

SCIENCE AND TECHNOLOGY PROGRAM

(EC-0170)

EXECUTIVE SUMMARY

BORROWER AND GUARANTOR: Republic of Ecuador

EXECUTING AGENCY: The Government of Ecuador (GOE) will transfer the loan and local counterpart resources to the Secretaría Nacional de Ciencia y Tecnología [National Office of Science and Technology] (SENACYT), which will execute the program through the Fundación para la Ciencia y la Tecnología [Science and Technology Foundation] (FUNDACYT) under an agreement for technical-cooperation funding and economic assistance.

AMOUNT AND SOURCE:

IDB:	US\$24 million (OC)	80%
Local counterpart funding:	US\$ 6 million	20%
Total:	US\$30 million	100%

FINANCIAL TERMS AND CONDITIONS:

Amortization period:	25 years
Disbursement period:	4 years
Interest rate:	variable
Inspection and supervision:	1%
Credit fee:	0.75%

OBJECTIVES: The basic purpose of the program is to help strengthen the scientific and technological capacity of Ecuador to transform it into a stepping stone for economic and social development. The program will contribute in particular to boosting the national capacity to assimilate, adapt, generate, and use science and technology as useful instruments to shape a new pattern for the country's entry into the world economy, based on the efficiency of its productive activities and rational use of its natural resources.

DESCRIPTION: The program consists of the following five components: (a) approximately 50 research and development (R&D) and scientific and technological services (STS) projects, for a total estimated cost of US\$9.1 million, at least 75 percent of which will be earmarked for R&D projects with results that can be immediately transferred to the productive sectors and STS projects; (b) eight science and technology infrastructure projects, for a total value of US\$3.5 million, to be executed in five universities; (c) establishment and

operation of a financing facility for around 30 private-sector innovation and modernization projects, for a total value of US\$2.5 million; (d) training of approximately 125 persons in postgraduate programs in Ecuador and abroad, in disciplines pertaining to the program's priority areas (US\$4.9 million); (e) strengthening the national science and technology system and the technical, operating, and promotional agency of that system, the Fundación para la Ciencia y la Tecnología [Science and Technology Foundation] (FUNDACYT) by means of studies, dissemination of information, and other activities (US\$1.8 million). In addition, repayment of the PPF and part of the incremental costs incurred by FUNDACYT in executing the program will be financed (US\$2.7 million).

**ENVIRONMENTAL
CLASSIFICATION:**

At its meeting of April 8, 1991, the Environment Committee (EC) classified this project as a Category II operation.

IMPACT ON POVERTY:

The program is specifically designed to improve the national capacity to develop, absorb, adapt, and use science and technology. Accordingly, the operation does not conform to any of the criteria that would classify it as targeting poverty reduction, as set forth in the report on the Eighth Replenishment.

BENEFITS:

The operation will increase the country's capacity to: (a) conduct scientific and technological research and make use of the findings thereof; (b) absorb science and technology from abroad; (c) promote cooperation between the academic sector and the productive sector of the economy; and (d) retain professionals specially trained for scientific and technological work.

RISKS:

Since FUNDACYT has been recently established, with new procedures for allocating resources and newly hired personnel, there is a risk that program execution will be slow and operating capacity limited at the outset of the operation. To diminish these risks and pave the way for the consolidation of FUNDACYT as an agency to promote a coordinated science and technology program: (a) a sample equivalent to 75 percent of the research, services, and infrastructure projects to be executed by the universities and research centers has been prepared; (b) clear-cut rules and procedures have been drawn up to regulate execution of all components; (c) highly qualified personnel have been recruited, including the best of those trained during program preparation; and (d) a specialized institution has been identified to administer the scholarships abroad.

The usual risk that the activities included under the program will not be continued once execution has been completed must also be considered. Building up national capacity in this field and the type of economic and social benefits derived therefrom normally have long gestation periods. If future governments do not allocate the necessary funds to continue financing the scientific and technological activities initiated under the program, the desired objective will not be attained. Proper execution of this program would contribute to future continuity of that financing. To diminish this risk, it has been proposed that the borrower set up a stable source of funds to ensure the future operation of FUNDACYT.

**EXCEPTIONS TO
BANK POLICY:**

As an exception to the policies on contracting consulting firms, FUNDACYT will contract the Latin American Scholarship Program of American Universities (LASPAU) to administer the scholarships abroad component. This is justified by the technical advantages of this specialized agency in terms of experience, cost, and coordination capacity.

**THE BANK'S
COUNTRY AND
SECTOR STRATEGY:**

The program is consistent with the Bank's strategy in Ecuador to support efforts to modernize the state and the productive sectors of the economy. Based on the Law on State Modernization and Privatization, Ecuador has replaced a government agency (CONACYT) with FUNDACYT, a private agency with a more flexible structure that can pay competitive private-sector salaries. As a result, an improvement is expected both in the efficiency and quality of the services provided.

**SPECIAL
CONTRACTUAL
CONDITIONS:**

Prior to the first disbursement: (a) SENACYT must sign a technical-cooperation and economic assistance agreement with FUNDACYT whereby the latter is authorized to accept the financing and the local counterpart funding and agrees to fulfill all the conditions set forth in the loan contract; (b) FUNDACYT must sign an agreement with the Corporación Financiera Nacional [National Finance Corporation] (CFN) to administer the financing for the private-sector innovation and technology modernization projects; (c) SENACYT must approve and FUNDACYT must implement the general regulations for program execution agreed on with the Bank; (d) FUNDACYT must implement the systems for administration and technical and financial monitoring of the projects financed; and (e) FUNDACYT must have reached agreement with the Bank on the organization and technical and administrative mechanisms that will

be used for procurement, pursuant to the procedures set forth in the annexes to the contract (paragraph 3.37).

Within three months after the date of eligibility for the first disbursement, FUNDACYT must sign a contract, acceptable to the Bank, with the agency that will be responsible for administering the scholarships abroad component (paragraph 3.38).

Within 30 months of the date on which the contract is signed, the borrower must: (a) have set aside, in a manner acceptable to the Bank, the equivalent of US\$10 million and have arranged to make over to SENACYT the annual income from these funds for transfer to FUNDACYT as a subsidy for a period of 15 years. The investments made with the funds must yield FUNDACYT a high enough return to ensure that the science and technology policy established and administered by SENACYT is viable; and (b) must have submitted a formalized legal instrument, acceptable to the Bank, attesting to the irrevocable transfer to FUNDACYT of the income from the above-mentioned investments (paragraph 3.39).

I. FRAME OF REFERENCE

A. Main features of the Ecuadorian economy

- 1.1 Economic development in Ecuador has traditionally rested on the export of agricultural commodities. Until the end of the 1960s, at different stages, banana, coffee, or cacao exports represented the major source of funds that enabled moderate economic growth. During the 1970s, the production and marketing of oil and shrimp exports led to a high rate of economic growth at an annual average of nine percent. Manufacturing grew rapidly and attained some degree of diversification. In addition, the coverage of public health and education was substantially improved and per capita income jumped from US\$300 to US\$1,600.
- 1.2 In the mid-1980s, the Ecuadorian economy suffered the dual blow of a fall in its oil export revenue and the international financial crisis which brought in its wake severe instability and a slowdown in GDP growth. This crisis exposed the failings of growth based on import substitution, sustained by the export of a few commodities with low value added and high protection of the manufacturing sector.
- 1.3 The economic policy of the present Government of Ecuador is geared towards restoring the principal macroeconomic balances and advancing the program for state reform and liberalization of the economy. The reforms are designed to make resource allocation more efficient by opening up the economy and allowing the free interplay of market forces.
- 1.4 In the external sector, the country has launched considerable efforts to bring its trade policy into line with the new international economic conditions. The country has accepted entry into an Andean free-trade area and has amended its tariff policy. Average nominal protection fell from 30 percent in 1990 to approximately 13 percent in 1994. The breakdown of tariffs shows a similar trend, from an initial level of 100 percent down to 15 percent. This economic liberalization policy has been recently reinforced with Ecuador's application to join GATT and the enactment of a new Customs Law.
- 1.5 However, the export sector is depressed and will show total exports in 1994 barely comparable to the levels seen in 1985. This situation is even more critical in view of the current rigidity in the supply of internationally competitive products and the fact that oil still accounts for 45 percent of total exports and world trade projections for this product are very pessimistic.
- 1.6 This lack of vitality is the result of difficulties in several key sectors of the Ecuadorian economy: the weak competitiveness of the manufacturing industry, the low productivity in some agricultural

sectors, diseases on coffee and banana plantations, problems of quality in cacao production, technical problems affecting shrimp farming, and the unmet technological needs of certain nontraditional agricultural exports.

B. Need to develop national capacity in science and technology

- 1.7 The macroeconomic policies designed to ensure the fundamental balances and liberalization of the economy do not in themselves guarantee the progress needed in terms of improvement of agricultural technology or an increase in the competitiveness of the industrial sector. To date, technological and productivity improvements in the agricultural and industrial sectors have taken place through importing technology. This situation is unlikely to change in the short term given the conditions of globalization of the international economy, technological interdependence, and the size of the Ecuadorian economy. However, imported technology is not the only alternative for technological development, nor is it in all cases the most efficient from the cost-benefit viewpoint. Existing international technologies cannot always be applied to any input and context, and in any event rational selection entails a minimum scientific and technological capacity in the country to effectively use the imported technologies.
- 1.8 Such a minimum capacity is therefore vital to improve the level of productivity and competitiveness of the economy, as confirmed by the recent experience of developing countries at a relatively more advanced stage of technological development. Otherwise, the country cannot: (a) keep up-to-date and understand the advances made in other countries, select the most appropriate technology, assimilate it, and use it efficiently; (b) adapt the available technology to the conditions of the context in which it is applied, based on soil type, topography, climate, biological environment, or available inputs; (c) generate necessary technology that does not exist or is not available owing to factors of confidentiality, or because it is highly specific for certain purposes, resources, or inputs; and (d) exploit specialized market niches by developing technologies for new products and new productive processes that do not currently exist.
- 1.9 The existence of a minimum national capacity in science and technology (S&T) is a necessary condition, although not sufficient in itself, for technological development in any country. That capacity must lead to a national science and technology system for the purpose of: (a) efficiently and effectively making use in the country of the knowledge and techniques available worldwide; (b) making its own efforts to generate knowledge and the technological innovation required in the country; and (c) training the specialized human resources needed for all of the above.

C. Background of the national science and technology system of Ecuador

- 1.10 In recent decades, a variety of public and private institutions have been established in Ecuador that conduct both basic and applied scientific and technological research. The latest survey of science and technology activities identified over 400 research centers with nearly 1,500 researchers and specialists. Most of these centers are located in universities and public institutes, and include the Instituto de Investigaciones Agropecuarias [Agricultural Research Institute] (INIAP), the Instituto de Higiene Leopoldo Izquieta Pérez [Leopoldo Izquieta Pérez Institute of Health], the Instituto Nacional de Pesca [National Fisheries Institute] (INP), the Comisión Ecuatoriana de Energía Atómica [Ecuadorian Atomic Energy Commission] (CEEAA), the Instituto Nacional de Meteorología e Hidrología [National Institute of Meteorology and Hydrology] (INAMHI), and the Instituto Ecuatoriano de Normalización [Ecuadorian Standardization Institute] (INEN).
- 1.11 National surveys of researchers and specialists indicate that some 50 have doctorate training and 200 master's degrees, while the remainder have professional qualifications or bachelor's degrees. According to the surveys, the research centers identified were executing 723 research projects, of which 42 percent were in agriculture, 23 percent in exact and natural sciences, and 19 percent in engineering. These figures indicate the extreme fragmentation of the research effort, also shown in the low productivity and, in general, the lack of impact of the work conducted. Statistics on papers published in international journals show that the contribution from Ecuadorian authors is on average seven to eight articles a year, which is very small for the apparent size of the scientific community.
- 1.12 Generally speaking, most of the research being conducted is out of touch with the real needs and demands of the productive apparatus and the social sectors, which as a result do not make use of the existing scientific capacity. With a few exceptions, private enterprises do not have their own capacity to innovate and promote technological development either.
- 1.13 Most of the research projects in universities and research centers in nonprofit institutions are financed by funds from the Consejo Nacional de Universidades y Escuelas Politécnicas [National Council of Universities and Polytechnics] (CONUEP) and CONACYT, which funds are awarded through competitions. However, in the absence of a system of priorities the funds have been allocated in very small amounts to a large number of projects: on average financing from CONUEP and CONACYT has been for US\$5,000 and US\$2,000 per project, respectively.
- 1.14 The poor scientific output is linked to the fragmentation of efforts, shortage of trained personnel, and insufficient financing for scientific research in Ecuador. The lack of importance

assigned to scientific and technological activities is evident from the average annual amount of total investment (public and private) which in recent years has fluctuated between 0.15 and 0.2 percent of GDP. These figures compare unfavorably with the average values in many Latin American countries of between 0.5 percent and 0.7 percent of GDP. In 1993 public investment was equivalent to approximately US\$22 million. The main public institutions received the following percentages of the national budget for science and technology: INIAP (31%), Institute of Health (26%), INP (4%), CEEA, (6%), INAMHI (7%), INEN (4%), CONUEP (29%), and CONACYT (4%).

- 1.15 The private sector annually spends an estimated US\$2 million on research and development (R&D) activities, i.e. 10 percent of total national spending. This low absolute and relative amount is typical of incipient science and technology systems; as the system develops, the proportion of its activities financed and conducted by the private sector tends to increase until in some developed countries it reaches close to 50 percent of the total. In Ecuador, however, this process is limited by the low R&D capacity, particularly of enterprises. This leads to low demand of resources for R&D directly applicable to production, as shown in a survey of 430 enterprises conducted during the preparation of this program.

D. Program preparation

- 1.16 Preparation of the program began with approval of a nonreimbursable technical-cooperation project (ATN/SF-3691-EC) which included resources to help CONACYT in the technical and economic evaluation of a sample of the projects and activities that would be financed with program resources. CONACYT issued a call for proposals which resulted in the presentation of 200 R&D and scientific and technological services (STS) projects and 30 infrastructure projects for a total of US\$174 million. CONACYT contracted Ecuadorian evaluators to analyze each of the projects presented and recommended R&D, STS, and infrastructure projects for a total value of US\$49 million.
- 1.17 A Bank mission studied all the projects recommended and the opinions of the specialists involved in their evaluation and found that the projects selected by CONACYT suffered from weaknesses in formulation and in the analysis conducted by the evaluators, as a result of a series of problems stemming from the lack of experience on the part of both the applicants and the CONACYT evaluators and specialists.
- 1.18 The projects were reformulated more systematically beginning in mid-1993, once the resources of reimbursable PPF operation 749/OC-EC-PPF became available. To remedy the above-mentioned problems, specialized international consultants were engaged to guide the applicants in reformulating their original projects on more realistic bases, taking into account their experience and that of the proposed associates in each case and the feasibility of

achieving the proposed targets within the execution period. The international consultants assisted in redesigning and reformulating the best projects presented. In several cases new projects were formulated by combining two or more of the original projects. The process of project reformulation was an enriching and formative experience for both the researchers who had submitted the projects and the CONACYT specialists who worked together with the international consultants. Once the projects were reformulated, they were sent to specialists - mostly foreign - for independent evaluation. These consultants then recommended whether the reformulated projects should be approved, modified, or rejected in each case.

- 1.19 As a result of this entire process, there are currently 28 R&D and STS projects and eight infrastructure projects evaluated and ready for immediate execution. This includes 66 percent of the R&D and services projects and 100 percent of the infrastructure projects to be executed under the program. In addition, as described in the following section, during program preparation the foundations were laid for a new science and technology system to promote, direct, and coordinate science and technology activities. This system includes SENACYT and FUNDACYT, with the staff trained during program preparation and several hundred scientists and technology experts who participated in the preparation, reformulation, and evaluation of individual projects.

E. Need for institutional reforms

- 1.20 Concomitant with project reformulation, studies were conducted to analyze potential reforms of the institutional framework. ^{1/} Of the various alternatives proposed, the Government of Ecuador (GOE) selected one that was based on the recent approval of the State Modernization Law. In April of this year, CONACYT was closed down and SENACYT was created, attached to the Office of the Vice President of the Republic, along with FUNDACYT, a private nonprofit institution, which has been entrusted with promoting and financing research and development, services, and technology innovation projects and training top-notch human resources in science and technology.
- 1.21 As a result of that reform, the national science and technology system of Ecuador has a new organization, headed by SENACYT, a small government agency that manages the system and formulates national policies in that area. The new agency for promoting and financing projects, FUNDACYT, is far smaller and more flexible than the former CONACYT, can pay competitive private-sector salaries and

^{1/} The Ecuadorian science and technology system that was to guide and coordinate CONACYT never operated as planned. To all intents and purposes Ecuador did not have effective mechanisms for promoting scientific and technological research.

therefore has the qualified professional staff needed for the tasks to be performed. In order to guarantee its financial soundness and the continuity of future activities, the operating costs of FUNDACYT will be entirely covered by the income from a permanent capital fund to be set up by the GOE as part of the proposed program. Once the Bank financing is approved, for the first time the system would have substantial funds to be used to promote R&D and other significant science and technology (S&T) activities.

- 1.22 The solution adopted is an improvement over the traditional method of covering up the inefficiencies of public agencies responsible for executing lending programs by setting up "executing units".

F. Program design and impact

- 1.23 Based on all the studies, the program components were sized and adapted to the actual potential of the scientific community in Ecuador and to the real needs of the economy and society.
- 1.24 In determining the priority areas of the program, account was taken of the existence of research groups with technical capacity and their potential for conducting research and providing technological services. Based on this and an analysis of the relationship between the potential areas of research and economic and social activities, and of the importance of current and future economic activities, the following five priority areas were established: biomedicine, foods, natural resources and the environment, raw materials and minerals, and engineering and industrial processes.
- 1.25 Among the subjects of the projects recommended are the following: decrease in post-harvest losses of fruits and vegetables, earthquake-proof construction of low-cost housing, development of processes for smelting silver and gold ore, aquiculture of nontraditional species of mollusks, study of the genomic diversity of cultivated shrimp, and nutritional problems of pregnant indigenous women.
- 1.26 The new strategy is reflected in the design of the program components. The expected results of program execution would be as follows: (a) establishment of an endogenous capacity in Ecuador to execute S&T programs with the support of a stable sustainable institution; (b) strengthening of the capacity to manage and execute R&D projects; (c) training of a core of young, highly skilled researchers; (d) initiation of innovative activities in the private sector through a pilot program; and (e) development of ties and a new tradition of cooperation between research laboratories and the private productive sector.
- 1.27 During program execution, the annual investment in science and technology will increase approximately 50 percent, but the impact on research capacity in the priority areas selected will be far

greater. The budget increase will be supplemented by a considerable increase in qualified research personnel in these areas and by focusing performance objectives on important projects. Likewise, the innovative capacity of the private sector and its ties with research centers will be strengthened. The new approach of the program will mean that more complex problems can be tackled and more far-reaching and higher quality projects conducted, with financing that will ensure they are executed for longer periods than is usual in Ecuador.

G. Bank operations in science and technology

- 1.28 This would be the first specific science and technology operation executed in Ecuador. The Bank has approved several projects that included modest components for graduate training abroad in basic sciences and especially in agriculture and aquiculture. A recent loan, the coastal resources management program (913/SF-EC) for US\$14.9 million, contains resources for six master's degree scholarships and for applied research in coastal management problems.
- 1.29 Previously, two projects were executed that included resources for training abroad in basic sciences, engineering, and agriculture. In 1993, execution of loan 710/SF-EC and ATP/SF-2208-EC for the Escuela Superior Politécnica del Litoral in the amount of US\$30.4 million was concluded. That project included master of science and doctorate training, in addition to physical infrastructure for research and teaching in science and technology. More recently, in 1994 loan 207/IC-EC was finalized for the agricultural technology development program (PROTECA) in the amount of US\$43.6 million, which contained components for agricultural research and postgraduate scholarships.
- 1.30 The general experience of the Bank in these operations has been the difficulty in keeping the graduates in the country in positions compatible with their capabilities and expectations once they have completed their studies abroad. A scheme has been devised for the proposed operation to improve the retention rate, closely linking the scholarships for researcher training to the development needs and plans of the most active research groups (see paragraph 2.15).
- 1.31 An operation for modernization of agricultural services (EC-0040), currently under study, includes components for agricultural research and training at the master of science and doctorate level. During preparation of that program and the science and technology program proposed herein, care was taken to avoid unnecessary overlapping.

II. THE PROGRAM

A. Objectives

- 2.1 The basic purpose of the program is to help strengthen the scientific and technological capacity of Ecuador to transform it into a stepping stone to economic and social development. The program will contribute in particular towards boosting the national capacity to assimilate, adapt, generate, and use science and technology as useful instruments to shape a new pattern for the country's entry into the world economy, based on the efficiency of its productive activities and rational use of its natural resources.
- 2.2 The program has the following objectives:
- a. to finance research and development (R&D) projects and scientific and technological services (STS) projects conducted by nonprofit public and private agencies, in the following five priority areas: biomedicine, foods, natural resources and the environment, raw materials and minerals, and engineering and industrial processes;
 - b. to strengthen the infrastructure of nonprofit public or private agencies to conduct R&D and STS in the priority areas;
 - c. to finance projects for technology innovation and modernization of private enterprises in the country;
 - d. to train specialized personnel in disciplines relating to the priority areas, according to verified demand for such staff on the part of the institutions conducting R&D or providing STS in the priority areas;
 - e. to strengthen the institutional framework and improve coordination of the national science and technology system to step up joint action geared to economic and social development of the country; and
 - f. to consolidate an effective and transparent system, to include external peer review procedures, for the allocation of resources for science and technology according to national priorities.

B. Program goals

- 2.3 The program goals are embodied in the following five components: (a) nonreimbursable financing, in a global component, for approximately 50 R&D and STS projects conducted by nonprofit public and private agencies, for an estimated total of US\$9.1 million. At

least 75 percent of that financing will be allocated to R&D projects with results that can be immediately transferred to the productive sectors and to STS projects; (b) nonreimbursable financing for eight specific research infrastructure projects in public and private universities, for a total value of US\$3.5 million; (c) establishment of a reimbursable financing facility for private-sector innovation and modernization projects, under which some 30 projects will be financed for a total of US\$2.5 million; (d) training of approximately 125 individuals in postgraduate programs in Ecuador and abroad, in disciplines pertaining to the program's priority areas (US\$4.9 million); and (e) strengthening of the institutional capacity of the national science and technology system for a total amount of US\$1.8 million.

C. Program components

1. Financing of R&D and STS projects

- 2.4 This component targets nonprofit public and private institutions. The R&D and STS projects will be selected through competition with the participation of external evaluators, following the procedures described in chapter III.
- 2.5 This component will be subject to a set of rules and criteria set forth in the Operating Regulations, including the following: (a) the financing will be nonreimbursable, unless the project results in findings that can be adapted to yield verifiable profits, in which case the profits will be divided among the researchers, the agency conducting the project, and FUNDACYT; (b) only projects in the priority areas and their respective related disciplines will be considered; and (c) delayed transfer (DT) research projects that do not generate economic and social benefits in the short term must contribute to developing the country's capacity in the respective area.
- 2.6 Through the evaluation and reformulation of the projects presented during program preparation, a group of 28 projects was selected, in different disciplines and with different executing agencies and fields of application (see Annex II-2). The projects are ready for immediate execution as soon as the loan is declared eligible. During program execution, a second project competition will be held, following the same guidelines designed and applied for the competition held during the preparation stage.

2. Scientific and technological infrastructure component

- 2.7 To select the eight specific projects for investment in the infrastructure of the national science and technology system, a call for proposals was issued to public and private R&D institutions, and 30 projects were submitted. To select the projects approved, their objectives and consistency with the objectives of the program and the priority areas defined were analyzed, along

with their usefulness as support for research in the program areas and their relationship with ongoing R&D projects and those that would be financed under the program, the potential impact and linkages with socioeconomic sectors, the suitability of the technical personnel, and the sustainability of the project through payment for the provision of services or contracts with the productive sector, and the commitment to provide financing on the part of the sponsoring institution. The projects are fully prepared. Financing for the respective institutions will be nonreimbursable.

2.8 The projects selected are described in Table II-1.

TABLE II-1 INFRASTRUCTURE PROJECTS				
Proj. No.	Project Name	Inst.	Finan. (US\$000)	BRIEF DESCRIPTION
P-IDB-028	BIOMEDICINE CENTER	UCE	349.2	Equipping and expansion of immunology, cytogenetics, and biochemistry labs. Center is geared to basic studies in nutrition, endemic diseases, and genetic damage caused by pollutants.
P-IDB-094	ENVIRONMENTAL RESEARCH AND CONTROL CENTER	EPN	474.3	Studies and research in environmental engineering, water treatment, and pollution control in the sierra and Amazon regions.
P-IDB-096	VERTEBRATE ZOOLOGY RESEARCH CENTER	EPN	289.0	Equipping and expansion of center specializing in ecology and survey of fauna native to Ecuador.
P-IDB-097	WATER RESOURCE RESEARCH CENTER	EPN	677.0	Equipping and expansion of center and construction of a variable grade canal.
P-IDB-100	HOUSING RESEARCH CENTER	EPN	428.8	Construction of laboratory with tile and reaction wall to optimize traditional and nontraditional systems of construction.
P-IDB-109	STRUCTURAL ENGINEERING AND RESEARCH CENTER	UCG	371.9	Equipping and expansion of center to strengthen area of earthquake-resistant structural engineering and study of dynamic soil behavior.
P-IDB-115	MATERIAL MICROSTRUCTURE ANALYSIS LAB	PUCE	609.8	Equipping and creation of laboratories for microstructure analysis of materials and services for thermal analysis of ceramic materials.
P-IDB-174	ENVIRONMENTAL STUDIES CENTER	ESPOL	289.5	Equipping and construction of geomatics laboratory and geographic information system for studies of environmental pollution and impact on the coastal region.
TOTAL INFRASTRUCTURE PROJECTS			3,498.5	

- 2.9 In all cases special attention was paid to avoiding duplications of existing services and equipment in the country. In addition, each project is justified within a specific work program and in terms of the availability of qualified personnel to manage and operate it. For example, the two environment center projects (P-IDB-094 and P-IDB-174) are differentiated by their geographical specialization in the coast and the sierra. The work plans of the housing project (P-IDB-100) and structural engineering project (P-IDB-109) concern research in very different areas and avoid duplication of either effort or equipment.

3. Financing of private-sector innovation projects

- 2.10 The program includes a pilot component to finance technology innovation and modernization projects in enterprises. In addition, linkages and cooperation between enterprises and research centers will be fostered by financing joint projects. The projects financed will fall in one of the following categories: (a) technology innovation or experimental research and development projects that correspond to a pre-commercial phase (type A); and (b) technology modernization projects that do not include experimental development but represent a contribution to the country's technological modernization (type B). Given their nature, type A projects present risks due to the greater uncertainty associated with any technological development project and therefore a different financing arrangement is justified.
- 2.11 For both types of project, up to 80 percent of the total cost will be reimbursable at market interest rates. A minimum of 20 percent of the cost must be contributed by the borrowers. For type A projects, up to 20 percent of the amount financed will be subsidized as an incentive to conducting risky projects, subject to confirmation by means of an ex post analysis conducted by FUNDACYT that the activities planned were performed within the periods stipulated. If the experimental work for type A projects takes place in a research center belonging to a nonprofit institution, 35 percent of the financing may be subsidized, in order to promote association between the academic and productive sectors.

4. Training of human resources

- 2.12 Evaluation of the projects presented in response to the calls for proposals has shown that, although there are some research groups in Ecuador that have made interesting contributions, the science and technology system is still very weak.
- 2.13 This component has been designed to strengthen the research capacity in priority areas by financing postgraduate studies in Ecuador and abroad. In addition, projects will be financed for the strengthening of research groups and training of young researchers by visiting researchers through institutional cooperation agreements with foreign institutions.

- 2.14 **Scholarship-loans:** Studies will be financed for training and development of approximately 125 individuals in master's and doctorate programs in member countries of the Bank.
- 2.15 A fundamental objective of this component is to create conditions to retain staff qualified for R&D, STS, or postgraduate teaching positions in the country, either in the public or private sectors. To prepare the calls for scholarship applications, account will be taken of the needs of staff specialized in active research projects in the priority areas of the program, especially those projects financed under the program itself. Each call for applications will specify the fields for which candidates are being sought and the institutions that are willing to hire scholarship recipients once they complete their training.
- 2.16 The individual beneficiaries will receive loans that may be subsidized only if the beneficiaries provide services to the nonprofit institutions that sponsor them for a period of at least twice the term of the studies. If the sponsor is a productive private or public enterprise, the loan must be repaid along with the corresponding interest.
- 2.17 **Visiting researchers program:** To strengthen the research capacity and promote the training of young researchers by means of practical instruction with trained visiting researchers, about five projects will be supported through institutional cooperation agreements with foreign institutions. FUNDACYT will select the projects to be financed by means of competition.

5. Institutional strengthening of the national S&T system and FUNDACYT

- 2.18 This component is designed to strengthen the management of R&D activities and the linkage between research institutions and society at large, particularly the productive sectors, and among research groups themselves, through the following activities:
- 2.19 **Special studies:** (a) Updating the strategic plan for science and technology: based on the experience gained in preparing and executing this project, the principal problems to be dealt with will be identified in order to provide support for development of the various productive sectors and society in general and the priorities and fields of action for future SENACYT and FUNDACYT programming; (b) access by women to S&T activities: a survey will be conducted of women's participation in scientific activities in Ecuador, analyzing the relative number of women researchers, their involvement in projects and publications, and the managerial positions they hold in scientific institutions, in order to propose policies to help increase their participation in scientific and technological activities; and (c) copyright legislation in Ecuador: current copyright legislation will be analyzed to assess its

limitations and potential and to draft regulations whereby improved protection of innovations will promote research and development in productive activity.

- 2.20 **Dissemination and transfer:** Several activities will be conducted through the dissemination and transfer unit of FUNDACYT, including the production of scientific information materials for the mass media, dissemination of information on FUNDACYT and program activities, and production of a regular FUNDACYT publication and occasional bulletins and news reports; financing for the creation of two pilot units for technology linkage and transfer, one in a university and the other in a business association; FUNDACYT will accord special priority to actions designed to improve coordination between R&D laboratories and society at large and to maximize use of the results of research projects.
- 2.21 **Financing in REICYT centers:** The Red Ecuatoriana de Información Científica y Tecnológica [Ecuadorian Scientific and Technological Information Network] (REICYT) was set up in a group of nonprofit institutions that conduct scientific and technological research or offer scientific and technical services. These institutions will be part of the Ecuadorian network ECUANET, which will interconnect with international networks such as INTERNET and BITNET. Program resources will be used to finance the necessary equipment to install each center and link up with national and international networks; the beneficiary institutions will be responsible for the equipment of their individual users and for operation and maintenance costs.
- 2.22 **Training of specialized technology management professionals:** The creation of a master's degree in technology management will be supported, with a view to training professionals for the private sector and public institutions to perform management tasks relating to the acquisition and administration of technologies, resolution of copyright and patent problems, formulation and management of technology development projects, administration of research institutes, or technological services. FUNDACYT will select one institution (or consortium of institutions) to be responsible for this master's degree program by means of competition, with the participation of an evaluation committee made up of international specialists. In this competition, the applicants will present an academic proposal and must agree to finance the master's degree program by charging fees that can sustain it after the initial period to which FUNDACYT would also contribute. Surveys were conducted to analyze the potential demand for such a master's degree and verified the feasibility of the proposal.

D. Sizing of the program

1. Immediate transfer research (IT), delayed transfer research (DT), and scientific and technological services (STS) projects

- 2.23 The size of this component was determined based on the competition held in 1991 and the careful process of evaluation and reformulation conducted between 1993 and 1994 described above (chapter I).
- 2.24 The 28 projects approved (15 IT, 10 DT, and 3 STS), for a total of US\$6.1 million, were evaluated according to the technical and economic criteria of the Bank and are ready to be executed (see list in Annex II-1). In addition, a second competition will be held during program execution, with financing of up to US\$3 million for another 15 to 20 projects.
- 2.25 The total cost of the IT, DT, and STS project subcomponent is US\$9.1 million. This figure is realistic, since the 28 projects already evaluated and ready for execution represent 67 percent of this cost.

2. Infrastructure projects

- 2.26 The eight projects selected from the 30 presented in response to the call for proposals in 1991 underwent the selection and reformulation process during the period 1993-1994. The actual capacity of the applicant institution to execute technological services or research projects with potential for transfer to the productive sector was analyzed. In the case of infrastructure projects with STS, the existence of actual demand and willingness to pay was taken into account in particular, and special attention was paid to avoiding duplications or underutilization of physical space or scientific equipment. The eight projects that make up this specific component represent a cost of US\$3.5 million.

3. Private-sector technology innovation projects

- 2.27 The size of this component was determined on the basis of a survey of 430 enterprises (nine percent of the potential universe). These enterprises were visited in order to identify technology innovation projects. Initially 75 profiles of innovation projects were obtained for a total of approximately US\$9.6 million.
- 2.28 The technical and economic evaluation identified 13 projects eligible for financing, for a total requested amount of US\$1 million. This reflects the current weakness of Ecuadorian enterprise in identifying its own R&D projects. Extrapolation of these results to the universe of industrial enterprises gives a potential demand of US\$3.5 million. However, since the component is both novel and experimental and a base of experience needs to be built up, its size was established conservatively at US\$2.5 million.

4. Training of human resources

- 2.29 **Scholarship-loans:** The magnitude of the needs for postgraduate training was based on an analysis of the shortage of specialized scientific researchers in research institutes in Ecuador from: (a) data available on training needs of the 114 eligible projects presented at the first competition held by FUNDACYT, which was confirmed through interviews with those responsible for the projects and technical evaluation of similar projects; and (b) a direct survey on the needs for doctorate and master of science training abroad conducted directly with the directors of the 74 most important scientific research centers in the country.
- 2.30 To calculate the unit costs of the scholarships, the principal sources of information on costs of postgraduate studies abroad were taken into account: LASPAU in the USA and embassies, cultural offices, and the British Council in Ecuador. The total cost of the 125 scholarships is US\$4.3 million.
- 2.31 **Visiting researchers program:** This pilot project subcomponent was sized at a total amount of US\$500,000. The funds will help strengthen at least five research teams. In each case the cost of contracting 15 consultant/months at a monthly remuneration of US\$6,000, including travel and miscellaneous costs, was considered.

5. Strengthening the national S&T system

- 2.32 This subcomponent encompasses many activities designed to strengthen the capacity to transfer knowledge and information in the system. The total cost of financing these activities is US\$490,000.
- 2.33 The size of REICYT network was determined from project profiles presented by universities, classified into three groups, based on the extent of their activity in scientific research and the potential use of public information networks in scientific and technological subjects. Amounts of between US\$10,000 and US\$30,000 will be financed in each university. The total cost of this subcomponent is US\$500,000.
- 2.34 The scale of the master's degree in technology management program was determined on the basis of analysis of three surveys to assess the potential student demand, demand of the productive sector, the public sector, and research centers, and the capacity of universities to organize a master's degree program with these characteristics. The cost of the initial investment is an estimated US\$100,000, with outlays on the order of US\$200,000 the first year, and between US\$450,000 and US\$500,000 in subsequent years. Program support for the master's degree in technology management represents a total of US\$300,000, earmarked to initially support the launching of the master's degree program. Use of the financing will be

subject to public competition among the universities, with an international award committee to identify the best proposal based on program quality, actual demand of students with willingness to pay for enrollment, and the capacity to ensure the continuity of the program and future financial stability.

E. Program cost and financing

1. Program cost

- 2.35 The total program cost is an estimated US\$30 million equivalent, including an ordinary capital loan for US\$24 million. The breakdown and sources of financing are shown in Table II-2.

<p align="center">TABLE II-2 FUNDACYT-IDB SCIENCE AND TECHNOLOGY PROGRAM TABLE OF FINANCING BY COST CATEGORY (US\$ thousands)</p>				
COST CATEGORY	IDB	LOCAL	TOTAL	Z
1.0 ADMINISTRATION AND STRENGTHENING OF FUNDACYT	1,805	861	2,666	8.9
1.1 Administration	719	561	1,280	4.3
1.2 Consulting services	100	300	400	1.3
1.3 PPF (Repayment of loan 747/OC-EC)	986	0	986	3.3
2.0 DIRECT COSTS	16,985	4,815	21,800	72.7
2.1 R&D and STS projects	7,542	1,573	9,115	30.4
2.2 Infrastructure	2,800	700	3,500	11.7
2.3 Private-sector technology innovation projects	2,000	500	2,500	8.3
2.4 Human resource training	3,993	872	4,865	16.2
2.5 Strengthening of S&T system	650	1,170	1,820	6.1
3.0 UNALLOCATED	1,231	48	1,279	4.3
3.1 Contingencies	513	0	513	1.7
3.2 Cost escalation	718	48	766	2.6
4.0 FINANCE CHARGES	3,979	276	4,255	14.2
4.1 Interest	3,739	0	3,739	12.5
4.2 Credit fee	0	276	276	0.9
4.3 Inspection and supervision	240	0	240	0.8
5.0 TOTAL	24,000	6,000	30,000	100.0
6.0 PERCENTAGE	80.0	20.0	100.0	

2. Recognition of expenditures chargeable to the financing and local counterpart funding

- 2.36 Up to US\$986,000 equivalent of the Bank financing will be used to reimburse expenses incurred for program preparation and strengthening of FUNDACYT using resources for loan 749/OC-EC-PPF. In addition, up to US\$300,000 in costs incurred by CONACYT, SENACYT, and FUNDACYT for program preparation will be recognized as part of the local counterpart funding. Additional counterpart costs incurred prior to eligibility of the proposed loan for program activities may be recognized provided they are consistent with the mechanisms and rules of the Operating Regulations agreed upon.

III. PROGRAM EXECUTION

A. Basic execution procedure

- 3.1 The GOE will transfer the resources of the loan and the local counterpart funding to SENACYT, which will execute the program through FUNDACYT by means of an interagency cooperation agreement and a technical cooperation and economic assistance agreement (see Annex III-1.A).
- 3.2 Program execution will be supervised by the head of SENACYT, attached to the Office of the Vice President of the Republic.
- 3.3 During program execution, FUNDACYT will be responsible for promoting, coordinating, and executing the competitions and other necessary activities to approve the projects and transfer the resources to the institutions that directly conduct research and execute activities similar to those provided for under the program. FUNDACYT will evaluate and approve projects financed with program resources and will monitor and control activities. The R&D and STS projects will be carried out with the participation of national and international experts representing different areas of expertise that, generally, will be engaged as needed. The program costs therefore include the corresponding item to lend continuity to this mechanism, the effectiveness of which was demonstrated during the preparation stage.

B. Allocation of program resources

- 3.4 The use of program resources will be governed by Operating Regulations that will incorporate all the rules, criteria, and procedures to be observed during execution of the program components. The regulations for each component have already been discussed and agreed upon in principle with the borrower and the executing agency, and are based on the procedures successfully used during the preparation stage. The principal characteristics of each component are described below.

C. Execution of the R&D and STS project component

- 3.5 **Beneficiaries:** The beneficiaries of the component will be public and private nonprofit institutions: universities, polytechnics, and research institutes.
- 3.6 The resources of the component will be used to finance 28 projects selected during program preparation (see paragraph 1.20). In addition, during program execution, a second competition will be held to select projects in the amount of approximately US\$3 million, following the criteria and methodology used for the first competition and set forth in the Operating Regulations.

- 3.7 **Eligibility criteria and project analysis:** FUNDACYT will apply the following criteria to select the projects by competition: (a) the projects must fall within one of the priority areas of the program; (b) they must offer a reasonable probability of attaining the expected results, especially considering the expertise of the researchers and the means available to conduct the projects; (c) IT projects must present evidence of a potential market for the results, including a written statement of interest from at least one potential user; (d) in the case of projects submitted by institutions having regulatory functions, the project objectives should not be at variance with the objectives of these regulatory functions; and (e) the projects must be evaluated using the methodology indicated in the Operating Regulations.

- 3.8 **Financing cap:** Financing for a project out of program resources may not exceed US\$400,000 equivalent (absolute limit) unless the Bank issues a statement of nonobjection. Once evaluation of the projects presented at the second call for proposals is completed, FUNDACYT will present to the Bank, for review, a sample of three of those selected.

D. Execution of the infrastructure project component

- 3.9 The construction of civil works and procurement of equipment for the infrastructure projects will be regulated by means of an agreement between FUNDACYT and the beneficiary institutions. This agreement will include the following commitments: (a) creation of a small executing unit; (b) awarding of contracts for the works by the beneficiary institution in accordance with the procedures set out in the contract; (c) monitoring of construction by an engineer designated by the beneficiary and an inspector hired by FUNDACYT; (d) procurement of the equipment through FUNDACYT; and (e) responsibility for maintenance of the equipment and the civil works on the part of the beneficiary institution.

E. Execution of the human resource training component

- 3.10 The granting of scholarships will be granted subject to regulations that include the following principal points:
- 3.11 **Scholarship-loans:** This subcomponent will be executed by FUNDACYT with the participation of the Latin American Scholarship Program of American Universities (LASPAU). FUNDACYT will be responsible for calling for proposals, receiving the applications, determining eligibility and selecting candidates, supervising LASPAU work, collecting loans when applicable, and fulfilling obligations.
- 3.12 LASPAU will be responsible for administrative and financial management of the financing, placement and admission of scholarship recipients in universities, academic monitoring of the scholarship

holders, disbursements and transfers of resources to the beneficiaries, and regular reports to FUNDACYT on the entire process.

- 3.13 The beneficiaries will be selected through public competition in which their qualifications, knowledge of languages, references, experience, and work plans, which must be compatible with the slots to be filled, will be evaluated. The applicants selected must agree with the sponsoring institution on a mutual commitment to employment once the training for which the scholarship is awarded has been completed for a period of at least twice the term of the studies.
- 3.14 **Financing conditions:** The scholarship-loan will be granted to the individual beneficiary on a nonreimbursable basis provided that he or she complies with the provisions of the contract and the sponsor is a nonprofit institution. If the beneficiary does not meet those commitments, the financing must be repaid in proportion to the period of noncompliance.
- 3.15 The financing will be repaid in the currency in which the loan was granted, plus interest, from the date on which the studies were begun. The beneficiaries must present two joint and several guarantors as backing for the entire amount of the financing.

F. Execution of the private-sector project component

1. Institutional operating scheme

- 3.16 FUNDACYT will channel the resources earmarked to finance private sector technology innovation projects through the CFN (a second-tier bank) and intermediary financial institutions (IFIs).
- 3.17 The CFN will act as trustee of the resources of this line of credit, through a trust agreement with FUNDACYT, which will basically establish the following responsibilities: (a) to channel the resources through the IFIs; (b) to optimize returns on unused balances of the component; (c) to provide cashier and treasury services; (d) to collect payments from the IFIs; and (e) to keep accounts to record the resources and prepare semiannual reports on their management. The fee extended to the CFN will be 1 percent per annum on disbursements.
- 3.18 Eligible IFIs will be those qualified to act in the CFN-IDB global multisector credit program and that have previously signed a participation agreement with the CFN. The IFIs' obligations will be: (a) to conduct a financial evaluation of the technology innovation projects approved by FUNDACYT and rate the credit recipient; (b) to act as intermediary for the resources from the IDB-FUNDACYT line of credit to finance technically and financially qualified projects; (c) to assume the entire risk of the credit granted to

the beneficiaries; and (d) to present the CFN with the documentation to be discounted.

- 3.19 FUNDACYT will conduct the technical evaluation of the projects presented. If a positive report is received from the IFI on the creditworthiness of the enterprise and the collateral security required and if the project has a positive technical evaluation, the decision to grant credit will be conveyed by FUNDACYT to the IFI for the latter to issue the financing commitment. This document will specify the financial conditions under which the credit will be granted.
- 3.20 FUNDACYT will conduct the technical monitoring of the project to verify its progress and proper use of the resources.

2. Credit regulations

- 3.21 The following are the most important features of the credit regulations:
- 3.22 **Beneficiaries:** The credit beneficiaries will be individuals or private corporations legally established in the country, which, in the opinion of the IFIs and FUNDACYT, have the administrative, technical, financial, and legal capacity to execute the project and translate it into a commercial reality.
- 3.23 **Project eligibility criteria:** The projects must meet the following eligibility criteria: (a) the technology innovation or R&D activities must be for the pre-commercial stage of development or contribute significantly to the country's technological modernization; (b) they must involve innovation or substantial adaptation of technology for products or productive processes; and (c) the procedures used and results sought may not have any unacceptable environmental impact.
- 3.24 **Financing conditions:** FUNDACYT will finance up to 80 percent of project cost, up to a maximum amount of US\$250,000. The remainder will be contributed by the loan applicant.
- 3.25 The projects may have a period of execution and a grace period of up to two years, both starting from the date of the first disbursement, plus an amortization period of up to six years, starting from the end of the grace period, for a total of eight years. The credits may be granted in sucres, UCVs, or in United States dollars. The CFN will fix a base rate the same as that used in the global multisector credit program. The IFI will stipulate the credit terms based on the financial evaluation.
- 3.26 **Use of recoveries:** The resources of the credits recovered by FUNDACYT will be managed in a revolving fund. They may only be used to finance new loans that conform substantially to the rules

set forth in the loan contract with the Bank and in the regulations for operations to be carried out by FUNDACYT.

- 3.27 Incentives for technology innovation: Only technology innovation projects (type A) that have been evaluated by at least one international specialist may benefit from nonreimbursable financing equivalent to 20 percent of the resources contributed to the project under the program or up to 35 percent in the case of research contracted by the enterprises through an agreement with nonprofit research centers. This incentive will become effective through a credit memorandum to the corresponding IFI, but may in no case exceed US\$50,000.

G. Execution of the component for strengthening the national S&T system and FUNDACYT

- 3.28 Special studies: The Secretary of Science and Technology will be responsible for preparing the strategic plan for science and technology using national and international consultants.
- 3.29 Creation of master's degree in technology management: This master's degree program will be executed by an institution selected through competition. The training coordinator of FUNDACYT will be responsible for supervising this activity and will control and monitor academic, financial, and administrative performance.
- 3.30 REICYT: The information director of FUNDACYT, through the information processing services unit, will be responsible for executing this activity. Specific association projects presented by Ecuadorian R&D institutions selected according to the respective regulations will be financed.
- 3.31 Transfer and dissemination of science and technology: The transfer and dissemination unit, under the information department, will execute this subcomponent. Particular emphasis will be placed on the promotion of and information activities on the various program components and on transfer of the research results, with the support of university and private-sector liaison units.
- 3.32 Special courses and events: The training coordinator and the transfer and dissemination unit will be responsible for this subcomponent. The special courses and events will be geared to professionals and specialists in institutions that belong to the national S&T system.

H. Administrative support for FUNDACYT with procurement of equipment

- 3.33 FUNDACYT will hire a coordinator and other experts to carry out these activities, as required, without creating a permanent position on its staff. FUNDACYT will reach agreement with the Bank on the organizational structure and the technical and administrative

mechanisms that will be used for procurement, in accordance with the procedures set out in the contract and its annexes.

I. Contracting of LASPAU as administrator of scholarships abroad

- 3.34 LASPAU is a specialized agency that supports scholarship holders from Latin American countries and administers resources for this purpose. It has active connections with universities and other institutions and the capacity to place postgraduate students in Japan, Europe, Latin America, and North America. It is a private nonprofit institution and has the following advantages: (a) extensive and favorable experience demonstrated in Ecuador through IDB and Fulbright financing; (b) an efficient organizational structure consisting of highly skilled professionals; (c) the capacity to coordinate and use other agencies worldwide; and (d) an extensive record and international prestige, which have enabled it to secure waivers of enrollment fees for Latin American scholarship holders. It also has the following institutional advantages: it can assist FUNDACYT in administration and performance of the clauses agreed upon in the loan contract relating to the training component; it can provide technical assistance in selecting scholarship recipients and proper places for studies; it can disburse the resources to the beneficiaries; its procedures for awarding scholarships to the best candidates are transparent; and FUNDACYT will therefore not need to hire additional personnel to perform these functions.

J. Works construction and procurement of goods and services

- 3.35 International public bidding will be held when the proceeds of the Bank financing are used and the estimated amount of the contracts for which bidding is being held is greater than the equivalent of US\$1 million for construction projects or the equivalent of US\$350,000 for procurement of equipment and materials. The bidding will be subject to the procedures annexed to the loan contract. These thresholds are justified, since in similar projects in the country foreign bidders have only submitted bids for contracts in excess of those figures. For contracts in amounts below the respective thresholds, bidding will be held according to the current regulations agreed upon with the Bank and recognized by Ecuadorian legislation.

K. Maintenance of works and equipment

- 3.36 The borrower will agree to include in the financing agreements with the beneficiaries the commitment to ensure that the works and equipment financed using program resources will be operated and maintained in accordance with generally accepted technical standards.

L. Conditions precedent to the first disbursement

- 3.37 Prior to the first disbursement: (a) SENACYT must sign a technical-cooperation and economic assistance agreement with FUNDACYT whereby the latter is authorized to accept the financing and the local counterpart funding and agrees to fulfill all the conditions set forth in the loan contract; (b) FUNDACYT must sign a power of attorney with the CFN for administration of the funds that will be used to finance private sector innovation and modernization projects; (c) SENACYT must approve and FUNDACYT must put into effect the General Regulations for program execution agreed on with the Bank; (d) FUNDACYT must implement the systems for administration and technical and financial monitoring of the projects financed; and (e) FUNDACYT must have reached agreement with the Bank on the organization and technical and administrative mechanisms to be used for procurement, in accordance with the procedures contained in the contract annexes.
- 3.38 Within three months after the date of eligibility for the first disbursement: FUNDACYT must sign a contract with an agency responsible for administering the foreign training activities.
- 3.39 Within 30 months after the date on which the contract is signed, the borrower: (a) must have set aside the equivalent of US\$10 million and arranged to make over to SENACYT the annual income from these funds for transfer to FUNDACYT as a subsidy for a period of 15 years. The investments made with these funds must yield FUNDACYT a high enough return to ensure that the science and technology policy established and administered by SENACYT is viable; and (b) must have submitted a formalized legal instrument, acceptable to the Bank, attesting to the irrevocable transfer to FUNDACYT of the income from the above-mentioned investments.

M. Execution schedule

- 3.40 The proposed period of execution is four years from the effective date of the loan contract. The tentative schedule of disbursements of the loan and local counterpart funding is as follows:

(in US\$ thousands equivalent)					
Source of financing	Year I	Year II	Year III	Year IV	Total
IDB	6,671	9,082	5,123	3,124	24,000
Local	1,631	2,137	1,365	867	6,000
Total	8,302	11,219	6,488	3,991	30,000

N. Fund advance

- 3.41 In view of the pace of execution planned, it is recommended that, at the request of the executing agency, a fund advance of up to 10 percent of the loan amount be furnished.

O. Environmental impact

- 3.42 The program was classified as a Category II operation by the Environment Committee at its meeting of April 8, 1991. In addition, FUNDACYT will ensure through its project evaluation, approval, and monitoring system that the projects and their results, financed under the various program components, do not have any adverse impact on the environment. The respective regulations stipulate that any environmental degradation must be avoided as a criterion for project eligibility.

P. Monitoring by the Bank during program execution

- 3.43 The Bank's Country Office will monitor the overall progress of the program. At the end of each year, the executing agency will present a report to the Bank describing the progress made in the execution of each component and the status of compliance with the annual targets set forth in the matrix in Annex III-1. After two years of execution, the Bank and FUNDACYT will conduct a mid-term evaluation of the program to verify compliance with the targets and will recommend measures to make any necessary corrections.
- 3.44 Bearing in mind the nature of the program and that it would be the first of its type to be executed in a Group D country, it is recommended that an ex post evaluation be conducted and be financed by the Bank. Annex III-2 includes the monitoring indicators that should be compiled annually as a basis for the ex post evaluation.

Q. External auditing

- 3.45 It is recommended that during the period of program execution the financial statements of the program and of the executing agency be presented to the Bank, audited by a firm of independent public accountants acceptable to the Bank.

IV. THE BORROWER AND EXECUTING AGENCY

A. The borrower and executing agency

- 4.1 The Republic of Ecuador will be the borrower. SENACYT will be the executing agency. It reports directly to the Vice President of the Republic and consists of a Secretary of Science and Technology at the level of minister without portfolio, the Office of the Secretary, and a legal advisor. SENACYT will contract FUNDACYT for program execution.

B. Reorganization of the science and technology system

- 4.2 In July 1993, the Vice President of the Republic designated a high-level steering committee to supervise preparation of the science and technology program and analyze the institutional changes that should be made to ensure proper, efficient execution. Using resources of the PPF operation approved by the Bank in 1993, national and international consultants were hired and recommended various alternatives on which to base the new institutional organization of the system.
- 4.3 The State Modernization Law of December 31, 1993 granted the President of the Republic the power to issue administrative regulations within the central government to attain, among other objectives, administrative streamlining and efficiency. This law empowers the President to reorganize and abolish public agencies that do not efficiently and expeditiously serve the needs of society.
- 4.4 In view of the fact that the national science and technology system created by Decree 3881 of 1979 did not operate effectively, and based on the studies and recommendations of the Office of the Vice President, the President decreed that CONACYT be abolished and that the system be reorganized and SENACYT be set up as its highest authority. Executive Decree 1603 of April 5, 1994 includes the following regulatory provisions: (a) to abolish CONACYT, pursuant to the State Modernization Law; (b) to set up SENACYT, attached to the Office of the Vice President of the Republic, as the policy-setting body for the system; (c) to establish FUNDACYT, a private nonprofit organization, to act as technical, operating, and promotional agency of the system; and (d) to transfer to SENACYT the assets, liabilities, budgetary allocations, and various contributions that by law belonged to CONACYT.
- 4.5 CONACYT assets consisted of real property (offices) and office furnishings and equipment. Its liabilities were mainly staff retirement payments, which have been settled with resources from the State Modernization Law. SENACYT delivered the offices and

equipment to FUNDACYT in trust, and will hire FUNDACYT to administer the resources from the Public Contracting Law, as well as the loan proceeds.

C. Institutional structure of the new system

1. SENACYT

- 4.6 SENACYT is the highest authority of the system and is headed by a national secretary appointed by the President of the Republic. SENACYT is in turn the president of FUNDACYT. SENACYT will be responsible for stepping up the contribution of science and technology to modernization of the state and society, as well as for obtaining and allocating the necessary financial resources. It will have a legal advisor in science and technology to formulate national policies in this area. Executive Decree 1603 of April 5, 1994 specifies the powers of SENACYT. The Secretary was appointed and took office on June 7 of this year.

2. FUNDACYT

a. Objectives

- 4.7 FUNDACYT is the technical, operating, and promotional agency of the national science and technology system and will administer SENACYT resources through specific agreements.
- 4.8 The most important functions of FUNDACYT are: (a) to program, execute, and control policies, strategies, and medium- and long-term plans approved by SENACYT; (b) to promote and finance research, services, and technology innovation projects and the training of first-rate human resources in science and technology; (c) to promote and finance mechanisms for linkage, dissemination, and popularization of science and technology and a national scientific and technological information network; (d) to channel the technical and financial cooperation negotiated by SENACYT; (e) to administer the financial resources entrusted to it by SENACYT, including those obtained from the various multilateral lending agencies; and (f) to raise, create, administer, and in general manage its own funds and/or resources or those from national or international sources.

b. Organizational structure

- 4.9 FUNDACYT will have three departments: Technical Operations, that will be responsible for technical and economic evaluation and monitoring of research and technology development projects presented by the universities and private enterprises, as well as for the human resource training component; Information, responsible for creating, organizing, and maintaining a national S&T information network, and for administering the activities of information

transfer and dissemination and the REICYT project; and **Administration and Finance**, responsible for the administrative and financial affairs of the institution and for financial control and monitoring of the projects approved.

- 4.10 The legal advisor's unit will be responsible for drawing up contracts, monitoring fulfillment of contractual obligations, and advising on legal aspects of program execution. Internal auditing will be performed by means of a contract with a specialized firm, which will be responsible for the control, monitoring, and inspection of the procedures and operations conducted by FUNDACYT.
- 4.11 Because it is a new agency, FUNDACYT needs to establish proper administration and accounting systems, as well as mechanisms for financial monitoring and control in order to supervise the projects it approves. The reimbursable PPF operation (729/OC-EC) approved in mid-1993 included US\$100,000 for strengthening of this area, which is expected to be completed prior to eligibility of the proposed loan.

3. Staffing

- 4.12 To commence its functions, FUNDACYT has hired management level staff and a group of professionals that were involved in formulation of the program and in evaluation of the sample of projects for its various components. These professionals, selected through public competition, have vast experience and proper qualifications for the positions they will hold; several of them have doctorates and master's degrees from internationally prestigious universities.
- 4.13 FUNDACYT will need a total of 20 professionals to operate at maximum capacity. Sixteen persons have been selected, of whom 13 have already been hired and three are pending recruitment. Another competition is being held to select the four remaining professionals, which will complete FUNDACYT's personnel.
- 4.14 FUNDACYT will also hire part-time or temporary personnel, including scientific and technological evaluators, area coordinators, and consultant economists.

D. CFN

- 4.15 The CFN is a state-owned institution whose purpose is to promote the economic development of Ecuador. It is a second-tier institution that gears its financing to economic activities using the procedure of discounts and rediscounts through the country's financial system. The CFN has been declared eligible to execute the global multisector credit program financed by a Bank loan (650/OC-EC) approved in 1992. For this reason, it was deemed unnecessary to analyze its institutional and financial capacity.

V. PROGRAM FEASIBILITY AND RISKS

A. Technical feasibility

- 5.1 All the projects and activities have been evaluated according to the technical design criteria and to ensure the competence of the groups of researchers and the capacity of the institutions to execute the projects and lend continuity to the priority lines of research.

B. Institutional feasibility

- 5.2 FUNDACYT has an appropriate organizational structure to administer the program and execute the new functions assigned to it. Part of the personnel hired has been actively involved in program preparation. In addition, as a private institution, it can pay competitive salaries and attract qualified professionals to complete its staffing. It currently has administrative procedures for supervision and financial control whereby it will be able to properly administer the resources of the proposed loan, and the budget necessary to hire national and international experts in scientific and technological activities. The support of LASPAU to administer the scholarships and of the CFN as trustee of the component targeting the Ecuadorian productive sector will further strengthen its efficiency in executing the proposed program.
- 5.3 The operating instruments that FUNDACYT will use to execute the program, such as regulations, contracts, agreements, financing application guidelines, and supervision and control management have been analyzed and are deemed appropriate.

C. Financial feasibility

- 5.4 The feasibility of the local contribution, equivalent to US\$6 million (less than US\$2 million per year), is guaranteed by the government. The local counterpart funding for the first year of execution is available, having been included in the central government budget for 1995.
- 5.5 To lend continuity to FUNDACYT and consolidate the system created, the government has reaffirmed its decision to support the program by providing the equivalent of US\$10 million. The income from these funds will be made over irrevocably to FUNDACYT for a period of 15 years to cover FUNDACYT's annual operating costs, which are estimated at approximately US\$500,000.
- 5.6 Pursuant to Law 95 of 1990, FUNDACYT also receives the revenue from a tax generated by the Public Contracting Law. In 1993, the tax yielded the equivalent of US\$1 million for CONACYT. If FUNDACYT

continues to receive such funds, they would be used to finance activities similar to those proposed in this program.

D. Economic feasibility

- 5.7 Each program component underwent an economic feasibility analysis using the specific methodology for each case. In addition, the capacity to implement the evaluation mechanisms required in the execution stage was evaluated.

1. Projects for immediate transfer (IT) and delayed transfer (DT) research and development, and for scientific and technological services (STS)

- 5.8 Sixteen IT R&D projects were evaluated, eight DT, and three STS. A cost-benefit economic analysis was used under conditions of uncertainty to evaluate the projects.
- 5.9 In addition, the STS projects must prove the existence of potential demand and willingness to pay by means of a survey of a representative sample that would ensure the generation of sufficient revenue for the project to be economically profitable.
- 5.10 The DT projects underwent a technical evaluation to verify their originality, the clarity of their objectives, the suitability of the researchers, methodological rigor, and the financial and institutional resources required for the research. The relevance of the project was assessed, by considering its importance for development of the particular area, its ties to the country's socioeconomic development, and its relationship with other projects with possible immediate applications.
- 5.11 Tables V-1-1 and V-1-2 of Annex V-1 list the principal indicators of economic return and the findings of the risk analysis of 19 projects (16 IT and 3 STS) of which 18 with an EIRR greater than 12 percent were approved. Of the 15 IT projects approved, eight are for research, the results of which will have a direct impact on improving the productivity of crop-farming, cattle-farming, or aquiculture. Three projects target health care, to improve the diagnosis of diseases or care for pregnant women. Others concern the mining sector and industry.

2. Infrastructure projects

- 5.12 An economic analysis was conducted of the eight projects selected from an open invitation for proposals issued to all institutions involved in scientific and technological research in the country. Five of the projects include the provision of technological services. The selection was based on an analysis conducted by local and international consultants.

- 5.13 For the infrastructure projects designed to provide services to the productive sector, a cost-benefit analysis under conditions of uncertainty was conducted, similar to that used for the STS projects. To be approved, the projects must have an adequate economic rate of return and the present value of the net benefits must cover at least 50 percent of the investment costs.
- 5.14 The infrastructure projects without services, essentially for basic research, underwent a least-cost analysis of alternatives and cost-efficiency analysis from basic indicators. The indicators show that those projects are cost efficient.
- 5.15 Three of the five infrastructure projects with technological services were approved. Table V-1-3 of Annex V-1 summarizes the principal indicators of economic return. Final approval of two projects (structural engineering and research center, P-IDB-109, and water resources research center, P-IDB-097) require an additional study on demand and willingness to pay for the services proposed to determine if the rate of return is adequate.

3. Private-sector technology innovation projects

- 5.16 For this pilot component, an economic evaluation was conducted of the indicative sample of 15 private-sector innovation or technology modernization projects.
- 5.17 The projects were selected based on the innovative nature and quality of the project. Six of the sample enterprises are in the chemical industry, five in metallic products, machinery, and equipment manufacturing, and three in microelectronics and software.
- 5.18 The cost-benefit analysis under conditions of uncertainty of 13 projects of the indicative sample showed an adequate economic rate of return, with an EIRR far greater than 12 percent. The principal indicators are summarized in Table V-1-5 of Annex V-1. Only six projects were classified as innovative projects with technological risk (type A). The others were technology transfer and assimilation or low technological risk projects (type B). Two projects were rejected as they had an economic rate of return below the acceptable standard, due to poor identification of demand or very high risks owing to competition from imported products.

4. Scholarship-loan component

- 5.19 The economic analysis of the scholarship-loans evaluates the impact on the economy of the expected increase in graduates in the scientific and technical fields under the program. The increase in the number of master's degree and doctorate level researchers will be directly and indirectly reflected in an improvement in economic productivity. This improvement was estimated from the salary

differential in the labor market between professionals with and without postgraduate degrees.

- 5.20 The costs of the component include all expenses to be incurred in masters's degree or doctoral studies abroad: tuition, sustenance, books and study materials, and travel. In addition, the loss of productivity for the economy during the student's studies was considered.
- 5.21 The cost-benefit economic analysis of the scholarships abroad, according to the assumptions considered here, shows that the rate of return of the component is adequate, with an IRR of 18.6 percent for master's degrees and 12.3 percent for doctorates.

5. National master's degree in technology management

- 5.22 The impact on the economy of an increase in professionals trained in technology management was evaluated, along with the savings of economic resources represented by training them in the country. Economic analysis of the master's degree program evaluated the cost-benefit by comparing the situation with and without the project. In the situation with the project, such students can be trained in Ecuador. Without the project, students who wish to earn a master's degree in technology management would have to do so at a university abroad.
- 5.23 The cost of the national master's degree program includes the costs of investment, provision of equipment, and other outlays for teaching, administrative, and operating and maintenance staff. The cost-benefit analysis of organizing the master's degree in technology management showed an appropriate economic return, with an EIRR of 29.5 percent.

6. Principal conclusions

- 5.24 The economic analysis of the R&D project component shows that the projects approved have a high economic rate of return, reflecting a significant connection between the research and the socioeconomic sectors. In terms of application of the evaluation mechanisms, the technical team of the institution has been trained through international consulting services and has demonstrated sufficient capacity to analyze and evaluate projects according to the criteria agreed upon.
- 5.25 The infrastructure projects have been proven cost efficient, and the scale of the STS projects has been determined based on potential demand and willingness to pay that justify the investment costs involved.
- 5.26 The private-sector technology innovation projects in the sample show a very high economic return, but only a few are significantly innovative with a high technological risk. The economic evaluation

of these projects showed them to be very sensitive to the quality of the market information on demand, market structure, and future prices. The Operating Regulations therefore call for the participation of an international specialist for the technology innovation projects, and resources have been included to improve the market information available for the evaluation. In addition, an incentive for enterprises has been designed to favor innovative projects with technological risk.

- 5.27 The human resource training component has been evaluated and shows an adequate economic rate of return. The scholarship-loans for master's degree and doctorate studies in the priority areas of the program will have a significant medium-term impact on the performance of the national science and technology system, and indirectly on economic productivity.

E. Benefits

- 5.28 The main benefit of the program will be the institutional consolidation of a system to coordinate, direct, and promote scientific and technological activities in Ecuador. Under the program, the system, which will be supported by SENACYT and FUNDACYT as its technical and operating agency, will be fully established and begin operations.
- 5.29 In addition, the proposed operation will increase the country's capacity to: (a) conduct scientific and technological research and apply the results of such research; (b) absorb science and technology from abroad; (c) develop cooperation between the academic sector and the productive sector of the economy; and (d) retain professionals specially trained for scientific and technological positions.

F. Impact on poverty

- 5.30 The program is designed specifically to improve the national capacity to develop, absorb, adapt, and utilize science and technology. It therefore does not meet any of the criteria that would qualify it as targeting poverty reduction, as set forth in the report on the Eighth Replenishment.

G. Program risks

- 5.31 Since FUNDACYT has only recently been established, and has new procedures for allocating resources and recently hired staff, there is a risk that program execution could be slow and operating capacity limited at the outset of the operation. To diminish these risks and pave the way for the consolidation of FUNDACYT as the agency to promote a coordinated science and technology system: (a) a sample equivalent to 75 percent of the research, services, and infrastructure projects to be executed by universities and research centers has been prepared; (b) clear-cut rules and

procedures have been drawn up to regulate the execution of all components; (c) highly qualified personnel have been recruited, including the best staff trained during program preparation; and (d) a specialized institution has been identified to administer the scholarships abroad.

- 5.32 The usual risk that the program activities will be discontinued after execution is completed must also be considered. Building up national capacity in this field and the type of economic and social benefits derived therefrom normally have long periods of gestation. If future governments do not allocate the necessary funds to continue financing the scientific and technological activities initiated under the program, the desired goal cannot be attained. Proper execution of this program would contribute to the future continuity of this financing. In addition, the borrower is to establish a stable source of funds to ensure future operation of FUNDACYT.

ECUADOR'S NATIONAL SCIENCE AND TECHNOLOGY SYSTEM

I. BACKGROUND

- 1.1 A plethora of public and private institutions devoted to basic and applied research in science and technology have sprung up in Ecuador in recent decades. The most recent tally of science and technology activities identified more than 400 research units with close to 1,500 researchers and technicians. Most of these units are found within universities and public institutes, including the Instituto de Investigaciones Agropecuarias [Agricultural Research Institute] (INIAP), the Instituto de Higiene Leopoldo Izquieta Pérez [Leopoldo Izquieta Pérez Institute of Hygiene], the Instituto Nacional de Pesca [National Fisheries Institute] (INP), the Comisión Ecuatoriana de Energía Atómica [Ecuadorian Atomic Energy Commission] (CEEAA), the Instituto Nacional de Meteorología e Hidrología [National Institute of Meteorology and Hydrology] (INAMHI), and the Instituto Ecuatoriano de Normalización [Ecuadorian Standards Institute] (INEN).
- 1.2 In the late 1970s steps were taken to institutionalize and coordinate research and development activities. In 1979, the National Science and Technology System Act was passed, creating the Consejo Nacional de Ciencia y Tecnología [National Science and Technology Council] (CONACYT) as the system's policy-making body and setting up the CONACYT Executive Committee, with the sector commissions on science and technology and scientific and technological development, which served in an advisory capacity.
- 1.3 CONACYT was created as an agency assigned to the Consejo Nacional de Desarrollo [National Development Council] (CONADE), with a mandate to formulate and coordinate policy and to promote and finance research in science and technology. CONACYT was to be administered by a board made up of the President of CONADE, the education and industry ministers, and representation from the Consejo Nacional de Educación Superior [National Council on Higher Education], national institutes involved in scientific and technological research, the scientific community, and producers' associations.
- 1.4 The Executive Committee was created as the system's technical and administrative agency and was to conduct studies as needed for policy-setting by the Board, implementing its decisions, and allocating and administering funds to carry out Board-approved projects and programs.
- 1.5 The system created in 1979 never actually functioned as intended. The Board did not meet as often as planned and management was

therefore left up to the Executive Director, who generally lacked the necessary representation and recognition. In addition, CONACYT never had access to the resources required to finance relevant projects or to undertake a genuine thrust to promote and coordinate scientific and technological activities. The budget administered by CONACYT represented only a small part of the total amount allocated for scientific and technological activities, so that in practice its actions had only a minor influence on national science and technology policy.

- 1.6 Generally speaking, the research that is being done is not responsive to the needs and problems of society. The policy of using scarce resources to finance a relatively large number of projects has led to a scattering of efforts without generating the ability to formulate and execute significant and relevant projects. The decision to finance a large number of small projects has not placed demands on evaluation systems, and there is as a result no tradition or capacity for objective evaluation with high standards.
- 1.7 The shortcomings of CONACYT, and of the science and technology system overall, became apparent during the initial preparatory stages of the science and technology program that was to be prepared for submission to the Bank.
- 1.8 In November 1991, a Bank mission reviewed the progress made on program preparation, with special emphasis on the project evaluation process and the scale proposed by CONACYT. The mission found that both the formulation and the analysis performed by the evaluators were weak for the projects selected by CONACYT. It was concluded that the program was not ready for approval, and that it evidenced a series of problems caused by a lack of experience on the part of both the requesters and evaluators and technicians of CONACYT.

II. PROGRAM PREPARATION

- 2.1 In order to continue with program preparation, a strategy was adopted that included two objectives: to strengthen management capacity and to promote the presentation of projects and activities inherent to program preparation. In this way, the interest of the requesters could be maintained while building up a capacity for project formulation and evaluation by preparing a program that was practicable. Although this is not usual in the preparation of the Bank's science and technology projects, it could be the most appropriate methodology for countries with less of a tradition in this area.

- 2.2 Specialized international consultants were hired in 1992 to provide guidance to the requesters of the original projects so that they could reformulate their projects on a more realistic basis, taking into account their experience and that of the parties proposed to work on the projects in each case, and the feasibility of achieving the targets set within the life of each project.
- 2.3 Projects were reformulated more systematically beginning in mid-1993, once funds were available under the reimbursable PPF (749/OC-EC-PPF). The contribution made by the international consultants served to reconceptualize and recast the best among the projects presented. In several cases, new projects were designed by combining two or more of the original projects.
- 2.4 Once the projects had been reformulated, they were sent to foreign and national specialists for independent evaluation. In each case the consultants recommended that the projects reformulated be approved, modified, or rejected. The reformulation process was a rich and formative one, both for the researchers who had presented them and for the CONACYT technicians that worked with the international consultants.

III. REFORM OF THE SCIENCE AND TECHNOLOGY SYSTEM

- 3.1 In parallel to the task of reformulating the projects, studies were begun to analyze possible reforms in the institutional framework. Among the various alternatives raised, the Government of Ecuador selected one based on the recently passed State Modernization Act. In April 1994 CONACYT was closed down and the National Office of Science and Technology (SENACYT) was created, reporting to the Office of the Vice President of the country, as well as the Fundación para la Ciencia y la Tecnología [Science and Technology Foundation] (FUNDACYT), a non-profit private-law institution that has been given responsibility for promoting and financing projects in research and development, services and technological innovation, and training highly qualified human resources in science and technology.
- 3.2 Since the reform, Ecuador's national science and technology system has a new organization, presided over by SENACYT, a small government agency that manages the system and draws up national policy in the field. The new project promotion and financing institution, FUNDACYT, is much smaller and more flexible than the former CONACYT, offers salaries that are competitive with the private sector, and has skilled professional staff who specialize in the areas in which they work. Its operating costs will be covered by the income from a long-term equity fund to be set up by the government as part of this program. Once the Bank financing is

approved, the system will for the first time have substantial financial resources to devote to promoting research and development and other science and technology activities.

- 3.3 The solution adopted is an improvement on the traditional approach of offsetting inefficiencies in public agencies in charge of executing loan programs by creating "executing units" composed of consultants who often enter into conflict with the permanent staff.

IV. ORGANIZATION OF FUNDACYT

- 4.1 Even before approval of the loan, its preparation caused an impact on Ecuador's science and technology system. The management structure and the management rules adopted by FUNDACYT take advantage of experience gained in the course of program preparation. The organizational structure adopted has the principal features described below.
- 4.2 The operation of the agency is the responsibility of a management board composed of representatives of the State, the scientific community, and the private sector. This board is in charge of appointing FUNDACYT's senior officers and approving the yearly budget and work plans. Participation by individuals representing various sectors is important in order to formulate policies that give priority to orienting research programs toward the needs of the producing sectors and society overall.
- 4.3 The management of FUNDACYT's work program is the responsibility of its Executive Director, assisted by three directors (of technical operations, information, and administration and finance), and a small core of staff members who are carefully selected based on qualifications and experience. The Bank's project team took part in defining the requirements and profiles for the selection of staff members to be hired for FUNDACYT.
- 4.4 The procedures governing FUNDACYT's operations, which are reflected in the program operating regulations, reflect the methodology that was successfully used to prepare the program. New projects -- both those to be financed with program funds and those to be financed with other funds administered by FUNDACYT -- and the beneficiaries of scholarship programs will be selected by competitive public bidding. The selection processes will use international and Ecuadorian experts, as is the usual practice in similar institutions in other countries of America and Europe. Funds have been earmarked under the program for the hiring of consultants and project evaluators in order to ensure continuity and quality through objective, transparent selection procedures.

- 4.5 The new staff members of SENACYT and FUNDACYT share the selection criteria that were used to prepare the program, and are committed to ensuring its continuity.
- 4.6 The process of project reformulation and evaluation used to prepare the program is helping create a new culture within the Ecuadorian scientific community that will be consolidated during its execution.

V. THE SUSTAINABILITY OF THE REFORMS: THE NEW S&T SYSTEM

- 5.1 The reforms introduced by the Government of Ecuador and the experience gained in the course of program preparation have led to a far-reaching transformation among the institutions responsible for administering the science and technology system. The capacity and conviction now exist that are needed to guide from these institutions (SENACYT and FUNDACYT) scientific activity that will be more relevant, of higher quality, and better matched to solving problems and meeting needs in society. The validity of the reforms will be effectively demonstrated once loan disbursement begins and the projects and other planned activities are carried out.
- 5.2 It is hoped that the impact of the reforms introduced will transcend FUNDACYT's direct sphere of influence. The implementation of demanding, objective evaluation systems and the execution of more relevant R&D projects will influence the orientation of the scientific and technological activities of other institutions with independent financing. In this sense, a successful FUNDACYT will serve as a role model for the rest of the system.
- 5.3 The experience acquired by the existing FUNDACYT staff members and by hundreds of scientists, technologists, and business people who presented projects and received feedback from consultants, evaluators, and members of the Bank's project team will be put to the test during execution of the program. Follow-up actions have been planned, including informal consultations, annual reviews, and administrative missions. In any case these actions will be of decreasing importance as the system overall begins to function normally. Upon completion of program execution, Ecuador should have a sustainable science and technology system operating in line with policies consistent with its development needs.

MATRIX OF OBJECTIVES

SPECIFIC OBJECTIVES OF UNDACYT-IDB PROGRAM	INFRASTRUCTURE	R&D PROJECTS	TRAINING	INSTITUTIONAL STRENGTHENING
Improvement, optimization, and increase in efficiency of production of knowledge and its use for innovation and modernization of the productive system.	Improvement in the supply and administration of physical and human resources.	Financing of immediate transfer projects and technology innovation projects.	Increase in highly qualified human resources in areas with high economic and social impact.	Promotion of linkage between science and production. Sponsorship of meetings and fora. Seminars on modernization. Dissemination of science and technology.
Increase in quality and level of postgraduate education in priority subjects.	Improvement in quality of postgraduate theses and in generation of knowledge.	Through project financing, opportunities offered to do postgraduate theses.	Accreditation of postgraduate courses that meet minimum international requirements.	Scholarships. Loans for individuals who agree to work for public and private nonprofit research institutions.
Creation of S&T services to meet demand of the productive and academic sector.	Qualitative and quantitative increase in analyses and advisory services consistent with international standards.	Specific financing to set up services in demand in the productive sector.	Short training courses to learn modern quality control methods.	Sponsorship of seminars and short courses to introduce quality standards in the productive sector.
Increase in management capacity, technology, and productivity.	Improved capacity to manage science and technology projects.	Opportunity to evaluate specific projects and their impact on the productive sector.	Short training courses to enhance knowledge of R&D center administration and management.	Development of postgraduate degree to train administrators and managers of modern production.
Creation of electronic information network for the Ecuadoran science system.	Creation of communication centers in the Ecuadoran science system.	Creation of an updated data bank on research projects. Supply of products in the information network.	Short training courses in advanced centers that use electronic services to update knowledge.	Sponsorship of courses and seminars on efficient use of information services for the science and production sector.
Incentive and motivation for researchers who execute R&D projects in priority areas.	Provision of opportunities to plan and execute eligible international-level projects including financing of incentives for research.	Financing of incentives and researchers executing R&D projects selected by the program.	Better opportunities to conduct R&D projects that can obtain financing from R&D agencies.	Sponsorship of courses and seminars on planning, programming, and control of R&D projects.
Increase in potential of Ecuadoran science system to secure financing for R&D projects through international cooperation.	Improvement in local counterpart in facilities and equipment for the execution of horizontal cooperation projects.	Increase in scientific and technological production to achieve better construction in international agencies financing R&D projects.	Increase in qualifications of human resources in R&D groups in Ecuador.	Sponsorship of seminars and meetings with international agencies financing R&D projects.

LIST OF R&D PROJECTS

IMMEDIATE TRANSFER (IT)		3,640,481
P-IDB-023	Biotechnol. diagnosis and epidem. control of cholera	173,868
P-IDB-055	Role L-arginine-Ca-No in preventing pregnancy-induced hypertension	271,145
P-IDB-081	Design and construction of electron prototype for use in telecoms industry elect sector	142,392
P-IDB-085	Design and construction of electron prototype for machine control	231,120
P-IDB-088	Continuous production of electrical porcelain using nonmetal purified minerals	410,747
P-IDB-090	Decrease in postharvest loss of export fruits and vegetables	307,591
P-IDB-099	Study processing of polymetallic sulfide mineral containing gold and silver	534,719
P-IDB-124	Design and construction medical equipment for vertical position birth care	77,206
P-IDB-130	Irrigation and erosion control methods Andean soils	272,743
P-IDB-170	Implementation seed production program	274,648
P-IDB-178	Technological R&D applied to fruit preservation	222,740
P-IDB-184	Improvement of goat population by selection and crossbreeding	106,699
P-IDB-197	Improvement of productivity in shrimp ponds	180,132
P-IDB-198	Cultivation of nontraditional species (mollusks)	152,361
P-IDB-206	Study agroindustrial postharvest product of lupinus mutabilis	282,370
Delayed transfer (DT)		1,680,410
P-IDB-008	Prefeasibility study phosphorite mineral treatment fertilizer product	215,298
P-IDB-016	Germ bank establishment and management	224,818
P-IDB-110	Earthquake vulnerability of low-cost housing	76,008
P-IDB-111	Cytogene markers in solid tumor and early blood detection Ca	198,377
P-IDB-114	Study of pulses and associated fauna	286,834
P-IDB-131	Establishment Andean river basin management plan	152,385
P-IDB-148	Study water quality to determine impact on shrimp production	152,848
P-IDB-192	Analysis chromosome damage in lymphocytes Pb exposed workers	66,565
P-IDB-210	Generate genomic diversity panaeus vannamei for aquiculture	155,003
P-IDB-234	Maternal nutrition, weight gain, and relation to neonatal morbidity	152,274
Services (STS)		840,744
P-IDB-092	Polymers applied research center	397,744
P-IDB-098	Services in technol processes textiles and quality control	150,854
P-IDB-128	Services center in area of metallic and nonmetallic minerals	292,097

SCIENCE AND TECHNOLOGY PROGRAM/EC-0170
PROJECTION OF GOALS

ACTIVITIES	COMPONENTS	SUBCOMPONENTS	GOALS					
			ACTIVITY	TYPE	1st Year	2nd Year	3rd Year	4th Year
Research and STS in for the	Global line of credit to finance research and STS projects	1.1 IT research projects	IT	No.	15	4		
				US\$(000)	1,456	3,009	874	
		1.2 DT research projects	DT	No.	10	3		
				US\$(000)	670	1,424	419	
		1.3 STS projects in areas of national interest	STS	No.	3	1		
				US\$(000)	589	630	42	
National structure	Financing of infrastructure projects for R&D in S&T in nonprofit institutions	2 Construction and provision of equipment for research laboratories		No.	8			
			Laboratories	US\$(000)	1,434	2,066		
Technological and private	Financing pre-commercial technological innovation activities for private sector enterprises	3	Project selection and approval	No.	5	10	5	
				US\$(000)	750	1,000	750	
Training scientific technical in the	Global line of credit to finance training and advanced studies of national scientists	4.1 Scholarship-loans	Doctorates and master's degrees	No.	50	50	25	
				US\$(000)	700	1,300	1300	
		4.2 Visiting professors program	Visiting professors	No.	1	2	2	
				US\$(000)	100	200	200	

SCIENCE AND TECHNOLOGY PROGRAM/EC-0170
PROJECTION OF GOALS

LEVELS	COMPONENTS	SUBCOMPONENTS	GOALS					
			ACTIVITY	TYPE	1st Year	2nd Year	3rd Year	4th Year
of the system and agency	Financing of activities for promotion, dissemination, interconnection, and management capacity of the executing agency	5.1 Strengthening of FUNDACYT	Preparation of strategic plan	% advance	100%			
				US\$(000)	77			
		5.2 Dissemination and transfer of S&T	S&T dissemination events	% advance	23%	43%	18%	
				US\$(000)	112	207	86	
		5.3 Special courses and events	Special courses	No.	11	14	14	
				US\$(000)	60	249	78	
		5.4 Interconnection of S&T institutions: REICYT	Internal network and hardware	% advance	100%			
				US\$(000)	495			
		5.5 Master's degree in technology management	Initial investment	No.				
				US\$(000)	324			
ent program	Financing of program execution and monitoring	Program administration	Operating funds for FUNDACYT	% advance	31%	23%	23%	
				US\$(000)	395	295	295	2
		Evaluation, monitoring, and supervision of research projects	Technical consulting services	% advance	20%	30%	30%	
				US\$(000)	80	120	120	
		Program preparation: PPF	Program preparation activities	% advance	100%			
				US\$(000)	986%			
				TOTAL	8,002	10,726	4,164	1,5

PROJECTION OF GOALS AND ACTIVITIES

1 R&D and STS projects

First year

- a) Initiation of execution of 28 R&D and STS projects already approved. Purchase of respective equipment.
- b) Bidding on the physical works and initiation of construction in the three STS projects.
- c) Disbursements for the 28 projects.
- d) Preparation and implementation of the call for proposals for the second competition of projects.

Second year

- a) Prepare progress reports on the 28 R&D projects. Equipment must be installed and operating.
- b) Activities under the three STS projects must be completed and contracts signed for the provision of services.
- c) Initiation of execution of R&D and STS projects approved in the second competition. Purchase of respective equipment.
- d) Disbursements for projects approved in the first and second competitions.

Third year

- a) Prepare progress reports on the R&D projects from the second competition. Equipment must be installed and operating.
- b) Activities under the STS projects must be completed and contracts signed for the provision of services.
- c) Prepare a report on project selection and approval for the second competition.
- d) Final disbursements for projects approved in the first and second competition.

2 Infrastructure projects

First year

- a) Contracts must be signed and executing units operating.
- b) Bidding on works. List of construction contracts awarded and execution commenced.
- c) Purchase of equipment.
- d) Corresponding disbursements.

Second year

- a) Works will be completed and the new equipment installed.

- b) The contracts will be established and minimum personnel hired for the execution phase. Implementation of the projects and services to be conducted based on the installed infrastructure.
- c) Final disbursements made.

Third year

- a) Report on activities: R&D and STS projects under way.
- b) Financing of activities conducted.

3 Private-sector R&D projects

First, second, and third years

- a) Evaluation and approval of projects as they are presented.
- b) Annual report on approved projects that have received financing or not.
- c) In the second year a report will be prepared on execution of the projects that received financing.

4 Human resource training. Scholarship-loans component

First, second, and third years

- a) The annual call for proposals will be prepared and issued, candidates will be selected, and scholarship-loan contracts will be signed with the students chosen.
- b) Disbursements and transfers of corresponding resources will be made.
- c) A progress report will be prepared on component activities.

5 Strengthening of the national S&T system

First year

- a) The strategic plan will be drawn up.
- b) The projects for connection to the ECUANET network will be selected and corresponding disbursements made to finance the procurement of equipment in the universities selected.
- c) Organization of a competition to select the institution or consortium of institutions to be responsible for implementing the master's degree in technology management. Disbursements to help launch the master's program will be made.
- d) The science and technology dissemination and transfer activities will be conducted, and the special courses and events held.

Second, third, and fourth years

- a) The science and technology dissemination and transfer activities will be conducted and the special courses and events held.

EX POST EVALUATION
INDICATORS AND METHODOLOGY

I. ANNUAL MONITORING REPORTS

- 1.1 During program execution, FUNDACYT must compile the following annual data to be used to conduct the ex post evaluation of the program.

A. General data

- a. Number and total value of applications presented by type of financing and type of project.
- b. Number and total value of projects approved by type of financing and type of project.
- c. Number and value of projects approved and executed by type of project.

B. Specific data

1. Private-sector technology innovation and modernization projects

- a. Objectives and expected results.
- b. Industrial sector corresponding to the principal activity of the enterprise, total personnel employed, professionals engaged in innovation activities and time spent in hours, percentage of sales of output abroad, and location of the enterprise.
- c. Type of innovation introduced: improvement of processes or of products, new products or lines of production, adaptation of technology, introduction of technology management systems.
- d. Type of real impact expected as a result of project execution in terms of: reduction in production costs, increase in production or yield, and improvement in quality.
- e. Probability of technical failure estimated ex ante.
- f. Expected economic internal rate of return.
- g. Expected period of project execution.
- h. Total costs of project compared with initial estimate.
- i. Project cost components: staff remuneration, purchase of equipment, construction of civil works, service subcontracts with third parties.
- j. Results obtained compared with initial targets. Any pending results must be indicated and explained.

2. Scientific-technological infrastructure projects

Indicate:

- a. Objectives and expected results.
- b. Type of services offered by the unit or institution, distinguishing between technological services of a commercial type for the private sector and support for scientific research projects for the institution itself, technological advisory services, and research or teaching activities.
- c. Type and amount of rate or fee charged for the service; specify whether there is a subsidy or if the entire costs of the service will be transferred to the user.
- d. Specify if this is a new service or expansion or improvement of an existing service.
- e. Profile of the demand served by the institution, total services offered with and without the project.
- f. Expected duration of project execution.
- g. Total costs of project compared with initial estimates.
- h. Project cost components: staff remuneration, purchase of equipment, construction of civil works, service subcontracts with third parties.
- i. Expected internal rate of return, and percentage of investment costs that will be covered by revenue from sales of services after operation and maintenance costs.
- j. The real impact produced or expected to be produced in the applicant enterprises or institutions in terms of the type of service offered: technological commercial-type services to the private sector or support for scientific research projects of the institution itself, technological advisory services, research or teaching activities.

3. Innovation and development projects

(i) General data

- a. Number and total value of applications presented.
- b. Number and total value of approvals.
- c. Number and value of projects approved and executed.

(ii) Specific data

For each project:

- a. Objectives and expected results.
- b. Enterprises identified that are interested in adopting the results of the research.
- c. Industrial sector corresponding to the principal activity of the enterprise, the total staff employed, professionals engaged in innovative activities and time spent in hours, percentage of sales of production abroad and location of the enterprise.

- d. Type of innovation introduced or expected to be introduced: improvement of processes or of products, new products or lines of production.
- e. Probability of technical failure estimated ex ante.
- f. Expected internal rate of return.
- g. Expected period of project execution.
- h. Total project costs compared with initial estimates.
- i. Project cost components: staff remuneration, purchase of equipment, construction of civil works, service subcontracts with third parties.
- j. Results obtained compared with initial targets. Any pending results must be indicated and explained.
- k. Real impact produced or expected to be produced in relation to: reduction in production costs, increase in production or yield, improvement in quality.

4. Scholarship component

Indicate:

- a. Number and total amount of scholarships requested by area, type, region of destination, and duration.
- b. Number and total value of scholarships awarded by area or discipline, type, region of destination, and duration.
- c. Number and value of scholarships awarded and degree of compliance with objectives.
- d. Total external scholarships by degree of compliance with objectives.
- e. Actual costs of national and foreign scholarships.

ECONOMIC FEASIBILITY OF THE PROGRAM

TABLE V.1.1 IMMEDIATE TRANSFER (IT) R&D PROJECTS							
Proj. No.	Proj. Name	Financ. (US\$)	NPV Exp. Val. (US\$000)	NPV/INV	EIRR Exp. Val.	Tech. Risk 1/	Profit prob. 2/
P-IDB-023	BIOTECHNOL DIAGNOSIS OF CHOLERA	173,868	49	0.28	14.9%	38%	51%
P-IDB-055	ROLE OF L-ARGININE-Ca-NO IN PREGNANCY-INDUCED HYPERTENSION	271,145	183	0.72	50.6%	29%	53%
P-IDB-081	DESIGN AND CONSTRUCTION OF PROTOTYPE FOR USE IN TELECOM INDUSTRY	142,392	40	0.26	12.4%	30%	69%
P-IDB-085	DESIGN AND CONSTRUCTION OF PROTOTYPE FOR MACHINE CONTROL	231,120	142	0.89	23.6%	17%	79%
P-IDB-088	PRODUCTION OF ELECTRICAL PORCELAIN USING PURIFIED MINERALS	410,747	991	2.02	31.5%	20%	87%
P-IDB-090	DECREASE IN POSTHARVEST LOSS OF FRUITS AND VEGETABLES	307,591	1,794	2.05	37.9%	19%	81%
P-IDB-099	STUDY PROCESSING OF POLYMETALLIC SULFIDE MINERAL CONTAINING GOLD AND SILVER	534,719	1,791	2.94	28.3%	21%	70%
P-IDB-124	DESIGN AND CONSTRUCTION OF EQUIPMENT FOR VERTICAL POSITION BIRTH CARE	77,206	68.7	0.23%	16.9%	5%	100%
P-IDB-130	METHODS OF IRRIGATION AND EROSION CONTROL ANDEAN SOILS	272,743	3,424	11.21%	38.2%	23%	73%
P-IDB-170	IMPLEMENTATION SEED PRODUCTION PROGRAM	274,648	908	3.11	40.3%	14%	78%
P-IDB-178	R&D APPLIED TO FRUIT PRESERVATION	222,740	3,831	8.86	45.4%	16%	82%
P-IDB-184	IMPROVEMENT GOAT POPULATION BY SELECTION AND CROSSBREEDING	106,699	811	7.98	23.5%	16%	56%
P-IDB-197	IMPROVEMENT OF PRODUCTIVITY IN SHRIMP PONDS	180,132	401	2.66	52.7%	16%	56%
P-IDB-198	CULTIVATION OF NONTRADITIONAL SPECIES (MOLLUSKS)	152,361	6,331	0.47	37.0%	26%	75%
P-IDB-206	STUDY AGROINDUSTRIAL PRODUCTION OF LUPINUS MUTABILIS	282,370	427	1.21	22.6%	13%	82%
TOTAL (SAMPLE) IT R&D PROJECTS		3,640,481					

Page 2 of 4

Proj. No.	Project name	NPV	NPV/INV	EIRR	Profit prob.	Op. NPV/INV 1/	Finan.
P-IDB-092	POLYMERS APPLIED RESEARCH CENTER	244,930	0.60	17.8%	76%	0.65%	397,793
P-IDB-098	SERVICES IN TECHNOLOGICAL PROCESSES OF TEXTILES AND QUALITY CONTROL	21,324	0.17	14.5%	72%	1.31%	150,854
P-IDB-128	SERVICES CENTER IN AREA OF METALLIC AND NONMETALLIC MINERALS	58,760	0.20%	13.3%	76%	1.35	292,097
TOTAL (SAMPLE) OF STS PROJECTS							840,744

1/ Op. NPV represents the net present value of the benefits discounted at 12% after investment costs have been deducted.

Proj.no.	Projectname	Proj. w services	NPV Exp. Val. (US\$000)	NPV/INV	EIRR 1/	Profit prob.	Op. NPV/INV 2/	Finan. (US\$000)
P-IDB-094	ENVIRONMENTAL RESEARCH AND CONTROL CENTER	Yes	362.10	0.34	35.3%	83.5%	1.87	453.76
P-IDB-097	WATER RESOURCES RESEARCH CENTER	Yes	Project approval subject to economic evaluation based on study of demand for services.					
P-IDB-109	STRUCTURAL ENGINEERING AND RESEARCH CENTER	Yes	Project approval subject to economic evaluation based on study of demand for services.					
P-IDB-115	MATERIALS MICRO-STRUCTURE ANALYSIS LABORATORY	Yes	114.96	0.27	17.5%	1.13%	570.08	
P-IDB-174	STRENGTHENING ENVIRONMENT STUDIES CENTER	Yes	180.35	0.49	22.2%	86.5%	1.91	310,25
TOTAL INFRASTRUCTURE PROJECTS								3,498.5

1/ Represents the EIRR on condition of covering all operating and maintenance costs and 50% of the cost of investment; methodology same as that used in other similar projects.
2/ Op. NPV represents the net present value of benefits discounted at 12% after investment costs have been deducted.

TABLE V-1-4 INFRASTRUCTURE PROJECTS WITHOUT SERVICES						
Proj. no.	Project name	Proj. w service s	Civil work US\$/m2	m2 lab/ research	Equip./ civil work	Finan. (US\$000)
P-IDB-028	BIOMEDICINE CENTER	No	151.0	22.2	1.9	349.2
P-IDB-096	VERTEBRATE ZOOLOGY RESEARCH CENTER	No	160.5	24.0	0.7	289.0
P-IDB-100	HOUSING RESEARCH CENTER	No	300.8	64.0	2.4	428.8
TOTAL INFRASTRUCTURE PROJECTS						3,498.5

TABLE V-1-5
PRIVATE SECTOR TECHNOLOGICAL INNOVATION PROJECTS

Proj. NAME	Proj. no.	Type fin. 1/	Proj. cost (US\$000)		NPV (exp. V)	NPV/INV	EIRR (Exp. V)	Tech. risk	Profit prob.
			Fin.	Total					
DUCTION OF ENTOPATHOGENIC MICROBIOLOGICAL AGENTS FOR CONTROL OF INSECTS, PESTS, AND DISEASES	SPP-01	2	74.26	87.89	201.8	1.42	35.4%	10.0%	97%
DEVELOPMENT OF VOICE SYNTHESIZER FOR TELEPHONE COMMUNICATION	SPP-03	2	87.79	98.0	137.6	0.90	101.4%	17.0%	76%
DEVELOPMENT OF LOW WATER USE SYSTEMS	SPP-23	3	120.0	150.00	391.0	0.36	99.93%	28.0%	77%
DEVELOPMENT OF SELF-PROPELLING DEVICES FOR MOVEMENT OF MATERIALS	SPP-27	3	63.0	82.00	362.9	3.05	33.8%	45.0%	83%
DEVELOPMENT OF TECHNOLOGY TO MODERNIZE PAINTING SYSTEM	SPP-33	3	45.45	50.50	15,361	2.94	27.9%	12.0%	65%
DEVELOPMENT OF PROCESSES FOR TARE INDUSTRIALIZATION	SPP-36	2	66.27	87.56	145.0	0.84	36.4%	28.0%	78%
EXTRACTING STEARIC ACID FROM PALM OIL	SPP-41	2	26.8	33.5	103.9	0.73	47.7%	22.0%	72%
DEVELOPMENT OF SYSTEMS FOR STORAGE, TRANSPORT AND TRANSFER OF LIQUIDS	SPP-42	3	28.4	34.56	14.97	0.33	25.5%	5.0%	72%
DEVELOPMENT OF WATER PUMPING SYSTEM LINE	SPP-54	3	114.0	152.00	675.6	7.36	49.7%	15.0%	100%
REPRODUCTION, MANAGEMENT, AND PRINTING OF OPTICAL IMAGES IN VARIOUS FORMATS WITH VARIED APPLICATIONS	SPP-67	2	75.78	96.84	59.2	0.54	30.3%	9.0%	89%
EXPERIMENTAL DEVELOPMENT OF INTENSIVE SHRIMP CULTIVATION IN SHALLOW PONDS ON SEA BED	SPP-74	2	239.97	298.88	355.2	0.11	24.6%	5.0%	72%
IMPROVEMENT AND REDUCTION OF IMPACT OF GALVANIZED WIRE LINE	SPP-85	3	126.97	146.21	238.0	0.61	27.2%	5.0%	75%
OPTIMIZATION OF PROCESS OF CANNING OF PEACHES FROM PEACH PALM	SPP-91	1	28.21	31.35	45.5	0.12	26.2%	5.0%	52%

1/ Type of financing: 1 Association enterprise-S&T research institution
2 Technological innovation
3 Technological modernization

APENDICE

PROPOSED RESOLUTION
ECUADOR. SCIENCE AND TECHNOLOGY PROGRAM

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Government of Ecuador, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Science and Technology Program. Such financing will be for the amount of up to US\$24,000,000 or its equivalent in other currencies, except that of Ecuador, which are part of the Ordinary Capital resources of the Bank, and it will be subject to the "Special Contractual Conditions" and the "Terms and Financial Conditions" of the Executive Summary of the Loan Proposal.