruguayan industry, agriculture or other societal sectors in Uruguay was not included as a factor in the project selection process. Where projects had this kind of relevance, it was by accident rather than by design. (b) Although the main rationale behind SAREC's support was the generation of research results, the quality of the projects was not examined *ex ante* by independent evaluators. The major mechanism for ensuring quality was the selection of Uruguayan researchers of good repute; SAREC had expertise that assisted in the selection. The involvement of Swedish institutions that would not be keen to participate unless reasonable intra-scientific criteria were met, could also serve as a form of quality control in some instances, although the Swedish institutions had a vested interest in the approval of projects. On the other hand, SAREC commissioned mid-term evaluations of three projects at the beginning of the 1990s. In this way a quality examination was performed while the projects were in progress. (c) The lack of involvement of central S&T authorities diluted the Uruguayan ownership of the programme and, accordingly, Uruguayan willingness to allocate future funds. Nor did the central authorities gain the additional credibility that would have enhanced their potential to acquire project funding from other domestic sources. This was unfortunate, since non-regular money for projects was very scarce in Uruguay, as it is in most developing countries. (d) Capacity building in the areas of policy capability, research administration and the like was very limited.

IDB proceeded on quite a different tack. It prepared a thorough and comprehensive loan document which formed the basis of the programme and entrusted the execution of the programme to Conicyt. Its selection of projects was based on competition and peer review. In addition, the programme contained a component aimed at strengthening Conicyt and Uruguayan policy capacity in the

research area. SAREC's programme was a prologue to the IDB programme; IDB's work benefitted from the Bank's ability to draw on SAREC's experience. IDB's *modus operandi* was of course more time-consuming and its disbursement pace proved to be lower.

The SAREC support was formally a "result-emphasising cooperation" in contrast to "capacity-emphasising cooperation". Much of the research cooperation contributed, however, towards a strengthening of research capacity, e.g. through the training of young researchers. This was consistent with the fact of Uruguayan research capacity being limited during the military regime and the essence of the Swedish institutions' contribution being the transfer of knowledge. We have also noted that several of the capacity-building activities of the IDB/Conicyt programme have helped to generate research results. The Uruguayan experience has thus hardly vindicated SAREC's firm distinction between "result-emphasising" and "capacity-emphasising" research cooperation, given that the two are inter-linked.

To some extent the initial choice of areas and experts was accidental in the sense that the areas of biology and biochemistry, traditionally strong in Sweden, could easily find successful partners in Uruguay, where these areas also have a strong tradition.

The amount, and quality, of scientific output varied between projects, as might be expected, and this probably reflected how the projects were initiated, as there was no change in projects during the whole funding period.

The network approach, with scientific groups in Argentina and Sweden was valuable, more in some projects than others, depending on how well groups were selected and on how well conceived the networks were. Parasitic diseases are one example of a successful network, producing both important results and capacity building. After the main funding period ended (1995), SAREC gave additional support to an educational network, which included additional countries in Latin America.

The "haphazard" selection of research areas did, however, lead to imbalances. What happened to research areas and scientists that were not included in the programme? Some were taken care of by other local and international agencies, including to some extent other Swedish agencies. The Swedish agency BITS sponsored cooperation between the Universidad de la Republica and KTH, the Royal Institute of Technology (Stockholm), in computing and pattern recognition, and with CTH, the Chalmers University of Technology, in systems engineering. The links established through personal exchanges and/or by the presence of Swedish companies in the area are of significance for all partners.

Although training of young researchers was formally not a component of the SAREC programme, we have found that such training became one of the most important parts of the programme. Many of the young scientists in the programme had the opportunity to go to Sweden for training. We understand that the so-called "sandwich-model" worked well in this case. We have found that many of the senior researchers involved in the SAREC programme have profited from their participation in the programme in their work as university teachers, although strengthening higher education in Uruguay was not among the aims of SAREC's programme. We believe that senior researchers who participate in SAREC-funded research projects should be engaged, in principle, in teaching. The teaching commitment should, accordingly, be part of the programmes.

The following are general recommendations for SAREC that can be inferred from our study:

1. Before initiating research cooperation with a country, SAREC should produce or commission a comprehensive country report, describing all relevant facts for organising science support. When establishing priorities, economic/societal factors are as important as scientific tradition.

2. Projects should be demand-driven as much as possible. SAREC's existing approach is, generally speaking, supply-driven and linear. No interactive mechanisms are foreseen and no funding is directed towards the *demand side* to increase and improve the demand for research and thus reinforce the quality of public sector research.
3. SAREC should work in close collaboration with national research organisations in the partner countries, and involve them as much as possible in programmes. Training in research management at all levels, from ministry to project groups, should be offered. It can be argued that the Uruguay programme had to be started without Conicyt being fully involved. Yet what according to SAREC was initially a matter of "efficiency", resulted in the creation of a programme that had no impact on Uruguay's national S&T system, and led a life of its own, unrelated to national priorities.
4. Clearly define anticipated results and impacts, and plan for project/programme evaluations from the start, including important milestones. Be prepared to redefine or terminate projects if results fall short of expectations or preconditions change.
5. SAREC should consider the option of supporting projects that are more integrated with local industry. By supporting research programmes that address the industrial development needs of partner countries, SAREC might contribute to economic growth while at the same time ensuring the sustainability of research projects and research results. Most R&D activities in Sweden are performed by *private* entities and there is a need to stimulate R&D in non-public entities in developing countries. No non-public entities, whether in Sweden or in developing countries, have even been mentioned in the SAREC Guidelines. No new *financing* schemes have been envisaged, for example schemes that could facilitate research partnerships between companies in the South and Swedish entities and partnerships with entities in middle-income countries.
6. SAREC's policy is a science policy, not a science and technology policy. To derive full effect from its investments in science, we think that SAREC should design them within the context of a *science and technology policy*.
7. SAREC sees itself as a *financing agency*, not as an agency which could act as partner, broker and adviser in the area of research cooperation, irrespective of the source of the funding of the research. SAREC should consider the possibility of extending its role to include a wider set of tasks. Acting as a broker/adviser, it could assist partner countries in the co-ordination of support from other donors and funding agencies. It could also assist its partners with regional cooperation, and it could act as a promoter of long-term cooperation between research institutions in partner countries and Swedish research institutions, even when SAREC itself has ceased to provide any funding.
8. Educational activities – not only training of researchers, but also other higher-level education – are very important in connection with research. SAREC should put greater emphasis on educational activities, and not see them as a different part of the foreign assistance scenario.
9. SAREC should be more active when it comes to publicising and requesting research cooperation. Through the Internet all projects, and all requests for project proposals, should be made easily accessible to the entire Swedish research community.

References

Bhagavan, The SAREC model: Institutional cooperation and the strengthening of national research capacity in developing countries, SAREC Report 1992:1

Dufour P, de la Mothe, Mullin, Using Science and Technology as Strategic Instruments for Canada's Foreign Relations with Latin America, Canadian Foreign Policy, Vol 5 No 2 (129-147) 1998

Hasselgren, Nilsson, Reflections on the role of Basic Sciences in Third World Countries, SAREC Report 1990:1

Inter-American Development Bank, Project Performance Review, Science and Technology Programme Evaluation, Uruguay, Evaluation Office, PPR-8/97, Washington D.C., October 1997

Mayorga R, Closing the Gap, Inter-American-Development Bank, Washington DC, January 1997

SAREC, Idépromemoria 1985-04-03, Forskningssamarbete med Uruguay och Argentina

SAREC, Idépromemoria 2 1986-01-22, Forskningssamarbete med Uruguay och Argentina

SAREC, Insatspromemoria 1986-04-28, Forskningssamarbete med Argentina och Uruguay

SAREC, Insatspromemoria 1987-05-22, Forskningssamarbete med Argentina och Uruguay

SAREC, Insatspromemoria 1989-05-30, Forskningssamarbete med Argentina och Uruguay

SAREC, Idépromemoria 1991-12-02, Riktlinjer för forskningssamarbete med medelinkomstländer samt fortsatt samarbete med Argentina och Uruguay

SAREC, Insatspromemoria 1992-05-27, Forskningssamarbete med Uruguay

SAREC, Guidelines for SAREC Support to Research in the Basic Sciences, April 1992

Sida (SAREC), Conference Summing up 10 Years of Bilateral Research Cooperation, Uruguay-Argentina-Sweden, Punta del Este, 29 November-1 December 1996

Sida (SAREC), Riktlinjer för forskningssamarbete, april 1998

Sida/UTV, Stefan Molund 1997-09-29, SAREC's programme for support to research cooperation with Uruguay 1986-1997: Comments on the planned evaluation report

Annex 1 – Terms of Reference

IDB/SAREC JOINT EVALUATION MATRIX FOR URUGUAY CASE STUDY

FOCUS	MAIN QUESTIONS	SECONDARY QUESTIONS	MEANS OF VERIFICATION
Rationale	Were the programs compatible with the policies and priorities of IDB and Sarec? Were program objectives well adapted to the countries' development and S&T plans?	Were program objectives clearly expressed? Have they remained the same during the lifespan of the program? Is program design coherent with its objectives? Was it modified during implementation? Were program activities coherent with the objectives and adequate to solve identified problems? Were execution mechanism adequate for program objectives and activities? NOTE: I have placed these two questions together. There is a subtle difference between the activities and their execution mechanism. Activities refers to categories such as research projects, scholarships, infrastructure projects ; mechanisms refers to the how, how were scholarship recipients selected , what were the procurement procedures, etc.; how were execution decisions taken?	Analyses of IDB-5, IDB-6 and IDB-7 Operational Policy OP-744 Sarec's Policy Documents Sectoral studies, ISE and CP for each country Project document
Effectiveness	Were the expected results achieved? To what extent did program results contribute to meet program objectives? What has been the quality of financed activities?	Did the financed activities meet acceptable requirements of originality, innovation and relevance? How was the relationship with similar concurrent activities sponsored by the government, the private sector and other cooperation agencies?	Reports from individual R&D projects financed by the program. Program annual reports. Analyses of products: publications, patents, cooperation agreements between universities and the private sector, human resources trained, new activities induced or enabled as a consequence of the program (e.g. new graduate programs, new R&D centers, new production activities). Interviews and site visits by an External Evaluation Team. Interviews with beneficiaries, S&T authorities and policy-makers, entrepreneurs, leaders of relevant academic and private sector institutions, "stakeholders". Fellowship and R&D project statistics.

	Was program execution well integrated with other related projects financed by the Bank (e.g. education, agriculture R&D, Programa Bolivar, SME's)?		Reports and analyses from the executing agency and of the relevant S&T institutions. S&T sectoral reviews.
Efficiency	How did program execution match the original time and cost schedule? How do the cost of financed activities compare with national and international standards? Could the same results have been achieved through different models of financing and cooperation?	Were there delays or major problems that hindered a smooth execution? How were such problems dealt with? Were there major deviations from the original schedule and program of activities? What were the reasons for such deviations? What was the "value added" introduced by the mandatory participation of Swedish research institutions in the Sarec model of cooperation in Uruguay?	Annual progress reports Disbursement records Project Completion Report (PCR)
Impact	What were the intended and unintended effects of the the programs to the development of national and institutional capacity in science and technology? Is there any evidence of an increase of innovation in the private sector What was the scientific and technical impact of the research activities sponsored by IDB and Sarec programs?	How and to what extent did the program contribute to the strengthening of national capacity for training specialized S&T personnel? What has been the program impact on the institutional capacity of the organizations involved in its execution? What was the impact of the program on the systems for research management in Uruguay? Did program activities contribute to a greater participation of women in S&T activities? Was there an increase in academic/private sector linkages (e.g. requests for consulting services, R&D contracts)? What was their academic as well as the social impact of the research results from the different sponsored activities ?	Site visit of External Expert Group. National S&T indicators: scientific publications, public and private expenditures in S&T, specialized human resources. Statistical data on university/firm agreements. Interviews

Sustainability	What is the likelihood that the activities financed by the program continue after its completion?	What has been the financial status of the executing agency after program completion? What is the historical evolution of national S&T expenditures? Have the operational mechanism used in the program been maintained after its completion?	National budget; institutional budgets. Interviews with executing agency staff.
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Annex 2

Sida/UTV
Stefan Molund
970929

SAREC's programme for support to research co-operation with Uruguay 1986-1997: Comments on the planned evaluation report

The following comments are complementary to the ToR for the IDB/Sida evaluation of support to science and technology in Uruguay and do not replace them. They concern the contents of the report from the evaluation of Swedish support through SAREC. They are motivated by the fact that the ToR for the evaluation are somewhat schematic and do not provide guidelines for reporting.

Audience and purpose

Who should read the report? The members of the evaluation team think that this question should be clearly and unambiguously answered before the writing of the report gets started. Sida/UTV agrees.

There are three main categories of intended readers: a) Sida personnel, especially personnel at SAREC who are concerned with policy issues in the field of research co-operation, b) programme beneficiaries and other members of the research community in Uruguay, c) Swedish researchers, mainly but not exclusively those who have participated in SAREC's Uruguay programme.

Like other texts of this kind the report will to some extent create its own audience. In the case of Sida/SAREC personnel the level of interest will probably depend on the perceived relevance of the report to significant policy issues. Presumably, something similar applies to the other groups of readers.

The purpose of the evaluation is partly summative, partly formative. We want to know what has been achieved over the years through SAREC's involvement in Uruguay, and we want the evaluators to draw useful lessons from the programme experience. SAREC's programme for research co-operation with Uruguay is all but completed. It is important that its main lessons are distilled and made available for other SAREC and Sida programmes.

'Benchmarking'

As originally conceived by IDB and Sida/UTV, the joint evaluation of SAREC's and IDB's Uruguay programmes would be an exercise in 'benchmarking' whereby both the organisations would learn about themselves. One problem with this idea, it turned out, was that SARECs and IDB's programmes are very different. Any benchmarking between these programmes will to some extent look like a comparison of apples to pears.

Thus, in the context of the report for Sida/UTV 'benchmarking' must be understood in the loose and extended sense of putting one thing into the perspective of another. It means nothing more (and nothing less) than a contrastive analysis of programmes where difference becomes a means of making visible and problematic programme features that otherwise might have been taken for granted. We believe that 'benchmarking' in this extended sense can produce quite interesting and useful results.

The following contrasts between the programmes have been noticed and commented upon in discussions between the evaluators and Sida/UTV. Some are obviously more likely as candidates for 'benchmarking' than others:

1. *Programme objectives:* SAREC has supported the production of research results that promise to be socially useful to Uruguay and other developing countries. Capacity building has been a subsidiary goal. IDB, on the other hand, supports a more narrowly defined purpose of creating links between science and the productive sectors of Uruguay.

(The fact that the objectives differ in important respects is of course one of the main reasons why benchmarking in a strict sense of the term is not possible.)

2. *Size:* few SAREC projects, many IDB projects; relatively small SAREC funds, much larger IDB funds, etc.

(Here 'benchmarking' could include a reflection on the possibilities and constraints of size. What are the appropriate ambitions for SAREC given the relatively small size of its programmes and resources?)

3. *Diversity:* SAREC support to a few academic research projects, IDB support to a larger and more heterogeneous collection of such projects, but also to university infrastructure and other things.
4. *Institutional embeddedness:* SAREC support directly to research institutions, national bodies for research planning and co-ordination apparently not much involved in the process. IDB support to research institutions mediated through national bodies for planning, co-ordination and allocation of funds.
5. *Co-operative links:* SAREC's programme basically a programme for support to research co-operation between Swedish and Uruguayan research institutions within a project framework. IDB's program a strictly national programme, lacking built-in links for co-operation.
6. *Regional co-operation:* SAREC's programme based on research co-operation between institutions in Uruguay and similar institutions in neighbouring countries. No such component in the IDB programme.
7. *Programme duration:* SAREC's programme lasted for a decade, IDB's programme for a shorter period.
8. *Conjuncture:* SAREC immediately after the restoration of democracy, IDB several years later.
9. *Sequence:* SAREC first, IDB afterwards.
10. *Mode of finance:* SAREC gift versus IDB loan.

(Here "benchmarking" might lead to a discussion about commitment and ownership. The fact that in SAREC's program the institutions in Uruguay are expected to contribute substantially to the projects would be relevant to such a discussion.)

11. *Donor involvement:* SAREC personnel continuously involved with beneficiary institutions and research teams, IDB personnel not directly interacting with beneficiary institutions and projects.

It is UTV's impression that several of the contrasts listed above are both relevant for an assessment of the results of SAREC's programme and interesting from a policy and methods perspective, but whether this really is for the evaluation team to decide.

In the evaluation report one would ideally set the chosen contrasts in relation to *programme results*, the latter specified under the headings of *effectiveness*, *relevance*, *effects (impact)*, *efficiency*, and *sustainability* as required by the ToR for the evaluation. But, obviously, it will often not be possible to say that one kind of arrangement is superior to its opposite in terms of these criteria. In some cases we do not even know what each one of the programmes has achieved or will achieve, independently of the other or independently of other donor programmes. Questions of relative merit must therefore be handled with a great deal of care.

In connection with this point it should be noticed that there is an important difference in timing of evaluation, the SAREC evaluation occurring at programme completion, the IDB evaluation at an earlier stage.

Programme rationale and design

SAREC's Uruguay programme is more or less synonymous with its component projects. There are few programme documents over and above the decision documents submitted to SAREC's Board at various points in time. The most important of the programme documents is Mr. Rolf Carlman's concept paper *Riktlinjer för forskningssamarbete med medelinkomstländer samt fortsatt samarbete med Argentina och Uruguay* (Guidelines for research cooperation with middle-income countries and continued cooperation with Argentina and Uruguay) from 1992. Carlman's paper summarises earlier guidelines for the programme, takes stock of the experiences of the first five years of co-operation, and makes some suggestions for change.

As there are no elaborate programme documents, except Carlman's, the evaluation must refer to more inclusive documents. The most important is *SAREC's Policy*, the latest version of which was adopted by SAREC's Board in 1995. Also highly relevant to the evaluation is Dr. M.S. Bhagavan's *The SAREC Model*. As long as their status in relation to the Uruguay programme is made clear, other policy documents may also be used in the evaluation.

On the project level there are more documents. The proceedings of the Punta del Este conference in 1996, Conference summing up 10 years of bilateral research cooperation. Uruguay-Argentina-Sweden, should be consulted as should available project evaluations and other projects documents.

It is important to notice that SAREC's bilateral programme for Uruguay consists of *support to project co-operation* between research institutions in Sweden and neighbouring countries, rather than *institutional support*, and that according to SAREC's policy the major goal of such co-operation is the production of *research results* relevant to the recipient country and other developing countries rather than *research capacity building*, which tends to be the overall goal for institutional support.

It must also be noted, however, that although the production of useful research results has been the main objective of the Uruguay programme, capacity building has figured as a subsidiary goal. In Rolf Carlman's concept paper from 1992 it is suggested that the Uruguay programme might have been more effective if support for capacity building had been given more weight from the beginning.

The evaluators should also be alert to the possibility that strengthening or building of capacity may have been a more important goal than the documents seem to indicate, especially during the second half of the programme.

In order to clarify programme goals and programme design the evaluators should not hesitate to make use of oral as well as written sources of information. Dealing with the criteria and procedures for the initial selection of projects, for example, the evaluators must rely almost exclusively on oral information.

Normally, SAREC's bilateral programmes are constructed on the basis of a preceeding *country analysis*. In the case of Uruguay, however, such an analysis was not made. The evaluators should consider the consequences of this. How e.g. was the process of project selection affected?

In the draft of the evaluators' synthesis report for IDB very important questions regarding capacity building for *knowledge acquisition* are briefly touched upon. The possibility and relevance of raising similar questions with regard to SAREC's programme might be considered.

Impact

According to the ToR the evaluators shall make an assessment of the impact of SAREC's programme. The following schematic classification is an attempt to make clear what the concept of impact might involve in an evaluation like the present one:

1. Intrascientific impact:

- 1.1 Impact on capacity building or capacity strengthening at three different levels: a) human resources (more and better qualified personnel) b) increased organisational and research capacity of beneficiary institutions, c) impact on national system of research.

Under the heading of increased organisational and research capacity, enlarged or improved opportunities for exchange with research institutions and research networks elsewhere should obviously be included.

Capacity building effects can come about in many different ways. E. g. it should not be overlooked that good research results tend to enhance the reputation of institutions and thereby also their ability to attract high-quality personnel, further funds, invitations to co-operation, etc.

- 1.2 Impact of support on the production of scientific results within the project.
- 1.3 Impact of scientific results on scientific research, including new techniques and methods; uptake and use of results by other researchers.
- 1.4 Negative intrascientific impacts from the point of view of beneficiary research institutions, beneficiary researchers, and other stakeholders?

2. Extra-scientific impact.

- 2.1 Extra-scientific use results for the benefit of society.
- 2.2 Negative extra-scientific impacts

Problems of extra-scientific impacts can be elucidated by a comparison with IDB's programme. But notice that in several cases the extra-scientific benefits anticipated or intended within SAREC's programme are transnational in scope.

This classification seems to be consistent with the understanding of the concept in the manuscript for the team's synthesis report to IDB.

Sustainability

By the ToR the evaluators are also required to make an assessment of sustainability. But what do we mean by sustainability in this case? In what sense is sustainability a relevant issue?

If sustainability means the continued existence of *research projects* after the termination of support questions of sustainability may *not* be very relevant to the evaluation. With a definition that includes the likelihood of future utility to beneficiaries and others of the *results* and *capacities* produced by the projects, however, the concept of sustainability is clearly relevant.

The following quotation from a DAC-discussion of sustainability makes the point:

The emphasis...is on sustaining the benefits, not the project. A donor project is an external intervention with specific inputs, activities, and expected outcomes that results in a stream of benefits. It is the stream of benefits and the institutional ability to deliver them that are to be preserved, not necessarily the project itself. .. the ultimate objective is to create the capacity within these countries to sustain for "an extend period of time" the benefits that were generated by the project. (1989:15)¹

We must not forget the difference between 'sustainable' and 'sustained'. In the first case we are making a judgement regarding the future in the second case we are looking towards the past in order to see what has actually happened. SAREC's program, which was initiated in the 1980's is now all but finished. When we are dealing with its sustainability, however, we are looking towards the future. What will be the long-term effects of the programme?

Questions of future government commitment similar to those that are raised in the draft of the team's reports to IDB would seem to be relevant in the evaluation of SAREC's programme.

Methodological reflexivity

The methodology and conceptual structure of the study should be clearly described. The report should contain a discussion of its own reliability and validity.

Manuscript for Sida Evaluations Newsletter

Sida/UTV expects the evaluators to produce a manuscript of a newsletter presentation of the report in accordance with the attached guidelines for writers of manuscripts for Sida Evaluation Newsletter.

¹ Organisation for Economic Co-operation and Development. Sustainability in Development Programmes: A Compendium of Evaluation Experience. Selected Issues in Aid Evaluation 1. Paris 1989.

Annex 3

List of abbreviations

CORIECIBA	Coordination of Networks for Research and Training in Biomedical and Agricultural Sciences
CTH	The Chalmers University of Technology
IDB	Inter American Development Bank
IIBCE	Instituto de Investigaciones Biológicas Clemente Estable
INIA	National Institute for Agricultural Research
KTH	The Royal Institute of Technology
LANBIO	Scientific Cooperation for Research on Bioactive Natural Compounds
LATU	Laboratorio Tecnológico del Uruguay
NIH	National Institutes of Health
PAHO	Pan American Health Organization
PEDECIBA	Programme for the Development of Basic Sciences
PPR	Project Performance Review
RTPD	Research and Training in Parasitic Diseases
S&T	Sciences and Technology
SBL	Statens Bakteriologiska Laboratorium
SLU	Swedish University of Agricultural Sciences
STD	Sexually Transmitted Diseases
STFI	Swedish Pulp and Paper Research Institute
SUAS	Swedish University of Agricultural Sciences
TWAS	Third World Academy of Sciences
UNDP	United Nations Development Programme
UNESCO	United Nations, Educational, Scientific and Cultural Organization
WHO	World Health Organization

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SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

S-105 25 Stockholm, Sweden

Tel: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64

Telegram: sida stockholm. Postgiro: 1 56 34-9

E-mail: info@sida.se. Homepage: <http://www.sida.se>