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DEVELOPMENT AND TRANSFER OF TECHNOLOGY

BRAZIL

The Technology Infrastructure and Related UNIDO Projects

Report of the evaluation mission*

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* This document has not been edited

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The views expressed in this report are those of the writers which may not correspond to the official positions of the Government of Brazil and of UNIDO. This report will not be distributed and should not be quoted. It will serve as an input to the IDB mandated in-depth evaluation of the activities of UNIDO in the field of development and transfer of technology.

INTRODUCTION

An in-depth evaluation of the activities of UNIDO in the field of development and transfer of technology was mandated by the Industrial Development Board. This evaluation consists of three phases:

- ***Desk work***
- ***Country studies (one per region)***
- ***Final report writing***

*The **Desk Work** consists of a number of desk studies as indicated below:*

- *Conceptual Framework: Where the present state of the art of the subject as related to developing countries is analyzed, in particular the influence of the process of globalization on technology. This document identifies issues for the in-depth evaluation.*

- *Legislative Background: Analysis of the various mandates of the UNIDO Policy Making Organs (PMOs) as related to the subject.*

- *Programme Framework and Programme and Budgets: The various programmes, sub-programmes and activities related to development and transfer of technology in the Medium-Term Plans and Programme and Budgets in particular the seven priorities themes for UNIDO, are analyzed.*

- *UNIDO Organizational Arrangements: Where it is indicated which UNIDO units are dealing and how with development and transfer of technology matters.*

- *Operation Activities: Containing a description of UNIDO's various activities related to development and transfer of technology.*

- *Other International Organizations: Where the role of other UN organizations in the area under analysis is described.*

*The **Country Studies**: Serve two purposes - one to analyze the technology system, as defined in the conceptual framework paper, that is: policies, instruments, institutions, private sector; the other is to evaluate in the field, UNIDO's technical assistance projects related to development and transfer of technology.*

*The **Final Report**: Will contain an evaluative part of the various UNIDO development and transfer of technology programmes and recommendations for the future.*

The Mission to Brazil

The mission to Brazil was constituted by Mr. C. Eyer do Valle, Consultant and Mr. Oscar Gonzalez-Hernandez, Head, Evaluation Section and visited the country from 3 September 1995 to 16 September 1995. A number of additional interviews was conducted by Mr. do Valle until the year's end. The report was updated with economic information related to the end of 1995.

Nineteen Government departments and institutions (public, semi-public and private) were visited, where interviews with managers and other staff took place. Furthermore 10 technical co-operation projects and project clusters most of them completed were analyzed through visits to project sites and discussions with counterpart personnel. Two personalities from different quarters with reputable status on the subject were interviewed. 4 fellows under ICS and ICGEB programmes were also interviewed. The mission discussed with the related recipient institutions, four foreign fellowships related to development and transfer of technology which were placed in Brazil.

This report consists of two main sections. The first one being an overview of the economy in general and of industrial development and transfer of technology policies and instruments in particular, as well as an analysis of the UNIDO's projects in Brazil dealing with the subject under review. The second part (annexes) includes inter alia the various interview reports and the analysis of projects.

Table of contents

A. *The Present State of the Economy with Special Reference to the Industrial Sector*

The economy is dominated by the success of the "Real Plan" in containing inflation and reducing budget deficits. The "Real Plan" is complemented by measures taken or still to be taken regarding deregulation and deindexation of the economy and as well as further tightening of the budget deficit.

The adoption of tight monetary and credit policy in April 1995 has braked the economy but inflation has gone down to 2% per month, continues falling and is presently at a monthly average of around 1.5%. It may be possible to devaluate during 1996 the Real without reigniting inflation.

Real GDP growth is estimated to be 4 to 5.5% in 1995[1] against 5.7 in 1994 and 3.8 projected for 1996.

The foreign trade account in deficit during 1996 should improve due to the economic slowdown. The foreign trade deficit in 1995 was USD 3,2 billion (exports USD 46,5 billion, imports USD 49,7 billion). The Government expects for 1996 a superavit between USD 2,5 and USD 3,0 billion. Exports of manufactured goods should increase in relation to exports of agricultural commodities. However, industry is suffering from the government's restrictive measures and output is declining. Total industrial production decreased by 7.5% in the second quarter of 1995 compared with the first quarter and continues to fall, but figures are better than during 1994.

The declining activity in the capital goods sector reflects the lower availability of credit for the acquisition of machines and equipment under FINAME, a credit line of BNDES for the purchase of capital goods. However, BNDES overall disbursements have increased 78% during the first half of 1995 compared to the same period of 1994. Disbursements for industry over the same period doubled from USD 876 to USD 1,790 million. Despite the bad start in 1995 in the automotive industry, output grew 20% in 1995 as compared to 1994 to reach 1.6 million units. All major car manufacturers have announced new investments to expand capacity. Several importers such as Renault (who once produced in Brazil), Honda, Peugeot and Toyota have announced plans to produce in Brazil. Mercedes-Benz producing already trucks and buses announced its entry in the passenger cars field.

The electronics sector as a whole is growing under the Real Plan. The computer industry has been also growing strongly and has acquired reasonable economies of scale. This industry is projected to grow in 1995 by 29.5% when it will reach an output of USD 5.7 billion. Production of micro-computers in Brazil during 1995 reached 516,000 units. This sub-sector will be favoured by a new USD 316 million BNDES programme. Apart from the mining sector, large sectors of the economy under state control are opening up to privatization. Cash revenue will be used to reduce short-term government debt.

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[1] According to a declaration of the Ministry of Economy in January 1996 real GDP growth was 4% in 1995.

Despite reduction in aggregated demand and government measures (higher tariffs and quota impositions) trade figures continued in deficit throughout the first half of 1995. However, during the second half, figures should respond to the policy measures and balance should be achieved early 1996.

B. Past Industrial Performance and Technology Development

Industrial activity in Brazil grew considerably from the fifties to the eighties. It was based mainly on import substitution policies and liberalized technology imports. Value added in manufacture more than doubled in real terms during 1970-1984. During the 1970s and most of the 1980s a considerable effort was made on endogenous R&D and a considerable amount of financing was devoted to that.

During the 1990s most (90%) of the R & D expenditures were incurred by the public sector. R&D expenditures were estimated to account for 0.6% of the GDP. The aim is to arrive at 1.5% at the end of the decade and increase private participation to 40%.

From 1990-1995 the economy was opened and liberalized. The role of the state changed from interventionist to facilitating. Enterprises are supposed to develop within a competitive environment - internal and external - and bear the brunt of technology development for which they are not frequently prepared. Furthermore, it is acknowledged that there are problems in harmonizing policies related to economic stabilization with those related to development which sometimes are antagonistic. During 1990-1995 the industrial policy dealt with three major orientations or programmes.

- *Systematic competitiveness - that means not only competitiveness at the enterprise level but at the national level. In other words help in reducing "Brazil costs". This involves some complementary interventions, such as:*

  - *increasing the efficiency of harbours and transport in general;*
  - *opening the internal market to informatic equipment;*
  - *reduction of tariffs on capital goods;*
  - *improvement of telecommunications;*
  - *privatization of operation of public services under the new law of concessions*

- *Quality productivity management - More than a programme it is a national campaign. During the previous import substitution era, this was not a priority. The programme has also to do with reduction of waste which is estimated to be in the order of several billion of USD per year. This programme is divided into the following main components:*

  - *Creation of awareness in quality of the society as a whole with a well publicized national prize for quality;*

  - *Dissemination of modern methods of quality management operationalized by institutions such as FINEP and BNDES;*

- *Human resources curricula: in the eight largest universities of the country, the subject of Quality Management was introduced;*

- *Technologic infrastructure: increase the infrastructure necessary to assist in quality control and certification. In December 1995 the 1000th Brazilian enterprise was certified against ISO 9000;*

- *Public procurement: to privilege enterprises which practice quality management.*

- *Parallel to these specific interventions quality programmes have been prepared for 38 sub-sectors of industry. 16 states have launched programmes of their own. Specific programmes for SMEs have also been launched.*

- *<u>Technologic development at the enterprise level</u> - Fiscal incentives to industry have been practically eliminated except those related to technological development through the use of their income tax for that purpose.*

This industrial policy is now developing into a more dynamic phase. During 1990-95 the attitude of the entrepreneurs has been a defensive one, that is to protect themselves from the market liberalization. The government aims at the future to a more aggressive phase which points to the following directions:

1. *One aim is to increase investment from 12-13% to 21-22% of the GDP. Large enterprises are already moving in this direction.*

2. *The other is to increase value added in products, particularly aimed at the external markets. This will be done by general type of improvements and more sophisticated designs and trade marks.*

3. *The quality drive is being expanded to cover services, particularly public services.*

4. *Exports are being promoted, inter alia, by adjusting the related interest rates to LIBOR (planned for early 1996).*

5. *A speedy safeguard and anti-dumping system is being introduced. A new Government department is going to work on this.*

6. *Anti-trust measures are being discussed to avoid monopolistic/oligopolistic situations.*

7. *Changes are to be introduced in the fiscal policies (both federal and state) aiming at the reduction of the cost of Brazilian products, particularly those for export.*

8. *New approaches to the different problems of reducing welfare costs to preserve employment is being addressed jointly by the trade unions, employees and Government. (Trade unions in Brazil, in particular the more left leaning, seem to be changing profoundly their attitude with regards to wage rises, working hours, social benefits, etc.)*

C. *Analysis of Technology Infrastructure*

The mission had the opportunity to visit a number of governmental offices, institutions, companies and personalities involved in technology development in Brazil. Notes on such visits are included in Annex 1.

Over the years, industrial policy in Brazil, including that related specifically to technology development, has little affected SMIs. Despite statements and intentions to the contrary, the major technology support programmes either financial and fiscal have been and continue to be mostly used by major companies, often multinational. Sometimes R&D programmes are more of a technology adaptation nature rather than genuine R&D. To give an example, a multinational in the automotive component business with a yearly income of USD 1 billion has a programme of only USD 3 million in R&D (over more than 1 year). Moreover, going through this programme, it appears to be more like an adaptation job for technologies well developed and implemented in the mother company rather than genuine industrial R&D.

Education at all levels constitutes the basis for technological capacity. Despite advances, Brazil has still serious shortcomings in this area. There are more than 20 million illiterate or with educational shortcomings in the Brazilian labour force.

The institutional base for science and technology development was launched during 1960-80 when most of the (public) research and development institutes were established. Despite that, at the beginning of the 1980s, the Brazilian industrial structure had an insufficient internal technology capacity. Most of the technology services concentrated on soft issues (analyses and tests) and the (mostly public) R&D offer was often not used by the private sector. There were, however, a number of successes in specific areas thus demonstrating the capacity of technology development in large Brazilian enterprises. This occurred principally in the public sector (aerospace, telecommunications, oil, electric energy and steel making) and less so in the private sector (alloys and banking automation). Up to the beginning of the 1990s a process of slowdown or even regression in the S&T effort took place which the Government is now trying to reverse.

This process included.

a. *disarticulation of the public enterprises' investments in S&T including their research centers;*

b. *dismantling or weakening of the technology expenditures of the private sector which was already quite weak (about 10% of total S&T national efforts). These expenditures are concentrated on the following sub-sectors: industrial automation, telecommunications, consumer electronics and computers.*

In addition to these problems, explicit technology imports by enterprises (via licensing and other means) have halved from 1980 to 1992.

The international technology dynamics has moved from energy and capital intensity and inflexible and mass production to technologies in informatics which are both flexible and automated, helped by across-borders strategic alliances and innovation networks. The industrial private sector in Brazil does not seem to have fully adapted to the new paradigm.

It will not suffice to redress the trends of S&T retrocess: A fundamental change in industry strategy is needed. Above all, the increased involvement of the private sector in technology activities and objectives will require a different entrepreneurship approach which admittedly is not a short-term enterprise. Those firms which have massively invested in internal R&D had demonstrated the advantages of such strategies in becoming innovative as well as sustaining their capacity to assimilate and explore information available elsewhere.

Laws 8248 and 8611 form the basis for R&D fiscal incentives. They are considered by the private sector as a good start, however, in need of fine tuning particularly the first one. To start with, since they relate to rebates on profit tax, they only apply if the enterprises make profits which is not always the case under the present economic conditions.

Research conducted by the Brazilian Institute for Applied Economic Research late 1995 shows that the incentive grant portion of R&D expenditures under law 8661 is on average 29.5% for the large enterprises while only 10% for small and medium. The law has low penetration in the industrial fabric and 88% of the enterprises interviewed did not know about the law. The study concluded that the law needs fine-tuning. Furthermore, the law has been criticised by entrepreneurs as too complicated and bureaucratic giving birth to consultants specialized in preparing the related applications which increases the costs and difficults accessibility.

In contrast, the application of law 8248 seems more widespread. Informatics industry shows a yearly billing of USD 10 billion of which half is accessing the benefits of the law. Proportionately, this industrial branch is the one which most invests in R&D. The law has privileged cooperation agreements between university and enterprises, since 2/5 of the R&D expenditures should be done in this manner. This law is a good example of the focused approach suggested below for R&D incentives.

To mobilize more effectively technology activities at the enterprise level, differentiated measures will have to be taken in terms of the following areas where weaknesses have been detected:

- *A more focused fiscal incentive system to R&D with special treatment for high cost high tech R&D which is not fully covered by law 8611 and decree 945.*

- *A diversified credit system[2] adjusted to particular industrial sub-sectors, enterprise size and structure and different stages of the development process with really attractive interests and duration.*

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[2]The sub-sectors with the greatest incorporation of technology innovation should receive particular attention. These sub-sectors are particularly sensitive to capital formation, and can be exemplified by electronics (informatics, telecommunications, industrial automation software), metalworking (machine-tools, agricultural machinery, equipment for power generation), chemicals (pharmacy and agricultural inputs) and biotechnology. Brazil possesses advantages in the above areas which would merit special treatment.

- *The setting-up of new instruments based on private sector resources to promote venture and risk capital involving financial institutions which presently are not used to finance R&D activities.*

- *Greater involvement of the private sector in the management as well as in the financing of the public R&D system.*

- *The utilization of the purchasing power of the state to further R&D activities following an approach similar to the one indicated above for the credit system.*

D. Women in Industrial Technology in the Context of UNIDO Assistance to Brazil

In the terms of reference for the evaluation on technology it is requested to analyze the effects of industrial technology on women employed in industry.

During the field mission to Brazil, undertaken as a country case study in the context of the above-mentioned evaluation, this aspect was analyzed. During the several visits undertaken to projects, institutions and personalities, the mission enquired on the impact of policies, instruments and technical assistance projects dealing with industrial technology. The mission could not ascertain any special reference to women. Regarding policies and instruments the mission was often told that they were gender neuter and it would be anti-constitutional to introduce a gender bias. The projects visited did not have "women in development" components. The projects did not lend themselves to having much components in this area, with one exception: project SF/BRA/92/001 which deals with an industrial branch employing predominantly women - the textile industry. Furthermore, the project has an important CAD/CAM component which has or may have an important influence on employment. The project did not but should have dealt with the subject. We do not mean that CAD/CAM techniques should not be introduced in order to keep up women employment. But at least, knowing in advance the impact on employment particularly women, it would qualify and quantify the problem and assist in taking the precautionary measures needed.

E. Overview of UNIDO Technical Cooperation in Brazil Dealing with Technology Questions

The UNIDO technical assistance programme at the end of 1995 in terms of on-going and completed projects is listed in Annex 2 and Annex 3.

It can be noted that the bulk of such projects deal with technology matters mostly of a sub-sectoral type (textile, leather) but also of a horizontal type (metrology, negotiations on transfer of technology). Under such circumstances it was not difficult to select the projects to be analyzed by the mission. In view of the wide geographical distribution of the UNIDO projects in Brazil, the projects selected concentrated in the states of Rio and São Paulo. Projects in other areas (UC/BRA/91/012, SF/BRA/94/002, SF/BRA/95/002 and SF/BRA/93/001) but with an important technological content were not visited but analyzed through a desk analysis. Results were no different from those related to the projects visited. The projects visited constitute a mix between completed and on-going.

Ten projects and clusters were analyzed through visits to the project's sites and discussions with project authorities. In some cases, changes in those authorities had taken place but UNIDO assistance was still recalled.

The notes on such analyses are indicated in Annex 4. Project US/RLA/90/004 was analyzed earlier in the year, practically at its term. As a consequence, it was not felt necessary to revisit it and the analysis then made is included in Annex 4. Those notes, in addition to a short description of projects, contain an appreciation of their relevance, impact, effectiveness and sustainability. The mission also interviewed 4 fellows of Brazilian institutions sponsored under ICS and ICGEB. Furthermore, 4 fellowships from other countries placed in Brazil were also analyzed from the stand point of the institutions/companies of their placement.

The overall analysis of the projects visited indicates that the assistance provided was by and large relevant, effective, had an impact and was sustainable. Particular mention should be made of the projects which assisted CETEA (Packaging Institute), INMETRO (Metrology) and CETIQT (Textile), as particularly successful interventions, the latter suffering however from weak institutional sustainability. The fellowships provided by ICS and ICGEB were relevant but their links to industry were weak or non-existent. Institutions and companies where UNIDO fellows from abroad were placed could not recall these events.

However, there was an obvious lack of country strategy to guide UNIDO's technical assistance in general and even more in development and transfer of technology related activities. As a result the projects were isolated interventions, not part of a programme.

The strategy is the more important the smaller is the skilled manpower endowment in the recipient country. In Brazil, management of recipient institutions and Government departments is usually highly skilled and therefore, one can argue that the demand, even lacking a framework, related to real problems and therefore, led to relevant projects. Furthermore, the size and needs of the industrial sector in Brazil and the limited nature and size of UNIDO's interventions spread all over the territory and industrial fabric makes it difficult for UNIDO to have a programmatic approach in this connexion. Another fact in favour of the nature of our interventions is that they were essentially client oriented. Under such circumstances, UNIDO has to respond to a wide variety of demands which makes it practically impossible to put these isolated demands together in the form of a programme.

The office of the UCD, due to its committed and involved staff, took an active role in the screening of the project proposals, in the follow-up of approvals and implementation. This avoided duplications, overlaps or conflicts between the different interventions.

Concluding, the appreciation of the UNIDO projects in Brazil related to transfer and development of technology is positive.

ANNEX 1

Institutions and Government Departments Visited

Ministry of Foreign Affairs

Persons interviewed: *Amb. Carlos Alberto Pimentel,*
Chief of Dept. for Science and Technology Cooperation
Renate Stille, Chief of Division for Science and Technology
Ana Beltrame, First Secretary
Division for Economic Organizations for Development
Marcio Correia, Advisor, Brazilian Agency for Cooperation

Traditional Technical Cooperation in support of Technology Development still has a role to play and the Institute of Food Technology (ITAL) and the Packaging Center (CETEA) are good examples of such cooperation.

However, in other cases (CETIQT) the question can be made whether the capacity developed is sustainable once assistance terminates.

The new forms of technical cooperation involve a higher degree of local ownership and management. The programme PROSINTE (UNDP and UNISP sponsored) to develop managers of cooperation programmes is an example in this direction.

Technology is considered by the Ministry as the key input for development cooperation. Here the traditional form of cooperation is not sufficient. New inroads are needed. The courses of technology agreements negotiations is a good example. Another important area is clean technologies and assistance in support of ISO 14000. A considerable amount of enterprises in Brazil will not be able to meet this standard. What is in cause is beyond the enterprise level and goes to the mastering of systems of environmental management. UNIDO can play a role in this connexion and has already started it through the establishment of a network of Clean Production Centers in the country.

Ministry of Science and Technology

Persons interviewed: *Claudio Luis Fróes Raeder, Secretary of Technology (SETEC)*
Caspar Erich Stemmer, Secretary of Programme Coordination (SECOP)
Maria Helena Brito Macedo, Special Adviser
Dalmo Marcelo de Albuquerque Lima
Division Chief for Environment and Infrastructure
Ernesto Costa de Paulo, Coordinator in SECOP

The Federal Ministry of Science and Technology - MCT - was created in March 1985. During two periods, from March 1989 to December 1989 and April 1990 to November 1992 its status was lowered to a Special Secretariat of Science and Technology, under the Presidency of the Republic. The Ministry of Science and Technology has the main functions of directing Government policy on science and technology and related instruments.

The following institutions are parts of the MCT organizational structure:

- *CNPQ, the National Scientific and Technological Development Council*
- *CTI, the Technological Centre for Computer Sciences*
- *INPA, the National Institute for the Research in the Amazon Region*
- *INPE, the National Institute for Space Research*
- *INT, the National Institute of Technology*
- *FINEP, the Studies and Projects Financing Company*

Brazil only invests 0.7% of its Gross Domestic Product in Science and Technology against 2-3% in developed nations and 5% planned for 2000 by Korea.

85-90% costs are assumed by the Government against 50% in the majority of developed nations, 70% in Japan and 80% in Korea.

The planning of the Ministry for 1996/99 projects an increase in R&D expenditures to 1.5% in 1999 with 70% Government financing.

To accomplish this impressive growth some legal mechanisms have been devised. Basically the law no. 8661 of June 1993 sets a framework of fiscal incentives that allow the deduction of up to 8% of the income tax due by any enterprise for investment in technological programmes, regardless of the enterprise size and capital origin. Another law (no. 8248 of 1991) similarly grants up to 50% income tax deduction to microelectronics and computing sciences companies.

These incentives for technological development are administered by two programmes, PDTI and PDTA, respectively oriented to industries and agribusinesses.

Under PDTI and PDTA, the first 30 enterprises assisted will invest USD 558.6 million (PDTI share of this is 75%) in "technology upgrading" during the next five years. These enterprises will receive fiscal incentives of the order of US$ 144.4 million. 40% of this total relate to enterprises in Sao Paulo.

There are no restrictions as to the type and size of enterprise assisted but a cursory review indicates a predominance of large enterprises, some multinational.

Another instrument is the Brazilian Programme of Quality and Productivity, which aims at mobilization and coordination in these areas through various institutions (CNI, INMETRO) and more operational programs at the level of training and education (for instance a Special Project for Quality management which disbursed USD 10 million during 1987-94 for training of 15,000 people through IBQN and other institutions) and laboratory development (mostly INMETRO).

Another programme created in 1984, the PADCT (Scientific and Technological Development Support Programme) administered by BNDES, provides loans at low interest rates for projects approved in 12 priority areas: biotechnology; environment sciences; education for science; geosciences and mineral technology; instrumentation; new materials chemistry and chemical engineering; information in science and technology; maintenance; planning and management in science and technology; provision of essential inputs; basic industrial technology. Resources for this programme are provided by the World Bank and the federal Government.

They are now launching a Special Project for Technology Management (similar to the one on Quality Management). They started under this project to train 100 union leaders in technology management and these are going to get complementary training abroad in quality, technology and capital/labour relations. (More under FINEP - Education for Competitivity.)

They are also involved in a Programme of Industrial Incubators in Florianopolis, an initiative of the Federal University with the local government and SENAI to provide 8,000 m^2 for 60 enterprises.

Although UNIDO has given assistance to some of the entities under the MCT structure, no projects have been implemented directly between MCT and UNIDO.

IPT
Instituto de Pesquisas Tecnológicas do Estado de São Paulo

Persons interviewed: *Milton de Abreu Campanário, General Managing Director*
Amantino Ramos de Freitas, Vice-Director, International Relations
José Geraldo de Lima, International Relations

The origin of IPT, the Institute for Technological Research of the State of São Paulo, can be traced back to 1899 as a nucleus for materials testing in the Polytechnic School of São Paulo. In 1934 the name IPT was introduced but only in 1944 it became independent from the university as a self-standing entity. In 1976 IPT was finally transformed into a public company, with its shares fully owned by the state of São Paulo.

IPT's activities are mainly oriented to the application of technology to the benefit of industries and other entities.

The organizational structure adopted by IPT comprehends several technical units that encourage the specialization of the technological research according to the economical sector they assist. The technical units, reporting to the board of directors, are: chemistry, metallurgy, mechanics and electricity, transport technology, civil engineering, forest products and textiles, geology, economy and systems engineering. Each technical unit has its own facilities and laboratories, installed in separate buildings.

In parallel to the formal structure there are programmes aiming at special themes that involve more than one kind of technology or sector of activity. The current programmes are: industrial modernization, biotechnology, energy, materials, industrial quality, siderurgy, transportation, housing technology, regional technological support and environment.

IPT has a tradition of international cooperation, receiving visitors from developing countries and rendering services of technological development to enterprises abroad. Recently IPT was one of the candidates to house the National Cleaner Production Centre to be installed in Brazil, but was bypassed by SENAI (see this institution).

IPS's budget has considerably decreased in recent years and as a consequence, its former reputation as a R&D Centre of Excellence both in Brazil and abroad has considerably suffered. Relationship of IPT with UNIDO has been considerable over years particularly in the wood working sector.

Instituto Nacional da Propriedade Industrial

Persons interviewed: *Arthur Camara Cardozo*
Roberto Bahzaián
Cordenação de Cooperação Técnica

Up to 1970 the Central Bank dealt with payments and authorizations regarding technology contracts with abroad. In 1970, this function was taken by the newly created INPI. The control was particularly strict from 1975 to 1988 from which date it was considerably relaxed. Presently, INPI has no approval authority and only registers these contracts since there is total freedom in their negotiating. It is interesting to note that the technology imports did not increase with this relaxation. INPI serves as well as the national patent register. It has 700 professionals. 25 of which are concerned with technology contracts (all in Rio de Janeiro). The various delegations throughout the country are only dispatching desks (balcões de atendimento). The information bank of technology contracts is very rich (30.000 cases) and could be used as a reference base by UNIDO.

INPI has not received assistance from UNIDO but has helped UNIDO in mounting events and technical assistance to other countries on intellectual property protection.

INPI has been one of the founding fathers of the UNIDO TIES system which at present is not active.

FINEP
Financiadora de Estudos e Projetos

Person interviewed: *Laurival Carmo Monaco, President*

FINEP is a financing agency attached to the Ministry of Science and Technology established over 25 years ago. Together with BNDES they constitute the main financing instruments for Science and Technology Development in the country. Its main products are:

FNDCT/PADCT	-	*Programa de Apoio ao Desenvolvimento Cientifico e Tecnológico, with World Bank financing, to finance R & D in all sectors.*
ASE/FNDCT and PROTAP/FNDCT	-	*Support to seminars and special events to interchange experiences on R&D.*
ADTEN	-	*Technology development at enterprise level*
AMPEG	-	*Guarantee scheme for micro and small enterprises, in cooperation with SEBRAE*
PATME	-	*Technological Support to micro and small enterprises*

FINEP disburses around USD 300 million per year for all his products. 80% goes to enterprises and 20% to institutions.

The Management of FINEP is aware that technology is the engine for growth . The bulk of its financing goes for technology knowledge development rather than for hardware.

FINEP is approaching China to achieve joint R&D projects.

The policy of FINEP has been to finance know-how development for innovation or productivity rather than product or processes. This is the orientation (at least in theory) of FINEP's credit lines. Innovation and productivity lead to increased competitiveness.

FINEP is aware of lack of incorporation of technology in the Brazilian enterprise. These are more interested in imports and joint-ventures as sources of technology. FINEP attributes this lack of innovative capacity to middle-level management and its lack of interaction with the shopfloor. Middle-level management operates mostly as a controlling agent. Therefore, FINEP is very interested in integrating the shopfloor level in the development process. FINEP, as a consequence, launched a campaign "Education for competitivity" to finance training at the enterprises with no or 2.5% interest. However, a real guarantee is requested.

FINEP is the coordinating body in Brazil for the UNIDO-executed courses on Technology Transfer Negotiations. (See more under this project.)

BNDES
Banco Nacional de Desenvolvimento Económico e Social

Person interviewed: *Paulo Sérgio Moreira da Fonseca*
Chief. Dept. of Environment, Planning Area

The BNDES is the main executive instrument of the long-term investment policy of the Federal Government. During 1994, BNDES contributed with USD 5.56 billion to the Brazilian economy in productive projects which totailed USD 10 billion of investments. Around 50% go to manufacturing industry. BNDES resources are received from a contribution of enterprises to unemployment insurance.

Priority of BNDES goes to the smaller productive enterprises and to the less developed areas of the country.

Further to its banking activities, BNDES is involved, through various mechanisms, in the privatization of public companies.

Going through the portfolio of the main industrial projects supported by BNDES during 1994, the following can be ascertained:

- *Projects are usually of a large size - over USD 10 million up to USD 800 million of investment.*
- *The main sub-sectors covered are food and beverage products followed by pulp and paper, metallurgy and metalworking industries.*
- *There are more expansions or modernization than greenfield projects.*
- *There are a number of joint-ventures (not many) and a few foreign owned projects.*
- *Many projects have evident environmental components. For instance in pulp projects, there are a number of reafforestation components.*
- *Development of technology is not a prominent feature of those projects. They concern more expansions, modernizations and product quality improvements. It should be mentioned that technology development is not a main goal for BNDES.*

FINAME is a separate fund within BNDES and aims at financing the purchase of equipment and machinery - produced in the country - for industry, agriculture and for export. Its disbursements in 1994 totalled USD 36 million, the highest ever, of which less than 10% for export operations. Equipment for the industrial sector led with 37% followed by agriculture with 29%, and transport with 22%

Another separate operation of BNDES is BNDESPAR which is a risk capital operation for essentially large projects (mostly public). At present this operation is mainly disinvesting.

There has been no cooperation of UNIDO with BNDES but it appears that there would be scope for cooperation in the area of environment analysis of industrial projects.

INMETRO

Instituto Nacional de Metrologia, Normalizacão e Qualidade Industrial

Persons interviewed: *Julio Cesar Carmo Bueno, President*
Marcelo Lins Vertis, Chief of Cabinet of the Presidency

The National Institute of Metrology, Standardization and Industrial Quality was established in 1973 (law 1872) at the peak of the import substitution policy. At that time, the questions related to quality and metrology were not important nor industry was interested in them. It is quite a different picture today.

In 1990 the CNI estimated that quality in production was of priority to 20% of the enterprises. The analysis was repeated in 1994 and the percentage jumped to 90%.

In the 1990s the Brazilian programme of quality and productivity was launched. More than 300 enterprises are participating in this programme. It is estimated that productivity has increased in 35% during the past four years. The certification of enterprises against ISO 9000 went up from 12 in 1994 to 917 in October 1995 and reached 1000 at the end of the year.

In 1991 INMETRO had certificated 20 laboratories for quality control tests, in September 1995 there were 150 and they expect to reach the 200 mark at the end of 1995. Their campus occupies 2.5 million m^2 and employs 1000 persons of which 250 professionals.

INMETRO considers that its task is at the base of science and technology. It also has a function of consumer protection. UNIDO was heavily involved with UNDP-financed technical assistance in the establishment and initial operations of INMETRO. The World Bank financed a considerable amount of installations. Twenty years have demonstrated the forward-looking nature of these projects. Human Resources Development, the elaboration of the original concepts and the installed laboratories undertaken under those projects are now bearing its fruits since they were the basis for the present system.

ABNT (Brazilian Association of Technical Standards - a private concern) is responsible for the elaboration of standards with a voluntary character. Inmetro helps them (at the tune of USD 750,000/year) on the elaboration of standards and international representation. (ABNT is the associate of ISO). The function of INMETRO is essentially legal and to homologate (credenciar) while ABNT is of certification. But they agree that the borderline between the two organizations is a bit blurred.

For the future they want to decentralize their operational activities by increasing the certification of private sector labs.

They are involved in the international arena participating in UNIDO, World Bank, IDB and CEE events of interest to them.

Within MERCOSUR they are working in the harmonization of the national metrology and quality systems.

SCTDE
Secretaria de Ciência, Tecnologia e Desenvolvimento Econômico do Estado de São Paulo

Person interviewed: *Emerson Kapaz, State Secretary*

This state secretariat covers not only the scientific and technological themes but is also the industrial aspects of the state economy.

Relevant SCTDE decisions are submitted to a State Council for Science and Technology, a collegiate organ which includes representatives from the universities and the private enterprises.

Another organ established under the auspices of SCTDE is the Centre for Technological Innovation, directed by a private entrepreneur. The centre has just subscribed a 2-year agreement with MIT - Massachusetts Institute of Technology, giving access to the technological assets of that institution.

SCTDE is also responsible for 110 technical schools in the state of São Paulo. Mr. Kapaz recognizes that these schools deserve improvements for which the state budget is not prepared to pay.

One of the projects SCTDE is now considering is a Technological Park that would link, with optical fibres and along an axis of more than 200 kilometres, different universities and development institutions connecting together something like 70% of the capacity for scientific and technological development of Brazil.

SCTDE has been the government implementing agency for the UNIDO project SI/BRA/93/801 providing high-level advisory services regarding polluting industries along the Tiete river (see this project).

FAPESP
Fundação de Amparo à Pesquisa do Estado de São Paulo

Person Interviewed: *Mariluce Moura, Adviser to the President*

FAPESP, the Foundation for the Support to Research of the São Paulo State, subordinates to the SCTDE (see this institution). Its mandate consists of financial assistance, on a grant basis, to activities in the fields of applied science and technology in the São Paulo State.

In 1947 the State law foresaw the creation of a foundation to support research activities in the São Paulo State. FAPESP was eventually created in 1962 and the funds collected since 1947 were transferred to the new entity as an endowment that generates, to this date, about 50% of its budgetary resources.

To supplement its budget, FAPESP receives 0.5% of the ICMS (Merchandises and Services Circulation Tax) collected by the State until 1988, when the new State Constitution increased this contribution to 1%. FAPESP's budget for 1996 reaches USD 200 million of which about 50% comes from ICMS.

FAPESP statute limits administration costs to 5% of its operations, although this figure is being kept below 1%.

Besides financing various modalities of scientific and technological activities (like individual research programmes, scientific meeting, support to the preparation of papers and scientific publications, support to visiting academicians and researchers etc.), FAPESP also grants fellowships to individuals taking their postgraduate, master, doctorate and postdoctoral degrees in Brazil and abroad. On the whole the researches exposed to FAPESP programmes were estimated to include 7000 PhDs.

FAPESP has taken part in some very effective projects and programmes in the past. One of them has been research work in the field of citric fruits that raised the São Paulo State to the condition of one of the leaders in citric production in the world. Other successful programmes supported by FAPESP funds have been the training of medicine doctors in heart surgery, and research oriented to improve the resistance of coffee crops to plant diseases.

In 1993 the amount disbursed by FAPESP reached USD 135 million; in 1994 this amount rose to approximately USD 165 million. These annual figures may be compared to the 1996 budget of USD 200 million.

FAPESP does not finance industry directly, but researches and scientists needing funds to support their individual industry programmes. However, of the total of funds channelled by FAPESP to support fellowships and research programmes in Brazil in 1994, more than 40% aimed at the engineering, earth and exact sciences group. This figure can be a measure of the indirect benefit to industry from FAPESP funds.

Up to now UNIDO did not participate in FAPESP's programmes and activities.

ITAL-CETEA
Instituto de Tecnologia de Alimentos
Centro de Tecnologia de Embalagem

Person interviewed: *Assis E. Garcia, Packaging Researcher*

CETEA, that stands for Food Packaging Technology Centre, was created in 1982 as a result of the consolidation of the existing capacity in packaging knowledge in the Institute for Food Technology - ITAL, installed in Campinas in São Paulo state.

The creation of CETEA has its origin in the UNIDO project DP/BRA/82/030. In 1988, a new project - DP/BRA/88/017 - gave further support to the consolidation of the institution.

Still a part of ITAL, which is subordinated to the São Paulo State Secretariat for Agriculture and Supply, CETEA is now a centre for packaging technology for all purposes, dropping officially, since January 1995, its primary orientation to food packaging but keeping its original acronym.

CETEA has an associative organization with more than 150 participating companies from the private sector. It is an acknowledged centre of excellence in its area and a member of IAPRI - the International Association of Packaging Research Institutes. In 1993, CETEA hosted the IAPRI 8th World Conference on Packaging, the first one to be held in a developing country.

CETEA is openly recognized as a good example and a success case in the relationship of UNIDO with Brazil in the area of technological development.

Federal University of Rio de Janeiro
Institute of Industrial Economics

Person interviewed: *Fabio Erber - Professor of Economic Development*

The Brazilian industry has followed a development path characterized by copying first followed by acquiring licenses for production methods and for detail engineering. Basic engineering was not considered. During the 1970s the Government tried to lift this relatively low technological ceiling in two ways: by financing research and development (creation of FINEP) and by controlling licensing through INPI. Through such approaches the technological ceiling was somewhat lifted, but in some cases - like informatics - to the detriment of end users who were forced to use sub-standard products locally developed/produced totally protected from external competition.

In the 1990s this state of affairs was disrupted by a combination of inter-related events:

- *The opening of the economy;*
- *The economic downturn;*
- *The emphasis on quality and productivity.*

The policy now seems to be: "we do not have to be autonomous, we have to be only efficient producers". As a consequence, the enterprises lowered their technology ceiling.

An example of this relates to the Petroleum Research Center of Petrobrás (CENPES) which was built at a cost of USD 180 million and was to employ a total of 180 professionals and has now its future in doubt. Among the capabilities of CENPES is deep-water oil prospection and production. FINEP is financing mostly quality improvement projects but little research. VW dismantled its design bureau in Brazil.

The instruments of technology development in Brazil are plenty but too expensive and little utilized. Interest rates are too high and guarantees requested too expensive. The FNDCT (Fundo Nacional de Desenvolvimento Cientifico e Tecnológico) had at the end of the 1970s USD 120 million and at the end of the 1980s USD 12 million only. Risk capital schemes are few. A new proposal (approach) prepared by Mr. Arruda et al for SEBRAE is on the table but will not be implemented soon. BNDES has its own risk capital scheme (CONTED) which only financed 10 operations in 3 years. SEBRAE has an insurance scheme for small enterprises.

The funds operated by the States for research function well in some cases, like SP which disposes of USD 140 million for 1995. (See more under FAPESP.)

In certain industrial sub-sectors they have no problems in what concerns competitivity and technology advance like soya/chicken, pulp/paper and forestry-related biotechnology, but

there are problems with peak sub-sectors like certain type of electronics. They also will have problems with the automotive industry where R & D is being moved to the mother countries. Local spare parts producers have a negative protection because of the low duty and overvalued currency (Brazil cost).

Another problem relates to the deterioration of public university education. There are plans to move the responsibility of the Federal Universities from the Central Government to the States.

Pontificia Universidade Católica do Rio de Janeiro
Foundation Padre Leonel França

The aim of the Foundation is to establish links between university and enterprises. It houses co-operative projects (working groups) with the productive sector using university students steered by professors.

The meeting was to take place with Mr. José Pelúcio Ferreira, President of the Foundation, but took place instead with Mr. Marcelo Gattass, Director of the Technology Group on Graphic Computation, which operates under the auspices of the Foundation. The Group has a handful of co-operative projects with local companies (mostly large) and institutions abroad (like MIT) for guidance.

One of the projects is a revolving one with expenditures of USD 1.5 million per year, using 50 professionals. It concerns product development (computer graphics) for about 20 products (such as calculations of oil platform components).

The country lacks a technologic culture. The Foundation tries to overcome this problem by inculcating in students the correct direction. The overall economic uncertainty in the country affects the productive sector which is not reinvesting investments, even less for technology development.

The new informatics law (tax deductions) has helped but there are enterprises which are only after the incentives without a real interest in developing technology and becoming competitive. It is mostly large enterprises (such as IBM and Siemens) which are taking benefit of the law.

Most of the services of the group concern informatics, graphics calculations and telecommunications but the Foundation covers a wider field of activities.

UNIEMP
Forum Permanente das Relações Universidade-Empresa

Person interviewed: *Carlos Vogt, Executive Director*

The institute UNIEMP was created in 1992 as an initiative of a group of entrepreneurs and academicians. It is a permanent forum for strengthening the relationship university-enterprise and has for mission to close the gap between the teaching and research institutions on one side and the enterprises, on the other. Acting as an interface between these entities, UNIEMP is supported by its associated enterprises and universities.

Mr. Vogt, its Executive Director, is a former dean of the Unicamp University, one of the three public universities in the São Paulo state.

The institute is administered by a Deliberative Body that establishes its general direction which is implemented by the board of directors. This Deliberative Body has for members 16 renowned entrepreneurs and academicians; one of them is Mr. Jose Mindlin (see this interview).

Among its associates there are some 25 companies, both Brazilian-owned and multinationals, covering most of the economic sectors, and more than 60 Brazilian teaching and research institutions.

UNIEMP runs several projects and among them, it should be mentioned, an electronic network connecting its associated enterprises with the universities and research institutes and, through Internet, with academic institutions abroad.

UNIEMP is also managing a training programme to strengthen suppliers in management techniques and organization for quality, in partnership with SEBRAE (see this institution) and some universities.

Up to the present no direct contacts and projects have been established between UNIDO and UNIEMP.

SEBRAE
Serviço Brasileiro de Apoio às Micro e Pequenas Empresas

Persons interviewed: *Miriam Machado Zitz, Supervisor, Area of Technology*
Felix Andrade da Silva, Technology Adviser

SEBRAE is a private entity supported by a compulsory tax of 0.3% on the pay-roll of enterprises, be them industries, commerce or services, collected by the federal government in a model similar to SENAI (see this institution). Banks, the state-owned companies and the agribusinesses are not covered by the tax.

SEBRAE's mandate is to provide support to the micro and small enterprises in a broad range of activities, including technical, administrative legal, commercial including exports, etc. Its activities cover all Brazil, each federal state having its regional SEBRAE department tailored to the problems faced by the local micro and small entrepreneurs.

The spread of the SEBRAE system is assured by more than 100 branches distributed all over Brazil, including stationary counters and also trailer-cars and even boats, used primarily in the Amazon.

Among the programmes offered by SEBRAE, the more widely used are:

- *Short-term courses for entrepreneurs in the most diverse fields of business activities as cash-flow organizing and management, total quality programmes, company accounting, sales promotion, public relations, export practices, legal procedures etc;*
- *Financing of working capital with subsidized taxes;*
- *Collateral funding;*
- *Consulting services (free up to 10 hours, then charged at subsidized rates);*
- *Technological support - a programme known as PATME-non-refundable up to 70% of the value needed for setting up new projects;*
- *Co-partnership, at very reduced costs, for participating in technical and trade fairs in Brazil or abroad;*
- *Improvement of entrepreneurship capabilities - a programme called EMPRETEC, encompassing SEBRAE, the Brazilian Cooperation Agency ABC and UNDP.*

SEBRAE is using the UNIDO subcontracting system in various states of Brazil, in projects aiming to promote small industries as new suppliers to big enterprises. A regional programme that includes other Latin American countries, also with UNIDO support, has been developed on the same basis but its results are now being re-evaluated.

SENAI
Serviço Nacional de Aprendizagem Industrial

Person interviewed: *Donald Nelson Uhlig, Chief, Advisory Group*

SENAI (National Service for Industrial Apprenticeship) is a private entity, established under the Brazilian Civil Code, supervised by the Public Administration but maintained and administered by industrialists through the Brazilian National Confederation of Industries and the Federation of Industries in each state.

The funds to support SENAI activities are collected as a compulsory contribution of 1% on the value of the wages of employees by industrial companies in Brazil. In addition to this General Contribution there is an Additional Contribution of 0,2% on the wages paid by industrial companies with more than 500 employees.

SENAI structure is federative and comprises a National Department, seated in Brasilia, and regional departments in the 26 Brazilian states and in the Federal District. SENAI-CETIQT (see this institution) has a special status as an independent department, reporting directly to the National Department.

The main purposes of SENAI are:

- *to carry out the professional training of students at schools maintained by the institution;*
- *to complete the professional education of workers over 18 years old through short-term courses;*
- *to assist employers to prepare and implement training programmes for its personnel;*
- *to offer specialization courses to higher-level employees;*
- *to cooperate in technological research of interest to industries.*

Since its foundation in 1942 more than 20 million youngsters and adults attended SENAI's regular courses and training programmes. In 1994 it had about 2,2 million students enrolled in its courses.

The system runs about 900 schools and training facilities all over Brazil, covering more than 3000 municipalities, and offers a wide range of professional programmes intended to meet the needs of industrial labour, taking into consideration the speciality of each region in the country. Each school is oriented primarily to a branch of industrial activity that plays an important economical role in the region. The laboratories and research facilities in such

schools have a close relationship with the local industries, providing technical and research services on request.

In the field of technology development and transfer SENAI plays an important role through its 16 National Centres of Technology (CENATECs) already implemented. These national centres are linked in a network with other regional centres; the focus of this net is an International Centre for the Education, Work and Transfer of Technology (CIET) being established in cooperation with UNESCO.

Through exchange agreements made with various entities involved in research and technological development SENAI joins forces with the scientific community and cooperates in finding new alternatives for technical problems submitted by the industrial companies.

Among the strategic issues established by SENAI to face the changing panorama of the Brazilian economy are included environmental policies and ISO 14 000 standards, total quality systems and ISO 9000 standards, occupational certification, professional reconversion, and the modernization of some industrial branches as textiles and apparel, marble and granite, etc.

SENAI has a long tradition of cooperation with UNIDO in various areas: textiles, leather and footwear, marble and granite, environment etc. In 1995, SENIA was chosen by UNIDO to host the first NCPC (National Cleaner Production Centre) in South America and having as one of its objectives to serve also the neighbouring Mercosur countries.

The experience of SENAI is recognized worldwide and its model of professional education has been, at different level, transferred to several developing countries.

CETIQT - CENTRO DE TECNOLOGIA DA INDUSTRIA QUIMICA E TEXTIL

Persons interviewed: *Lúcio G.T. Tenan, General Manager*
Robert Hirschler, CTA

The Centre belongs to the SENAI system (which has a total of 900 units) and is the only one with administrative independence. Its Board of Management has 9 members of which 5 are from Industry. This is a typical feature of all SENAI Centers. It has a national character contrary to most SENAI Centers which concentrate their activities in one state and carries out activities related both to education, information and extension services.

* ***Education*** *- There are slightly over 1,000 students enrolled in the Technical Courses: regular for those getting their secondary level education together with the vocational training in 3 years, and special for those who enter CETIQT with their secondary level education completed and receive the additional professional training in 2 years. CETIQT, in co-operation with the State University of Rio de Janeiro (UERJ), runs a complete (5 years) Textile Engineering Course with 2 years at the university and 3 years at CETIQT (about 40-50 graduates per year). CETIQT has an agreement with UERJ to carry out 4 post-graduate courses (Master level). They want to develop post-graduate courses through research in co-operative projects with enterprises.*

  Furthermore, there are shorter duration post-college and continuing education courses ranging from 40 hours to 1 semester. Over 4,000 professionals from the industry have participated in a wide variety of short and medium duration courses.

* ***Information***

  - *provision of information and abstracts through regular CETIQT publications and upon special requests;*

  - *preparation of training materials for schools and enterprises;*

  - *economic studies and statistics mostly for the Government.*

  They have started to computerize their information systems so that the information may be made available through CD ROM. They would need assistance to complete this development. This will be done within CIET - The National SENAI information Centre - which is connected to INTERNET.

* ***Technical Assistance Nucleus*** *- Extension services are provided to the full textile chain (Cadeia textil) through its Technical Directorate which provides the following service:*

  - *general surveys and diagnoses;*

- *preparation of industrial projects (new and extensions);*
- *research and services on colorimetry (which have been established with UNIDO assistance);*
- *CAD CAM systems (idem);*
- *management development;*
- *general;*
- *quality systems (they do not certify enterprises against ISO 9000 but are working towards it);*
- *research (verdicts and certificates) undertaken always in co-operation with enterprises.*

UNIDO assistance has been particularly useful in the human resource development of CETIQT.

Technical assistance is provided to enterprises in all the national territory. Enterprises in Rio de Janeiro state (mostly garments) account for only 20% of this assistance. The services are paid by enterprises at cost.

There are other centres of SENAI which are also engaged in the textile industry (Rio Grande do Norte, Sao Paulo, Santa Catarina, Minas Gerais). CETIQT has also helped these other centres such as for instance, Santa Catarina on colorimetry. 20-25% of the gross operational income of CETIQT relates to extension services which is estimated at USD 2.5 million year.

CETIQT is allegedly the only integrated source of extension services in Brazil for the textile industry. There are some individual consultants operating mostly out of Sao Paulo and Santa Catarina states.

It has the first colorimetry laboratory of Brazil (established under the UNIDO project). They are helping INMETRO in this area.

The mechanical test laboratory has been certified (credenciado) by INMETRO for international tests.

FIESP/DETEC
Federação das Indústrias do Estado de São Paulo
Departamento de Tecnologia

Persons interviewed: *Emilio Mauricio Kosuta Jr., Technical Adviser*
Carlos Alberto de Souza, Adviser for Technology

DETEC, the Department of Technology of the Federation of Industries of São Paulo State, was originally conceived as a centre for the improvement of the industrial design. Since then its mandate has been enlarged to offer assistance to industry in other fields related to technology.

From design its activities have expanded to industrial automation, ergonomy, packaging design, computer sciences, standardization, quality, industrial property, transfer of technology and technological information, capacitation and innovation.

DETEC is also a regional focal point for Latin America and the Caribbean of the UNIDO Industrial and Technological Information Bank (INTIB). In Addition DETEC has also an agreement with TIPS[3] - Technological Information Promotion System to disseminate technology offers.

DETEC cooperates with MCT - the Ministry of Science and Technology (see this institution), participating in programmes such as PACTI - Technological Capacitation Support Programme and PADCT - Scientific and Technological Development Support Programme. Its areas of operations and impact seem to be limited.

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[3]TIPS - Technological Information Promotion System - is an electronic network created by UNDP and sponsored, in part, by the European Commission. Its aim is the dissemination of technology offers at international level. The system is operated by DEVNET - Development Network, a non-governmental organization based in Rome, Italy. Its Latin American regional headquarters is Montevideo, Uruguay. FIESP-DETEC is one of the knots of the network.

INP
Instituto Nacional do Plástico

Persons interviewed: *José Simantob Junior, General Manager*
Cândido Souza Lomba Neto, Technical Adviser

INP is a private entity established in 1989, organized and supported by the thermoplastic resin manufacturers, plastic transformers and plastic transforming machinery manufacturers.

The problems of competitiveness and quality in the plastic industry are of great concern to INP. Its approach is to enhance a solid technological basis to the industry, using modern management techniques oriented to the end-users in terms of quality, cost effectiveness and technological innovation.

To reach the plastic processors, supposedly more than 7000 in all Brazil, INP organized short duration courses on plastic technology, covering themes such as plastic composition, processing, materials, maintenance, environment protectional etc.

INP is also very active in the areas of quality assurance and quality control and has organized a cooperative, ISOCOOP, to congregate small and medium scale enterprises in search of certification in the ISO 9000 quality standards. This attitude has its origin in the difficulty identified in most of the small processors, to pay for a complete certification programme. The common costs of the certification programme are therefore shared among the cooperators but the certification in itself, of course, is given separately to the processors that comply with all the requirements imposed by the norms. While in Brazil 13 out of the 15 existent thermoplastic resin manufacturers are already certified, only 5 in more than 7000 plastic processors have the certificate of ISO 9000.

In a partnership with SEBRAE (see this institution) INP offers consulting and training in technological modernization to small plastic transformers, and FINEP (see this institution) is also designating INP as its partner to finance quality programme for the plastic industry.

INP was the implementing agency for the project SI/BRA/92/801 - Plastic Recycling Technologies (see this project).

IEDI
Instituto de Estudos para o Desenvolvimento Industrial

Person interviewed: *Mauro Fernando Maria Arruda, Executive Director*

The IEDI - Institute for Studies on the Industrial Development - was founded in 1989 by a group of 30 Brazilian entrepreneurs responsible for local industrial groups, as a think tank to identify trends and to develop new courses of action for the Brazilian industry. The executive director of IEDI is Mr. Mauro Arruda, an economist and a former president to INPI (see this institution) with an extensive experience in technology transfer contracts.

The concern with a global and systemic approach to the industrial competitiveness in Brazil was originally analyzed by IEDI, according to Mr. Arruda, and led to the concept of "custo Brasil" (the costs added to Brazilian products by taxes, social benefits, compulsory contributions, etc), to which the general lack of competitiveness of Brazilian manufactured goods is widely attributed.

An assembly of the participating entrepreneurs, designated as Forum IEDI, meets every three months and analyses the conjuncture and the forthcoming decisions affecting industries in Brazil. Conclusions drawn by IEDI regarding the different branches of industrial activities in Brazil call for a bleak future for auto parts and advanced technologies locally developed. On the other hand, commodities like pulp, paper and steel, as well as biotechnology, are considered areas in which Brazil can be very competitive in the world market.

Up to now UNIDO did not participate in IEDI's programmes and activities.

JOSÉ E. MINDLIN
Industrialist

Mr. Mindlin is an industrialist who converted his car parts manufacturing company, Metal Leve SA, into one of the most successful enterprises in Brazil from the technological view point, with branches abroad and very active in the export of bushings and sintered parts for the automotive and aeronautic industries. He still holds a position in the Board of Administration of Metal Leve but has handed over to his son Sérgio Mindlin the duties of CEO.

Besides his career as an entrepreneur he is well known for his personal culture and is a renowned bibliophile. In the 1970s he held the position of Secretary of Culture in the Government of São Paulo State.

As a member of the board of FIESP (see this institution) and chairman of the board of IPT (see this institution), Mr. Mindlin is deeply involved with questions related to development and transfer of technology and well aware of the capabilities of UNIDO to cooperate with Brazil in these fields.

According to his views, one of the shortcomings of the Brazilian development is the very low percentage of the GDP assigned to technology development and the low private sector participation in it. In 1994, this rate was only 0,6% and it is expected to grow to 1,5% by the end of 1998. Another aspect to be reoriented in the Brazilian technology development is the public share - 90% as compared to only 10% for the private sector. The target, as planned by Brazilian authorities, is to increase the participation of the private sector to 40% by the end of the current presidential term (1998).

Mr. Mindlin is confident on the new legal framework devised for enhancing the technological investments. Based on a new federal law (law 8661 of 2 June 1993) up to 8% of the corporate income tax due can be deducted as an incentive money to support programmes envisaging the technological development.

JACQUES MARCOVITCH
Vice Dean, University of São Paulo

Mr. Jacques Marcovitch is a Professor of the Faculty of Economics and Administration of the University of São Paulo, that belongs to São Paulo State Government. Currently Mr. Marcovitch is the Vice Dean for cultural affairs of the University.

He considers UNIDO as a reliable counterpart for both sectoral or global support in technology development and transfer. He refers to ITAL-CETEA (see this project) as a very positive experience with UNIDO that should be considered as a good example of cooperation.

According to his views, many groups and entities in the world are nowadays involved with sectoral or regional studies but only a few are really competent to handle worldwide programmes and among them UNIDO plays an important role.

Organisms like OCDE, EC, etc, says Mr. Marcovitch is concerned with 2 billion persons at the utmost. Who should take care of the remaining 3 billion is the question that must be addressed by those responsible for technological themes. In Mr. Marcovitch's opinion that is the role of UNIDO and other multilateral international organisms to play in the developing world.

ANNEX 2

OPERATIONAL PROJECTS

OF THE UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

IN THE FEDERATIVE REPUBLIC OF

BRAZIL

11 country projects, with a total budget of approx. $3.6 million
(including, where applicable, Government cost sharing, but excluding
Government contribution in kind as well as bilateral cooperation)

(TSS described but not counted/added to figures)

PROGRAMME:

Country Strategy and Programme Development
Mobilization and Management of Financial Resources
Information and Research
Human Resource, Enterprise and Private Sector Development
Industrial Sectors and Environment
Investment and Technology Promotion
Operational Support
General Management

ANNEXES:

I. List of approved and/or operational technical cooperation projects and technical support services

II. List of completed technical cooperation projects is available on request

III. Table on UNIDO's programme delivery in the country

ASSISTANCE IN THE ESTABLISHMENT OF A CENTRE FOR MANAGEMENT METHODS OF STATISTICAL PROCESS CONTROL, PHASE I (TF/BRA/92/B10) and (DP/BRA/92/004)

Funded by:	Japan (TF part)		
Division/Branch:	IRD/Industrial Statistics		
Backstopping officer:	Mr. Yamada		
Approval date:	June and October 1993		
Estimated completion date:	1995		
		TF/92/B10	DP/92/004
Project inputs:	International experts		0.3 w/m
	S/M missions	$ 2,530	$ 7,850
	Subcontracts	$ 214,144	
	Study tours		$ 64,600
	Sundries	$ 4,565	$ 13,270
Total allotment:*)		$ 221,239	$100,000
Uncommitted balance:*)		$ 2,549	$ 32,606
Government counterpart:	Carlos Vanzolini Foundation, University of Sao Paulo		

Development objective: The Brazilian Government's intention to open up the industrial sector will require that its manufacturers compete more intensely, both in the home market and abroad. In order to do this, firms must improve their systems of quality control and raise levels of productivity. The relevant goals are specified in the Government's new Programme for Quality Control and Productivity. They include the utilization of centres of excellence as a means of introducing managerial systems for continuous improvements in quality and productivity.

The immediate objective is to introduce modern methods of SPC and TQC and to assist in the installation of the associated managerial systems by providing support to the Centro Internacional para Producitividade e Qualidade (CIPC). The centre will offer courses in all relevant fields such as SPC, design of experiments, logistics, new product design, measurement and control, etc. Other functions will include the development of customised courses for specific corporations, audit-team reviews, assistance in systems implementation and the development of methods for monitoring effectiveness of the systems.

The institute is being staffed by Brazilian professionals who are trained in TQC and SPC. It will work with executives and senior and middle-level industrial managers of firms which are affiliates of CIPC. It will also work with institutions in other Latin American countries, assisting them to develop similar approaches.

*) Figures ex UMA PO2/A as at 30 October 1995

APPLICATION OF MODERN TECHNOLOGIES AND MANAGEMENT SYSTEMS TO IMPROVE CETIQT AND BRAZILIAN TEXTILE AND APPAREL INDUSTRY (SF/BRA/92/001)

Funded by:	Brazil	
Division/Branch:	ISED/Agro-based Industries	
Backstopping officer:	Mr. Moll	
Approval date:	April 1992	
Estimated completion date:	1996	
Project inputs:	International experts	81.5 w/m
	S/M missions	$ 15,338
	Subcontracts	$146,699
	Equipment	$804,386
	Sundries	$ 23,855
Total allotment:*)	$1,933,616	
Uncommitted balance:*)	$ 206,838	
Government counterpart:	Serviço Nacional de Aprendizagem Industrial (SENAI)	

Project objective: To strenghten the SENAI/CETIQT International Technical Assistance Unit in providing high-level training and technical assistance for the Brazilian textile and apparel industry in the special fields of textile computer applications (CAD/CAM, colour matching, dyehouse automation, process optimization, etc.) as well as in total quality systems.

In the frame of the project, the CETIQT International Assistance Unit is going to provide - with the participation of UNIDO consultants - technical assistance (direct support) to participating textile and apparel companies in Brazil in the introduction, implementation and application of high-level advanced techniques of textile and garment manufacturing and quality management.

Related projects:	TF/BRA/92/002	Associate expert
(completed)	Donor country:	Germany
	Ms. L.H. Kemel	12.0 w/m
	Cost:	$67,898
	Termination date:	October 1993
(ongoing)	TF/BRA/94/001	Associate expert
	Donor country:	Germany
	Ms. J.K. Gay	12.0 w/m
	Cost:	$65,682
	Termination date:	September 1995

*) Figures ex UMA PO2/A as at 30 October 1995

CREATION OF FOCAL CAPACITY IN SENAI TO SUPPORT THE MARBLE AND GRANITE INDUSTRY IN BRAZIL (SF/BRA/93/001)

Funded by:	Brazil	
Division/Branch:	ISED/Chemical Industries	
Backstopping officer:	Ms. Yalçindag	
Approval date:	July 1994	
Estimated completion date:	1995	
Project inputs:	International experts	4.3 w/m
	S/M missions	$ 3,000
	Study tours	$17,741
	Sundries	$ 542
Total allotment:*)	$84,230	
Uncommitted balance:*)	$ 2,514	
Government counterpart:	Serviço Nacional de Aprendizagem Industrial (SENAI)	

Purpose of the project is to support the modernization efforts of the marble and granite industry by creating a local core capacity at SENAI, the Government agency responsible for national service for industrial training.

This first phase can be considered a preparation phase for further project development.

*) Figures ex UMA PO2/A as at 30 October 1995

PREPARATORY ASSISTANCE FOR ELIMINATION OF CFCs IN THE SECTOR OF POLYMER FOAMS MANUFACTURING OF BRAZIL (MP/BRA/93/095)

Division/Branch:	ISED/Chemical Industries	
Backstopping officer:	Mr. Bysyuk	
Approval date:	July 1993	
Estimated completion date:	1995	
Project inputs:	International experts	8.0 w/m
	National experts	2.0 w/m
	S/M missions	$32,000
	Equipment	$ 1,000
	Sundries	$10,000
Total allotment:*)	$150,000	
Uncommitted balance:*)	$ 6,462	
Government counterpart:	Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) through Interministerial Ozone Technical Group (GTO)	

The project aims at a preparatory consultancy service related to the formulation and further implementation of the national programme, as well as of the full-scale demonstration projects in the main three industrial zones of the country for the elimination of CFCs and the introduction of substitutes in the manufacturing of various polymer foams in accordance with the requirements of the Montreal Protocol.

*) Figures ex UMA PO2/A as at 30 October 1995

INVESTMENT PROJECT FOR PHASING-OUT OF OZONE-DEPLETING SUBSTANCES (ODS) AT FRISOKAR EQUIPAMENTOS PLASTICOS LTDA. (MP/BRA/95/124)

Division/Branch:	ISED/Chemical Industries	
Backstopping officer:	Mr. Puerto Ferre	
Approval date:	August 1995	
Estimated completion date:	1996	
Project inputs:	International experts	2.0 w/m
	s/m missions	$ 7,500
	Subcontracts	$178,698
	Study tours	$ 32,000
	Sundries	$ 19,750
Total allotment:*)	$267,948	
Uncommitted balance:*)	$255,390	
Government counterpart:	Brazilian Ministry of Industry, Trade and Tourism	

The project has been designed to phase-out 100 per cent of CFC-11 used when producing Integral Skin Semi-Flexible Foam (ISSF) at Frisokar Equipamentos Plasticos Ltda., Sao Paulo. The chosen alternative is N-pentane as foam blowing agent. The project will be implemented through modification of existing production facilities and installation of supplementary safety equipment and instruments.

*) Figures ex UMA PO2/A as at 30 October 1995

CONVERSION OF THE ASSEMBLY OF REFRIGERATION COMPRESSORS TO PHASE-OUT CFC-12 AND CFC/HCFC-502 BY USING HFC-134A AND R-404A AT ELGIN MAQUINAS, S.A. (MP/BRA/95/125)

Division/Branch:	ISED/Engineering and Metallurgical Industries	
Backstopping officer:	Mr. Nowotny	
Approval date:	August 1995	
Estimated completion date:	1998	
Project inputs:	International experts	1.0 w/m
	Subcontracts	$363,490
	Fellowships	$ 30,000
	Contingencies	$ 41,849
Total allotment:*)	$460,339	
Uncommitted balance:*)	$460,339	
Government counterpart:	Brazilian Institute for Environment (IBMA)	

The project objective is to convert the assembly of compressors for the operation with refrigerants CFC-12 and HCFC-502 to the alternative refrigerants HFC-134A and R-404A which do not affect the ozone layer. The total (indirect) impact of the planned phase-out is 89 MT of ozone-depleting substances (ODS) per year.

Due to the delayed phase-out of the Brazilian Commercial Refrigeration Sector, the company predicts a gradual phase-out to the year 1999. The planned phase-out is in compliance with the Brazilian Country Programme for the Commercial and Domestic sectors.

The project includes the redesign of the compressors, the introduction of special laboratory equipment for testing new lubricants compatible with HFC-134A, R-404A, and the new compressors, the development of a new assembly line for non-ODS compressors as well as the training of service men to repair and maintain the new compressors.

*) Figures ex UMA PO2/A as at 30 October 1995

PREPARATION OF AN INVESTMENT PROJECT IN A PLANT (ELGIN) CONSUMING 60 METRIC TONS OF TCA USED AS A DECREASING AGENT IN THE PRODUCTION OF COMPRESSORS (MP/BRA/95/132)

Division/Branch:	ISED/Engineering and Metallurgical Industries
Backstopping officer:	Mr. Shatravko
Approval date:	August 1995
Estimated completion date:	1995
Total allotment:*)	$ 15,000
Uncommitted balance:*)	$ 15,000
Government counterpart:	International Ozone Working Group (GTO)

The objective of this project is to formulate three projects dealing with the phasing-out of ozone-depleting substances (ODSs) in electronic and metal cleaning industries in the country. A group of companies involved in utilizing ODSs will be identified by IBAMA. The project will be implemented through carrying out the survey of companies selected by UNIDO experts, data collection and analysis, selection of new cleaning technologies and formulation of three investment projects.

*) Figures ex UMA PO2/A as at 30 October 1995

ESTABLISHMENT OF A NATIONAL CLEANER PRODUCTION CENTRE (NCPC) IN BRAZIL (SF/BRA/95/003)

Funded by:	Serviço Nacional de Aprendizagem Industrial (SENAI)	
Multifund to	EP/GLO/95/002	
Division/Branch:	ISED/Environment and Energy Branch	
Backstopping officer:	Mr. Volodin	
Approval date:	October 1995	
Estimated completion date:	1996	
Project inputs:	International experts:	4 w/m
	Training:	$ 37,500
	Sundries	$ 2,500
Total allotment:*)	$150,000	
Uncommitted balance:*)	$150,000	
Government counterpart:	Serviço Nacional de Aprendizagem Industrial (SENAI)	

This project is based on the UNIDO/UNEP umbrella programme "Support to National Cleaner Production Centres (NCPCs)" which proposes to support National Cleaner Production Centres in approximately 20 countries during a five-year period. The NCPCs will serve a coordinating and catalytic role for cleaner production by providing policy advice on environmental management, supporting demonstrations of cleaner production techniques and technologies, training industry and government professionals in this new area of industrial environmental management and by being a source of information on cleaner production. They will become the core of a network of institutions and individuals involved in pollution prevention activities.

*) Figures ex UMA PO2/A as at 30 October 1995

OPPORTUNITY STUDY - MARKET ANALYSIS AND CONCEPTUAL PLAN FOR THE ESTABLISHMENT OF AUTOMOBILE PRODUCTION PLANT IN THE STATE OF BAHIA (SF/BRA/94/002)

Funded by:	Brazil	
Division/Branch:	ITPD/Feasibility Studies	
Backstopping officer:	Mr. Hagiwara	
Approval date:	April 1995	
Estimated completion date:	1995	
Project inputs:	Subcontracts	$60,000
	Sundries	$ 5,000
Total allotment:*)	$65,000	
Uncommitted balance:*)	$ 5,464	
Government counterpart:	Secretariat of Industry, Trade and Tourism of the State of Bahia	

Development objective: To develop indigenous automotive industry in the State of Bahia.

Immediate objectives: To produce an opportunity study with strong market emphasis for the establishment of an automobile plant in the State of Bahia to enable the relevant Government parties to take a decision about the development of the industry concerned and the further analytical work required for the purpose.

*) Figures ex UMA PO2/A as at 30 October 1995

UNIDO's Approved and/or Operational Technical Cooperation Projects
(approved = PAD issued)
and Technical Support Services at programme (TSS-1) and project (TSS-2) level

Federative Republic of Brazil

Project Number		Backstopping Responsibility	Programme Element Code	Project Title
DP/BRA/92/004		IRD/STAT Mr. Yamada	053000	Assistance in the establishment of a centre for management methods of statistical process control (phase I) (multifund to TF/BRA/92/B10)
TF/BRA/92/B10	*	IRD/STAT Mr. Ballance/Mr. Yamada	053000	Assistance in the establishment of a centre for management methods of statistical process control (multifund to TF/GLO/92/100) (related to DP/BRA/92/004)
SF/BRA/92/001	**	ISED/AGRO Mr. Moll	0720CQ	Application of modern technologies and management systems to improve Servicio Nacional de Aprendizagem Industrial/Centro de Technologia da Industria Quimica e Textil (SENAI/CETIQT) and the Brazilian textile and apparel industry (see also TF/BRA/92/002, TF/BRA/94/001)
TF/BRA/94/001		ISED/AGRO Mr. Moll	0720CQ	Associate expert (Ms. Gay) (related to SF/BRA/92/001)
SF/BRA/93/001		ISED/CHEM Ms. Yalçindag	0730B0	Creation of focal capacity in SENAI to support the marble and granite industry in Brazil
MP/BRA/93/095	*	ISED/CHEM Mr. Bysyuk	0730CD	Preparatory assistance for elimination of CFCs in the sector of polymer foams manufacturing of Brazil
MP/BRA/95/124	*	ISED/CHEM Mr. Puerto-Ferre	0730CD	Investment project for phasing-out of ODS at FRISOKAR EQUIPAMENTOS PLASRICOS LTDA
MP/BRA/95/125	*	ISED/EM/ENG Mr. Nowotny	0742HD	Conversion of the assembly of refrigeration compressors to phase-out CFC-12 and CFC/HCFC-502 by using HFC 134A and R-404A at ELGIN MAQUINAS, S.A.
MP/BRA/95/132		ISED/EM/ENG Mr. Shatravko	0742KD	Preparation of an investment project in a plant (ELGIN) consuming 60 metric tons of TCA used as a degreasing agent in the production of compressors
SF/BRA/95/003	*	ISED/ENV Mr. Volodin	0750CB	Establishment of a National Cleaner Production Centre (NCPC) in Brazil (multifund to EP/GLO/95/002)
SF/BRA/94/002		ITPD/IS/FEAS Mr. Hagiwara	082300	Opportunity study - Market analysis and conceptual plan for the establishment of an automobile production plant in the State of Bahia (in cooperation with ISED/EM/ENG)

* Large-scale project (= total allotment $150,000 or above
** Total allotment $1 million or above

THE FEDERATIVE REPUBLIC OF B R A Z I L
U N I D O TECHNICAL COOPERATION
TSS-activities not considered

$18.9 million total delivery between January 1972 and December 1994*

PROGRAMME DELIVERY 1982 - 1994 BY SOURCE OF FUND

Year	XA/XP $	UNDP $	SIS $	IDF $	UNDP Tr.Funds $	Other Tr.Funds $	UNDCP + Oth.Ag. $	Total/ year $
1982	0	686,469	77,654	289,761	420,514	0	40,109	1,514,50
1983	0	789,903	38,878	110,231	213,896	0	29,075	1,181,98
1984	0	361,926	14,398	151,938	150,998	0	211	679,47
1985	18,314	501,253	3,779	178,123	111,579	0	(478)	812,57
1986	0	559,821	108,353	139,880	26,323	0	0	834,37
1987	0	145,341	(4,774)	178,058	28,024	0	0	346,64
1988	0	84,036	0	67,067	(271)	0	0	150,83
1989	647	538,327	93,100	192,381	0	0	11,713	836,16
1990	36,500	305,365	127,814	511,593	0	49,026	65,622	1,095,92
1991	88	642,026	90,233	155,867	0	43,995	(2,383)	929,82
1992	0	36,992	97,092	98,946	0	580,292	2,394,961	3,208,28
1993	19,310	(2,924)	159,949	58,648	0	803,196	346,933	1,385,11
1994	28,201	390	45,010	15,929	0	742,433	282,215	1,114,17
Tot.	103,060	4,648,925	851,486	2,148,422	951,063	2,218,942	3,167,978	14,089,87

THE FEDERATIVE REPUBLIC OF B R A Z I L
U N I D O TECHNICAL COOPERATION
TSS-activities not considered

PROGRAMME DELIVERY 1982 - 1994 BY PROJECT COMPONENT

Year	Project Personnel $	Subcontracts $	Training $	Equipment $	Miscell. $	Total/year $
1982	589,992	238,060	143,385	516,735	26,335	1,514,507
1983	483,891	144,686	153,359	384,438	15,609	1,181,983
1984	477,265	(22,953)	98,886	103,992	22,281	679,471
1985	307,538	35,474	135,316	317,880	16,362	812,570
1986	495,737	99,126	73,210	148,920	17,384	834,377
1987	262,698	26,414	48,103	(1,511)	10,945	346,649
1988	131,141	19,000	(6,733)	435	6,989	150,832
1989	303,519	51,500	105,004	367,436	8,709	836,168
1990	361,760	36,466	209,454	478,938	9,302	1,095,920
1991	605,780	16,000	83,822	211,778	12,446	929,826
1992	401,901	80,114	61,803	2,653,635	10,830	3,208,283
1993	554,920	85,000	(8,876)	742,949	11,119	1,385,112
1994	475,569	263,199	21,373	336,190	17,847	1,114,178
Total	5,451,711	1,072,086	1,118,106	6,261,815	186,158	14,089,876

ANNEX 3

UNIDO's Completed Operational Technical Cooperation Projects
(approved = PAD issued)
and Technical Support Services at programme (TSS-1) and project (TSS-2) level

Federative Republic of Brazil

Project Number		Reference to Current Programme	Programme Element Code	Project Title
DP/BRA/69/019		ISED/EM/ENG	30.1.02	Machine tool design
DP/BRA/69/023		HEPD/EDR	31.1.02	Metrology
DP/BRA/70/001		HEPD/ISP	00.0	Industrial programming
DP/BRA/70/544	*	HEPD/ISP	31.4.02	Industrial Development Centre, Feira de Santana
TS/BRA/71/003		HEPD/ISP	65000.0	Production adaptation and development for export-oriented industries
TS/BRA/71/004		ITPF/IS/IP	82100.0	Exploratory mission to establish an investment promotion unit for the State Bahia
TS/BRA/71/005		ISED/AGRO	72A00.0	Protein enrichment of cassava
TS/BRA/71/010		HEPD/ISP	65000.0	Assistance to the Industrial Centre of Aratu (CIA)
DP/BRA/71/560	*	HEPD/EDR Mr. Schmied	31.3.K	National Institute for Weights and Measures (INPM) (multifund to DC/BRA/71/560)
DC/BRA/71/560		HEPD/EDR Mr. Schmied	31.3.K	National Institute for Weights and Measures (INPM) (multifund to DP/BRA/71/560)
IS/BRA/71/805		ISED/EM/MET	00.0	Metalworking export promotion
IS/BRA/71/808		ISED/AGRO	30.6.01	Re-orientation of the textile industry
IS/BRA/71/809		ISED/EM/MET	30.2.00	Technological innovation and its implications for long range planning of the iron and steel industry
IS/BRA/71/812		IRD/INF	00.0	Assistance to the Institute de Pesquisas Technologicas
IS/BRA/71/813		HEPD/HRD	31.5.01	Assistance to engineering post-graduate programme (COPPE)
IS/BRA/71/814		IRD/INF	00.0	Organization of the information field liaison service for the Brazilian industry
IS/BRA/71/818		ISED/AGRO	00.0	Textile industry adviser
RP/BRA/72/001		ISED/AGRO	30.6.03	Leather processing
TS/BRA/72/002		ISED/EM/MET	74100.0	Advisory mission on the techno economic aspects of copper, lead and zinc metallurgy
TS/BRA/72/006		ISED/EM/MET	74100.0	Advisory mission on the techno-economic aspects of copper, lead and zinc metallurgy
IS/BRA/72/006		HEPD/ISP	00.0	Assistance to the Ministry of Industry and Commerce on industrial technology
TS/BRA/72/007		ISED/AGRO	72A30.6.02	Development of an export-oriented agro-industry to produce cassava pellets for the European market

* Large-scale project (= total allotment $150,000 or above)
** Total allotment $1 million or above

UNIDO's Completed Operational Technical Cooperation Projects
(approved = PAD issued)
and Technical Support Services at programme (TSS-1) and project (TSS-2) level

Federative Republic of Brazil

Project Number	Reference to Current Programme	Programme Element Code	Project Title
IS/BRA/72/007	ISED/CHEM	00.0	Synthetic fibre production
IS/BRA/72/008	HEPD/SME	31.4.02	Assistance to the Industrial Estate Development in the State of Rio Grande do Sul
TS/BRA/72/009	HEPD/ISP	65031.3.G	Seminar on industrial design for export products Sudene, Recife
IS/BRA/72/023	ISED/EM/MET	31.8.A	Metallurgical investigations on ilmenite concentrates
RP/BRA/73/001	ISED/AGRO	30.6.02	Dry freezing of food
TS/BRA/73/001	HEPD/ISP	65031.1.02	Exploratory mission to discuss the Government implementation problems on large-scale projects
TS/BRA/73/002	ISED/AGRO	72C30.6.01	Textile laboratory: evaluation of facilities at faculty of industrial engineering, Sao Bernardo do Campo, Sao Paulo
RP/BRA/73/002	ISED/EM/MET	30.2.00	Design of building lay-out and operational iron steel plants
RP/BRA/73/003	ISED/AGRO	30.6.03	Leather processing
RP/BRA/73/005	ITPD/IS/FEAS	32.1.00	Training in preparation and evaluation of industrial projects
DP/BRA/73/006	ISED/EM/MET	31.8.C	Technical assistance to the iron and steel industry
DP/BRA/73/008	HEPD/SME	31.4.01	Industrial advisory services to the State of Bahia
DP/BRA/73/009	HEPD/HRD	31.5.B	Training in footwear industry production and management Ernesto Plents Filho
DP/BRA/73/015	ISED/EM/MET	30.2.02	Assistance in the diagnosis of the non-ferrous metals industry
IS/BRA/73/016	HEPD/ISP	32.3.02	Regional programme of industrial design
DP/BRA/73/020	HEPD/ISP	31.2.A	Industrial advisory assistance to the State Secretariat of Industry and Commerce
DP/BRA/73/021	ITPD/TS/TDS	31.3.Z	Studies, coordination and strategy for industrial technology development
DP/BRA/73/022	HEPD/ISP	32.3.02	Industrial designer
DP/BRA/73/023	ISED/EM/ENG	30.7.02	Packaging and containers technology
DP/BRA/73/024	HEPD/EDR	31.1.02	Inspection and quality control
IS/BRA/73/026	ISED/AGRO	30.6.00	Industrial processing of crab meat
VC/BRA/73/171	ISED/AGRO	72A30.C.02	Promotion of cooperation between developing countries in the development of the food processing sector

* Large-scale project (= total allotment $150,000 or above)
** Total allotment $1 million or above

UNIDO's Completed Operational Technical Cooperation Projects
(approved = PAD issued)
and Technical Support Services at programme (TSS-1) and project (TSS-2) level

Federative Republic of Brazil

Project Number		Reference to Current Programme	Programme Element Code	Project Title
DU/BRA/74/001		HEPD/HRD	31.5.A	Establishment of a foundry service in Itauna (Executing Agency: ILO)
RP/BRA/74/002		HEPD/ISP	32.3.02	Product adaptation and development for export-oriented industries
IS/BRA/74/002		ISED/AGRO	31.7.C	Modernization and diversification of the tobacco industry
TS/BRA/74/002		ISED/EM/MET	74130.2.00	Advisory mission to the Ministry of Planning on scientific and technological development
IS/BRA/74/011		ISED/AGRO	30.6.02	Food processing, assistance to ITAL
DP/BRA/74/019		ISED/AGRO	31.7.D	Advisory services for the development of the leather and footwear industry
DP/BRA/74/032		ISED/AGRO	31.7.C	Latin American seminar on science and technology of the food processing sector
SI/BRA/74/823		ISED/EM/ENG	31.9.D	Assistance in shipbuilding and testing technology
DP/BRA/75/003	**	ISED/EM/MET Mr. Surguchov	J13210	Assistance in the field of standardization, quality control and quality certification of iron and steel (multifund to DC/BRA/75/003)
DC/BRA/75/003	*	ISED/EM/MET Mr. Surguchov	J13208	Assistance in the field of standardization, quality control and quality certification of iron and steel (multifund to DP/BRA/75/003)
IS/BRA/75/005		ISED/EM/MET	31.8.A	Advisory services for development of the zinc and lead mining ore dressing and metallurgy
IS/BRA/75/006		ISED/EM/MET	30.2.01	Assistance in production of TiO2 pigment and pollution control
DP/BRA/75/012		ISED/EM/MET	31.8.F	Assistance to STI in preparation of master plan, development of iron and steel industry technology
DP/BRA/75/018	*	HEPD/EDR	31.3.K	Assistance in the field of standardization, quality certification and industrial quality
IS/BRA/75/028		ISED/EM/MET	30.2.00	Advisory mission on non-ferrous metals industry development
IS/BRA/75/030		ISED/EM/MET	31.8.A	Assistance to secondary aluminium industry
DP/BRA/75/036		HEPD/ISP	31.3.A	Marketing of industrial research results
IS/BRA/75/038		ISED/AGRO	31.7.C	Technological development of the temperate climate processed food industry in the South of Brazil
SI/BRA/75/805		ISED/EM/MET	31.8.A	Advisory services for development of the zinc and lead mining ore dressing and metallurgy
SI/BRA/75/831		ISED/EM/MET	31.8.A	Market survey of non-ferrous metals ore concentrates
SI/BRA/75/837		ISED/AGRO	31.7.C	Assistance in the establishment of a national system of normalization, control and certification of quality industrialized food products
RP/BRA/76/001		ISED/EM/ENG	31.9.H	Fellowships in industrial design

* Large-scale project (= total allotment $150,000 or above)
** Total allotment $1 million or above

UNIDO's Completed Operational Technical Cooperation Projects
(approved = PAD issued)
and Technical Support Services at programme (TSS-1) and project (TSS-2) level

Federative Republic of Brazil

Project Number		Reference to Current Programme	Programme Element Code	Project Title
RP/BRA/76/003		HEPD/HRD	31.5.B	Industrial training
RP/BRA/76/004		HEPD/HRD	31.5.B	Industrial training
RP/BRA/76/005		HEPD/HRD	31.5.B	Industrial training
DP/BRA/76/008		ISED/AGRO Mr. Moreira-Dias	31.7.C	Standardization and industrial quality control in agro-industries
RP/BRA/77/001		ISED/AGRO	31.7.C	Study tour for observation of Yugoslavia's agro industry
RP/BRA/77/002		HEPD/HRD	31.5.B	Leather technology
SI/BRA/77/801		ISED/EM/MET	31.8.B	Specialist in flash smelting of copper
SI/BRA/77/802		ISED/CHEM	32.1.C	Assistance in cathodic protection
SI/BRA/78/801		ISED/EM/MET	31.8.A	Aluminium industry expert
RP/BRA/79/001		ISED/EM/MET	31.8.Z	Consultation visit to UNDIO
SI/BRA/79/801		ISED/AGRO	31.7.D	Elaboration of a project to establish a pilot demonstration plant for tannery effluent treatment at Estancia Velha, RS (continued under US/BRA/80/166)
DU/BRA/80/001		ISED/AGRO Mr. Moreira-Dias	31.7.C	Agricultural development policies and programmes (Executing Agency: FAO)
DU/BRA/80/002		ISED/AGRO Mr. Antinori	J13103	TCDC Senegal in mango processing (Executing Agency: UNDP/OPS)
DU/BRA/80/008		ISED/CHEM Mr. Youssef	32.1.H	Programme support (Executing Agency: OPE)
US/BRA/80/166	*	ISED/AGRO Mr. Buljan	72BJ13104	Assistance in the establishment and operation of a pilot and demonstration plant for tannery effluents treatment at Estancia Vehla, RS (continuation of SI/BRA/79/801)
SI/BRA/81/801		ISED/EM/MET Mr. Shen	J13210	Assistance for activating the production of gold metal in the State of Minas Gerais
SI/BRA/81/802		ISED/CHEM Ms. Maltezou	32.1.J	Industrial pollution control
ST/BRA/81/T01	**	ISED/CHEM Mr. Youssef	730J13420	Optimization and development of carbon fibre technology
DP/BRA/82/002	*	ISED/CHEM Mr. Williams	J13424	Enzymatic hydrolysis of cellulosic materials and production of other liquid fuels from biomass (Associated Agency: FAO)
DP/BRA/82/003	*	ISED/EM/ENG Mr. Pürkus	J13318	Energy conservation and substitution of imported energy inputs in the industrial sector
UC/BRA/82/011		ISED/AGRO Mr. Moreira-Dias	72A31.7.C	Comparative analysis for the agro- industrial development programme and the implications of this analysis for Brazil
DC/BRA/82/020	*	HEPD/EDR Mr. Kozlov	J12102	Metrology, standardization and industrial quality (phase I) (multifund to DP/BRA/82/020)

* Large-scale project (= total allotment $150,000 or above)
** Total allotment $1 million or above

UNIDO's Completed Operational Technical Cooperation Projects
(approved = PAD issued)
and Technical Support Services at programme (TSS-1) and project (TSS-2) level

Federative Republic of Brazil

Project Number		Reference to Current Programme	Programme Element Code	Project Title
DP/BRA/82/020	*	HEPD/EDR Mr. Kozlov	J12102	Metrology, standardization and industrial quality (phase I) (multifund to DC/BRA/82/020) (continued under DP/BRA/87/038)
DP/BRA/82/029		ISED/CHEM Mr. Chari	J13422	Transfer of technology through the pharmaceuticals chemical multi-purpose pilot plant
DP/BRA/82/030	*	ISED/EM/ENG Mr. Belo	J13320	Consolidation of the existing capacity of the Institute of Food Technology (ITAL) through the creation of a national food packaging centre
SI/BRA/82/801		ISED/EM/ENG Mr. Chacon-Puig	31.9.A	Assistance to the Government of Brazil in the field of material engineering
SI/BRA/82/802		ISED/AGRO Mr. Minke	31.7.B	Assistance to CETIQT (Centre of Technology of the Chemical and Textile Industry)
SI/BRA/82/803		ISED/EM/ENG Mr. Smirnov	J13313	Micromechanics/microelectronic interfaces
SI/BRA/82/804		ISED/CHEM Mr. Youssef	32.1.H	Assistance to CETIQT in the area of synthetic fibres
UC/BRA/83/241		ISED/AGRO Mr. Eräneva	72CJ13102	Rehabilitation and adequation assistance to the knitting industry of the State of Santa Catarina
RP/BRA/84/001		ISED/CHEM Mr. Youssef	32.1.H	Study tour of four Brazilian synthetic fibre experts to India (SASMIRA) and China (Synthetic Fibre Academy) for two weeks each
UC/BRA/84/054		ISED/CHEM Mr. Csizer	32.1.D	Assistance to the Instituto de Tecnología do Papana (TECPAR) in vaccine production
UC/BRA/85/180		ISED/AGRO Mr. Miranda da Cruz	J13103	Preparatory/exploratory joint UNIDO/Italy mission on integrated agro-industry development in the Paraná State
SI/BRA/85/801		ISED/CHEM Mr. Youssef	J13420	Assess present status and future plans of plastic processing inustries
SI/BRA/85/802		ISED/AGRO Mr. Eräneva	J13102	High-level advisory service to the Centre of Technology of the Chemical and Textile Industry (CETIQT)
UC/BRA/86/119		ITPD/IS/FEA	823J14102	Technical advice in putting into operation the 'Greater Carajas Programme'
SI/BRA/86/837		ISED/AGRO Mr. Bassili	J12209	Advisory services to prepare a programme for the development of a wood processing industry in Mato Grosso
SI/BRA/86/846		ISED/EM/MET Mr. Somnay	J13207	Assistance for activating the production of gold in the State of Minas Gerais
DG/BRA/87/012		ISED/AGRO Mr. Bassili	J13101	Assistance to the wood and furniture industry of the State of Mato Grosso
US/BRA/87/031	*	HEPD/ISP Mr. Maizza Neto	650065000	Coopération France-Brésil dans le domaine des composants électriques, électroniques et mécaniques fondée sur l'emploi de la méthode ACT (Analyse de la Complexité Technologique) et visant en priorité le développement de la petite et moyenne industrie (follow-up to UC/GLO/87/234)
DP/BRA/87/033	*	ISED/AGRO Mr. Moll	0720C0	Support to SENAI-CETIQT Applied Research Unit
DC/BRA/87/038		HEPD/EDR Mr. Kozlov	J12102	Industrial quality and metrology - preparatory assistance (multifund to DP/BRA/87/038)

* Large-scale project (= total allotment $150,000 or above)
** Total allotment $1 million or above

UNIDO's Completed Operational Technical Cooperation Projects
(approved = PAD issued)
and Technical Support Services at programme (TSS-1) and project (TSS-2) level

Federative Republic of Brazil

Project Number		Reference to Current Programme	Programme Element Code	Project Title
DP/BRA/87/038		HEPD/EDR Mr. Kozlov	J12102	Metrology, standardization, quality control - preparatory assistance (multifund to DC/BRA/87/038) (continuation of DP/BRA/82/020)
US/BRA/88/006		ISED/AGRO Mr. Miranda da Cruz	J13103	Développement de l'industrie agro-alimentaire du littoral du Paraná (phase I - mission de formulation du projet) (continued under US/BRA/89/072)
DP/BRA/88/017	*	ISED/EM/ENG Mr. Belo	0740V0	Consolidation of the food packaging centre - CETEA, within ITAL
SI/BRA/88/801		ISED/CHEM Mr. Youssef	J13420	Assistance to the Brazilian plastics industry
TF/BRA/89/001		HEPD/SME Mr. Cannas	640J12103	Associate expert (Mr. Ognibeni) (multifund to US/INT/87/046, US/INT/89/211)
DP/BRA/89/009		ISED/EM/MET Mr. Nogueira da Silva	J13208	Assistance to SIDERBRAS - preparatory assistance
XP/BRA/89/012		CSPD/LAC	360E02501	Visit of high-level official of SIDERBRAS to UNIDO
US/BRA/89/072		ISED/AGRO Mr. Miranda da Cruz	J13103	Développement de l'industrie agro-alimentaire du Paraná (phase II) (continuation of US/BRA/88/006)
US/BRA/89/100		ISED/AGRO Mr. Moll	J13102	Application of CAD/CAM techniques in the Brazilian garment industry
SI/BRA/89/801		ISED/AGRO Mr. Moll	J13102	High-level advice on proper utilization of computerized colour matching (CCM)
SI/BRA/89/802		HEPD/EDR Mr. Stephens	J12102	Technical advisory services to the Instituto Nacional de Metrologia, Normalizaçao et Qualidade Industrial (INMETRO)
DP/BRA/90/011		ISED/CHEM Mr. Youssef	J13420	Symposium on ways and means for profitable production and use of petrochemicals and chemicals
DP/BRA/90/012		ISED/CHEM Mr. Youssef	J13420	Workshop on integrated development of chemical industry
XP/BRA/90/066		IRD/STAT	530E03401	Pilot seminar on statistical process control
US/BRA/90/086	*	ISED/AGRO Mr. Moll	0720C0	Assistance to the SENAI textile training institutions in the field of apparel computer aided design and production
US/BRA/90/163	*	ISED/AGRO Mr. Moll	J13102	Assistance to the SENAI textile training institutions in the field of apparel computer aided design and production
SI/BRA/90/801		ISED/AGRO Mr. Schmel	J13104	Technical advisory services on the utilization of CAD/CAM techniques in the shoe industry of the Franca region - Sao Paulo State
SI/BRA/90/802		ISED/CHEM Mr. Youssef	J13420	Advisory services on the establishment of the market analysis data base for chemical industry in the State of Rio Grande do Sul
SI/BRA/90/803		HEPD/SME Ms. Taluy	J12103	High-level advice on the implementation of the industrial estate of Rio Largo, Maceio, Alagoas State
SI/BRA/90/804		CSPD/LAC Mr. Skupch	036000	High-level advisory services to the Department of Industry and Trade of the Ministry of Economy, Finance and Planning
TF/BRA/91/001	*	ISED/AGRO Mr. Miranda da Cruz	0720A0	Industrial processing of pfaffia products

* Large-scale project (= total allotment $150,000 or above)
** Total allotment $1 million or above

UNIDO's Completed Operational Technical Cooperation Projects
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Federative Republic of Brazil

Project Number		Reference to Current Programme	Programme Element Code	Project Title
TF/BRA/91/002		ISED/AGRO Mr. Miranda da Cruz	72AJ13103	Industrial processing of Capivara products
SF/BRA/91/003	*	ISED/AGRO Mr. Moll	0720CQ	Computer aided design systems for selected Servicio Nacional de Aprendizagem Industrial (SENAI) textile schools
US/BRA/91/012		ISED/AGRO Mr. Buljan	0720BC	Assistance in the operation of a joint tannery effluent treatment plant in the Franca Region, Sao Paulo State
TF/BRA/92/002		ISED/AGRO Mr. Moll	72C0720C0	Associate expert (Ms. Kewel) (multifund to SF/BRA/92/001)
SF/BRA/92/003		ISED/AGRO Mr. Buljan	J13104	High-level technical assistance for the implementation of the Regional Centre of Technology for the Leather and Footwear Industry (SENAI), Regional Department in Campina Grande
UC/BRA/92/009		ISED/AGRO Mr. Moll	72CJ13102	Preparatory assistance for the establishment of a new textile and garment technology centre
DG/BRA/92/037		ISED/CHEM Mr. Ramsay/Mr. Heijndermans	0730A0	Centre of excellence on sanitary engineering and environmental sciences (and TSS-2 NU/BRA/92/037)
UC/BRA/92/173		ISED/CHEM Ms. Yalçindag	J13428	Technical advisory mission of the modernization of the marble and granite industry of Espirito Santo State
SI/BRA/92/801		ISED/CHEM Mr. Youssef	J13420	Plastics recycling technologies
SI/BRA/92/802		ISED/AGRO Mr. Moll	J13102	High-level technical advisory services in shade control of apparel fabrics
XP/BRA/93/036		HEPD/ISP	E03202	Seminar on industrial policies, Brasilia, 23 - 25 November 1993
SI/BRA/93/801		ISED/AGRO Mr. Moll	0720CC	High-level advisory services to the Secretaria da Ciencia, Technologia e Desenvolvimento Economico (SCTDE), Sao Paulo regarding relocating polluting industries
SI/BRA/93/802		HEPD/ISP Mr. Richard	065000	High-level advice on strategic industrial development for the State of Tocantins
SI/BRA/93/803		HEPD/ISP Mr. Chanana	065000	High-level advisory services for the Brazilian export processing zones programme
XP/BRA/94/008		ITPD/TS/TAS Mr. Seidl da Fonseca	083200	Capacity-building course on technology transfer negotiations

* Large-scale project (= total allotment $150,000 or above)
** Total allotment $1 million or above

ANNEX 4

PROJECTS ANALYZED BY THE MISSION

PROJECTS WITH INMETRO
(all completed)

DP/BRA/69/023 - Metrology. USD 18,600 (1971)

The project covered preparatory assistance for a large scale project "Standardization in Brazil" which was subsequently approved under DP/BRA/71/560. During the project, cooperation was established with the Inter-American Development Bank (IADB), one of the international agencies which provided late financial assistance to Brazil on Standardization. Counterpart was the National Institute of Weights and Measures, the forebear of INMETRO.

DP/BRA/71/560 - National Institute for Weights and Measures. USD 953,588 (1972-79)

This project created the basis of INMETRO (established in 1973). It had a French CTA which served through the project and short term expertise on different aspects of Metrology. It had an element of cost sharing. During the project several labs (electrical and mechanical) were installed with equipment provided by other financial sources as well as from existing labs. A considerable amount of training took place under the project. There were considerable problems with the level of expertise of the then national personnel (counterparts).

DP/BRA/75/018 - Assistance in the field of Standardization, Quality Certification USD 211,140 (1976-77)

This is basically a continuation of the previous project with expertise (CTA Mr. Sen) and training . The project lasted only for 14 months (from planned 36 months) and gave way to a large scale project DP/BRA/82/020. The reason for the reduction was that the Government felt that the national counterpart was able to carry out the policy formulation and implementation of the system on its own and international assistance should be provided instead through more sub-sectorial projects (BRA/76/010 - Electrical industries, BRA/76/011 - Mechanical industries and BRA/75/003 - Iron and steel). This approach, however, was contradicted by the following project.

DP/BRA/82/020 - Metrology, Standardization and Quality Control. USD 650,000 (1983-87)

This project was first designed as a USD 1.5 million project and was subsequently reduced to the above figure. It had a CTA (Mr. Krichnamachar) and a number of experts on sub-sector standardization and quality control. It was formally evaluated in 1987 and it was

found that the expertise provided was of a high order but unable to solve all training problems of INMETRO. The institution changed presidents too often and the institution building aspects of the project were deficient. With time the situation proved to improve over what was indicated in the evaluation report. A considerable number of international standards were adopted by INMETRO under the project's guidance.

SI BRA 75 025 - Assistance in the establishment of a national system of normalization, control and certification of quality for industrialized food products. USD 15,000 (1977-78)

An expert was provided to lay the basis on a standardization and quality control system for food products. The project seems - but it is not sure - to have provided the foundation for the project below.

DP BRA 76 008 - Standardization and quality control in agro-industry. USD 82,000 (1979-80)

Provided advice (two experts) on alcohol and canned products and some fellowships. The advice proved by the experts seems to have allowed the preparation of standards in the related fields.

DP BRA 75 003 - Standardization and quality control in Iron and Steel. USD 1,787,400 (1977-86)

Expertise and fellowship were provided in this important sub-sector which at the time was being supported within the policies of import substitution and technological independence. The CTA was Mr. Krichnamachar, seemingly in conjunction with project 82 020. The project was audited in 1982 (there were then no in-depth evaluation) and was found to be satisfactorily managed and with successful results. The project was centered on training.

DP BRA 76 010 - Quality Control in Electrical and Electronic Sector
DP BRA 76 011 - Quality Control in the Mechanical Sector

Despite a considerable amount of correspondence on the above projects they never took off and the related activities were partly taken over by project 75 003.

SI BRA 89 802 - Technical Advisory Services to INMETRO USD 15,841 (1990-91)

The project consisted of one expert to provide INMETRO advice on the organization, activities and establish a mid-term development plan. It related to a crisis caused by drastic federal budget reductions and the move of dependency of Inmetro from the Ministry of Industry to the Ministry of Finance (Collor Administration). The problems have in the meantime been solved and dependency returned to the Ministry of Industry.

The report produced by the expert is of high quality but it is not known to what extent its recommendations were considered applied. In 1995, there is a different administration in Inmetro than in 1990/91.

Relevance: All the above projects were conceived within a broad technology plan drawn up by the then powerful Secretary of Industrial Technology based on technology self-sufficiency and import substitution policies. The projects were relevant within that policy framework.

Effectiveness: There were considerable problems in the implementation of those projects - such as difficulty in finding adequately qualified expertise and fellowship placement as well in the levels of counterparts and frequent administration changes. However, by and large, all the projects met their objectives.

Impact: Impact of those projects was mixed and different from what it was originally planned but can be considered on average positive.

The development objective at the time of the preparation of the above projects was related to an import substitution policy. However, standardization and quality control systems are even more needed in an open economy. Therefore, the activities of INMETRO, whose creation owes much to the assistance provided under the above projects, are even more relevant and important today.

Sustainability: In view of the important position attained today by INMETRO (see note on INMETRO) the projects indicated above may be termed as having had, as a whole, a high degree of sustainability.

UNIDO PROJECTS WITH CETEA (PACKAGING CENTER) (all completed)

DP/BRA/82/030

The project aimed at establishing a Food Packaging Center within the existing Institute of Food Technology (ITAL) of the State of Sao Paulo where a "packaging nucleus" existed. The project had a UNDP contribution of USD 1 million: for experts (USD 268,000), subcontracts (USD 220,000), fellowships (USD 160,000) and equipment (USD 327,000). The IDB provided a loan associated with the establishment of the center. The project concentrated on retail packaging. The expertise supplied seems to have been of a high standard and the equipment wisely selected. A contract was issued with the Michigan State University for courses on Packaging.

Due to UNDP's retrenchment during the life of the project, total contribution was reduced to USD 826,000 of which half was for equipment.

The project lasted from 1983 to 1986.

DP/BRA/88/001

This project is a phase II to the previous one. The project aimed at consolidating the retail packaging activities of CETEA and extension of services to other areas such as distributing packaging and the establishment of an information and documentation system. The project had a UNDP contribution of USD 580,000 for short term expertise, training and equipment (USD 400,000). An estimated USD 2,400,000 for new investments in staff, equipment and facilities were provided as counterpart inputs. The project started in early 1989 and lasted until the end of 1991.

The project suffered somehow from delays on the construction of the premises' extensions. Apart from that, it was professionally implemented. This phase included the participation of the private sector in the Center through paid membership.

Present status

Presently the Center (one of six of ITAL) deals with packaging in general and is not only limited to food projects although the food related work continues to be the most important. They are members of the International Association of Packaging Research Institutions. The 6th World Conference on Packaging was organized in Brazil by CETEA, the first time in a developing country.

The annual budget is around USD 1,000,000/year of which USD 550,000 comes from the State Government (Secretary of Agriculture) and USD 450,000 from the private sector (1/3 membership fees and 2/3 sale of Services).

They have at present 50 professionals of which 18 have the Researcher rank. They occupy 1,450m² of labs plus 550m² of office space.

Besides quality control services they conduct research projects financed by FINEP and a private foundation.

The Center has been used by UNIDO as demonstration and training for people from other countries like Vietnam, Thailand and Uruguay. CETEA is the regional coordinator of the Ibero-American information network on packaging. The information section is impressive. A list of publications on stock is issued regularly. They provide quality control services under INMETRO auspices.

Relevance: In view of the importance of the food sector in Brazil and the little know-how available in the related packaging areas before the assistance started, the projects can be definitely considered as relevant.

Effectiveness: Objectives were met, that is the Center was established, admittedly with a strong counterpart contribution and an IDB loan.

Impact: Although end-users were not visited, it seems that the development objective was achieved in so far as it has contributed to the development of the packaging industry in Brazil.

Sustainability: The Center continued functioning and developing beyond the life of the project. Therefore, assistance was sustainable. However, sales of services are relatively small in relation to the budget. In our opinion, they should be as a minimum 50%.

SF/BRA/92/001
Application of Modern Technologies and Management Systems to improve SENAI/CETIQT and the Brazilian Textile and Apparel Industry
(completed in December 1995)

There is a long history of technical co-operation of UNIDO with CETIQT and therefore, the above project should be analyzed in the wider context of that history.

Prior to 1987 a number of short-term (1 week to 1 month) visits of UNIDO consultants provided advice on laboratory practices and instrumentation. In 1987, a UNDP financed institution building project (USD 0,000 with 50% cost sharing - lasting 4 years) dealt with CAD/CAM systems, computerized colour matching and dye house automation. This project was centred at CETIQT but also included advisory services to other SENAI textile schools at Sao Paulo and Santa Catarina. This project was complemented with 4 projects as follows:

- *SIS - USD 100,000 (1989-90) to establish an Applied Colorimetry Laboratory.*
- *IDF USD 590,000 (SENAI 33%, France 67% financing) (1990-91) on specific aspects of CAD/CAM.*
- *Trust fund (SENAI) (1991-1992) USD 200,000 to establish Gerber design and marker maker systems at CETIQT, at Blumenau, São Paulo and Caxias do Sul.*
- *SIS - USD 48,000 (1992) on shade control of fabrics.*

All the above led to the project under analysis with a self-financed trust fund of USD 2,226,000 including overhead costs and which lasted from March 1992 to 30 September 1995. The project was to operate on the basis of individual agreements with textile companies to provide them with the technical assistance they require. The companies paid CETIQT for those services 50% of the budget was earmarked for equipment, covered by CETIQT's regular budget, to renew and update laboratories and pilot plants. The experts were to strengthen the so called "International Technical Assistance Unit" which has no administrative existence and serves to house the international experts but is expected to serve throughout CETIQT.

The project document's logic is not good allegedly because of the unpredictability of services to be requested by enterprises. The appraisal note made a point of this but no changes were made to the projet document. However, the project was detailed as far as inputs were concerned.

Through the project, CETIQT has been able to attract donations of equipment (about USD 1 million) from manufacturers of CAD/CAM equipment which will be used for demonstration purposes.

In more recent times, CETIQT has been the object of the following additional projects:

- *UNIDO Regular Programme USD 70,000 - 1993 to bring speakers from Europe and the U.S.A. and participants from other developing countries to the exhibition CATAI'93 on Computer Applications in the Textile and Apparel Industry.*

- *Two associate experts (German-financed) have served the project under analysis.*

- *UNIDO also supported the International Conference Textile/Apparel (CITC'95) with a USD 230,000 project (42% UNIDO, 58% CETIQT financing) to finance the participation of 8 speakers from Europe and the U.S.A. and 18 participants from developing countries and provision of video equipment.*

- *A GTZ (German bilateral implementing agency) started in 1994 a three-year project on apparel, stamping, environment and women's work in the textile industry.*

Relevance: The project (and the ancillary above indicated projects) have addressed a real problem of the manufacturers (textile and apparel) in their modernization particularly in CAD CAM systems.

Effectiveness: Although the analysis did not reach end-users (enterprises), it may be concluded that the projects were effective (i.e. met their objective) in improving (modernizing) CETIQT's capability to provide extension services to the enterprises. The Project Performance Evaluation Report (only one) prepared in 1995 provides good information on the outputs reached and activities undertaken by the project. The sales of extension services by CETIQT is a positive indicator.

Impact: It cannot be evaluated as visits to end-users did not take place. This was examined during the in-depth evaluation of September 1995 and was considered positive.

Sustainability: Sustainability here can be measured by the capacity of CETIQT to provide extension services and further by the absorbability of enterprises of these services. Whatever way you measure it, this seems to be the main problem which faces this project. The project was essentially run by two (now by only one) long-term international experts. The main project objective is stated in the project document as "the strengthening of the CETIQT International Technical Assistance Unit in providing high-level"(services to industry). Since this unit is to be staffed by international experts, this is contrary to the very principles of technical co-operation sustainability, that is, we are here to help and build up capacities not to run things. The answer to this argument has been given by the Backstopping Officer in that salaries of CETIQT's staff are so low that when you train people they move to industry so you need international expertise to run things (forever?). This is confirmed by CETIQT's willingness to finance long-serving resident experts (one has been with CETIQT for about 5 years) says the backstopping officer.

Conclusion: A rather vague project document as demonstrated by the appraisal note of 14.2.92. However, a seemingly good project (it is being published by UNIDO as one of its best success stories) in what concerns relevance and effectiveness. Serious problems regarding sustainability. The in-depth evaluation report provides more information.

SI/BRA/92/801
Plastics Recycling Technology (USD 47,469)
(completed)

The project was conceived to analyze the potential for plastic waste recycling in Brazil, to inform the Brazilian plastics sector of the various systems and technologies used for this purpose in other parts of the world, describing the advantages and disadvantages of these systems, and to evaluate which systems would be best adapted to the needs of the country. The implementing agency for this project was INP - National Plastic Institute (see this institution).

The background and justification of the project, as described in the project document, are in line with the reality of Brazil and call attention to the volumes of municipal waste that must be cared of in cities like São Paulo, requiring the disposal of more than 12.000 tonnes of waste a day, of which about 6% is plastics. This represents more than 250.000 tonnes of discarded plastics a year

Although the project concerns the fielding of three UNIDO high level experts, INP refers only to two, namely, Mr. Vincent Sciascia and Mr. Willy Blaudt. The presence of these experts has been considered very positive and the result of their work was considered good by INP.

The project output was accomplished and a final report was delivered to INP and to PLASTIVIDA, the Brazilian Association for the Recycling of Plastic Material. Although the quality of this report was considered satisfactory in its time, its validity has allegedly a short duration due to the continuous introduction of new techniques and different approaches for the recycling of plastics. Consequently a revision of the report contents would be mandatory.

Relevance: The relevance of the project for Brazil can be measured by the amount of solid waste generated in its major urban concentrations. It should be considered that more than 70% of the Brazilian population of 160 million are now living in cities, some of these becoming very fast huge conurbations like São Paulo and Rio de Janeiro.

Effectiveness: The approach of recycling is effective not only because of the volume of waste considered but also for the generation of employment. In volume, the plastics content in the domestic garbage can go up to 20%, that means an appreciable reduction in the lifetime of the landfills to where this garbage is usually destined. On the other hand, the recycling of materials, including sorting out and collection operations, is welcome as a source of employment for the unskilled workers.

Impact: The impact exercised by the project was very weak and it was impaired by the absence of follow-up measures to spread its conclusions and foster practical actions by recyclers. A measure of this low impact attained is evident in a recently published Garbage Manual sponsored by IPT (see this institution) and a group of companies concerned with recycling practices. In spite of being a comprehensive and detailed manual, no mention is made to the project's report in its extensive bibliography on plastic recycling.

Sustainability: Plastic recycling is growing in importance in Brazil and an estimated 600 enterprises are engaged in this activity. In 1994 was created ABREMPLAS an association of plastic recyclers. On the other hand, the thermoplastic resin manufacturers are deeply concerned with the destination of plastic products improperly discarded and are supporting actions to enhance the recycling practices through their PLASTIVIDA association. Sustainability not achieved.

Conclusion: The product of the project, i.e. its final report, was not adequately spread and propagated among its possible end-users, primarily plastic recyclers and municipal cleaning service and therefore, impact and sustainability suffered.

SI/BRA/93/801
High-level Advisory Services to SCTDE/São Paulo regarding Relocating Polluting Industries *(USD 104,600)*
(completed)

Although the project SI/BRA/93/801 stresses in its title the relocating of polluting industries, this is not the approach considered by the authorities of São Paulo State in relation to the Tiete River De-pollution Programme. The programme has the participation of SCTDE - State Secretariat for Science, Technology and Economic Development (see this institution), CETESB - State Company for the Environmental Technology and SABESP - State Company for Basic Sanitation, amongst other entities.

The project document addresses two industrial branches as the most serious polluters: electroplating industry and textile dyeing and finishing industry.

The objective of the project regarding the electroplating industry, as stated in the project document, was approached by visits of the international expert Mr. J. K. Cosselett who oriented the organisms and enterprises involved with the programme with regard to aspects such as water economy, good housekeeping etc. Two reports were produced by Mr. Cosslett, respectively on November 1993 and March 1995.

The first report collects observations made during his visits and contacts held in São Paulo and puts forward a number of practical recommendations mainly envisaging the administration of pollution generated in plate shops.

The second report addresses the problems of the final destination for sludges resulting from the effluent treatment, since this is a real problem not yet properly solved worldwide.

As far as it concerns the second industrial branch addressed by the project, the textile industry, there were reports, prepared by the expert Mr. Peter J. Horn who also visited São Paulo, encompassing textile dyeing and its consequences on the river waters. Mr. Horn lines up a sequence of recommendations to be followed by the installed industries. These recommendations were split into two classes, i.e. measures requiring substantial investment and those that do not require substantial investment. Recommendations are considered practical and objective.

<u>Relevance</u>: The project in itself is not relevant to the present possible solution of the industrial pollution in São Paulo. Most of the topics mentioned in the project reports are in fact the confirmation of measures already taken or under way, either by the industries themselves or by the local authorities.

<u>Effectiveness</u>: Although the pollution generated by electroplating industries is a real problem and its impact on the environment has been identified as very serious due to the heavy metals contained in the non-treated effluent, the relocating of the industries is a wrong approach and lies beyond the programme undertaken by Government and the industry to clean the effluent cast in the Tiete River and its tributaries. Adding to that, most of electroplating plants in São Paulo are small or medium sized industries, that cannot afford to move out of the region.

The project objective to "advise the Government of São Paulo State on ways to immediately reduce poliution..." is too ambitious and was not reached. On the other hand the project did not help much in solving the new problem already created by the implant accumulation of sludges generated by industries that have installed effluent treatment facilities.

Impact: The control of the pollution in the Tiete River cannot be ascribed to the project, even in small scale. Mr. Emerson Kapaz, the new State Secretary for Science, Technology and Economical Development, when questioned about this project, did not react as even knowing about it. It should be noted that he came into the post at the time when the project was well under way. Impact marginal. Project too ambitious.

Sustainability: The formulation of the project was centered on a concept of advice to the State Government. The documentation perused consists of four technical reports with recommendations and a general presentation of alternatives for the treatment of the effluent generated by the electroplating industries and the textile dyeing installations. In fact, such reports are surveys and do not lead to a sustainable influence in future actions taken by the Government. Sustainability not achieved.

Conclusion: The results shown and the contents of the reports produced are not in line with the project title and its objectives.

XP/BRA/94/008
Capacity-Building Course on Technology Transfer Negotiations
USD 37,280
(completed)

The project was to enhance the national capability in technology transfer negotiations, through the organization of a short term course on technology transfer negotiations, with a twofold objective: a. to train government officials, practitioners and enterprise managers and professionals on how to handle the process of preparing, conducting and implementing technology transfer transactions; b. to set a basis for a programme of regular courses and advisory services on technology transfer negotiations in Brazil. The establishment of regular courses and advisory services benefits from the UNIDO experience, methodologies and didactic materials embodied in the Manual on Technology Transfer Negotiations.

The project was sponsored by FINEP and hosted in IPT for five days. 40 trainees attended which included 14 enterprise managers, 10 government officials and 16 researchers (or participants from research institutions).

The course recommended that a systematic educational programme be designed to enhance the skills in technology transfer negotiations and contracting in Brazil. The participants should be mostly from industry. There was no possibility to interview participants, nor FINEP has done a follow-up, but it seems the course had the interest of the participants. It opened an interesting market demonstrated by a wider (both subject and geographic coverage) programme which is now being finalized ($ 500.000) on a self-financed trust fund basis. FINEP will continue to be the counterpart agency but CNI and SEBRAE will be involved. Participants are expected to pay for attendance and therefore the project will be totally self-financed.

Relevance: The project addresses a perceived need in upgrading skills in negotiations of transfer of technology agreements and contracts.

Effectiveness: The analysis did not reach end-users but the project seems to have met its objective in upgrading the necessary skills. The fact that an enlarged programme is being approved is a sign of the good acceptance

Impact: It cannot be evaluated since applications of the skills imparted could not be ascertained.

Sustainability: Not applicable in this project but should be an element to verify in the follow-up large-scale project. Given the general level of development of Brazil and the fact that consultants will participate in the programme, a local (self-financed) capacity to continue such courses should be built up and maintained by an institution like FINEP.

US/RLA/90/204
Regional Programme for the Development of Industrial Sub-contracting and Match Making in Latin America

(Enlargement of a previous programme to cover five additional countries)
USD 519,800 (1991-95)
(ongoing)

The project covers the establishment/development of industrial subcontracting exchanges in five Latin American countries, one of which is Brazil, in addition to eight countries already covered by a previous project. The concept of industrial subcontracting is valid and is a useful tool to promote industrial development and thicken the industrial fabric.

The Programme has an ambitious objective to further national and regional subcontracting exchanges in all the above countries. It is found that if strong national exchanges do not exist or are weak - which is the case - it will be impossible to move into international subcontracting unless the aim is simply the exchange of information between the countries, which seems to be the case as seen from the Brazil case. (As well as results of the in-depth evaluation of the Arab Programme).

The comments below result from a conversation with Mr. Oscar Vidal, presently in charge of the Subcontracting Exchange in SEBRAE São Paulo. He is rather new in SEBRAE so he has not participated in any of the committee meetings of the programme. However, Mr. Vidal was four years in ABIMAQ as an intern associated with the exchange and has only recently joined SEBRAE. Before Mr. Rogerio de Nadai (SEBRAE-SP) was in charge. He is the one who participated in the committee meetings. ABIMAQ and ABINEE seem to have retired institutionally from the exchange although individual associated enterprises are members.

The concept of subcontracting exchange is in Brazil connected with the so-called "business exchanges - bolsas de negócios" - which have a much wider scope than pure subcontracting. In SEBRAE-SP there has been for some time such a business exchange within which the subcontracting exchange operates.

In 1993 a Colombian expert by the name Juan Carlos Montes came to Brazil to install the subcontracting software (UNIDOSS). He returned several times. He visited metalworking enterprises (ABIMAQ associates), electrical and electronic (ABINEE associates), plastics and rubber enterprises and also diverse small and micro-enterprises through SEBRAE.

The software utilized was both not enough detailed and user friendly. The first problem was the language since it was in Spanish not mastered by many entrepreneurs. The classification of activities was too complex and at the same time using few information items. The software could not be used by multiple users and was limited to operation by one microcomputer. Another problem referred to the incapacity of covering sub-sectors like garment manufacture and consultancy services where a market exists. There were also problems in classifying the different operations available/needed.

As a consequence, they have abandoned the UNIDOSS system and developed their own which is also used by SEBRAE/MG. Furthermore, they plan to create a national network where state exchanges will be linked.

International subcontracting in Latin America seems not to function in a structured way. What exists is exchange of information on a personal basis between countries.

Relevance: The programme of subcontracting is as a whole relevant since it addresses a problem encountered in developing countries which is the lack of well functioning subcontracting exchanges and the lack of know-how to do so.

Effectiveness & Impact: In respect of Brazil the results are marginal since the system and approach sponsored by UNIDO have been abandoned in favour of a local design.

Sustainability: The exchange is functioning but not on UNIDOSS.

The above results relate only to the Brazilian component of the project.

MP/BRA/93/095

Preparatory Assistance for the Phase-out of CFCs in the Sector of Polymer Foams Manufacturing of Brazil (USD 150,000)
(ongoing)

As the name implies, the project aims at the preparation of project documents and detailed work programmes for the CFC phase-out in the foam sector. Due to insufficient demand in the sector, the scope of the project was enlarged to cover phasing-out of CFCs in general.

Theoretically the Government counterpart agency is IBAMA (Brazilian Institute for the Environment and Renewable Natural Resources) but this role has been assumed de facto by ABINEE (Association of Electrical Equipment Producers), ABIPEÇAS (Association of Automotive Components Manufacturers) and INP (Plastics National Institute). At the start of the project ABINEE invited interested companies and 2 have been retained: CALOI (for bicycle seats) and FRISOCAR (for automotive components). Only the latter was approved (under a MP project for USD 300,000) since CALOI has allegedly stopped the manufacture of seats using CFC-based foam and at any rate, had not shown sufficient interest in the assistance.

From the time that the project was prepared - May 1993 - the production of polymer foams in Brazil has undergone major changes. Polystyrene and Polyethylene are no longer used for foam production in Brazil and the use of polyurethane has diminished considerably.

As a consequence, the preparatory assistance was used to develop other projects in the following sectors:

- *industrial refrigeration*
- *domestic refrigeration*
- *solvents*

Among the projects developed the following can be mentioned:

- *ELGIN (see this project under MP/BRA/95/125)*
- *Multibras - servicing of refrigerators and foam* *USD 2-3 million*
- *Nippodenso - Fligor Servicing of air conditioners* *USD 300,000*
- *ABRAVA - Commercial refrigeration. Training of servicing personnel in retrofitting* *USD 364,000*
- *Electrofrio, Rechs and Plotter - Commercial refrigeration - change production - also with a foam component*
- *Prosdomo Svat - Production and servicing of refrigerators and freezers*

- *SICOM - compressors manufacture* *USD 966.500*

Relevance: The project is relevant since it serves the purpose of identifying projects for CFC phasing-out.

Efficiency: The project met its objective: preparation of the related project documents for most of them are approved or in the course of being approved.

Impact and Sustainability: Not applicable since it is a preparatory assistance.

Montreal Protocol Project
MP/BRA/95/125

Conversion of the Assembly of Refrigeration Compressors to phase out CFCs USD 520,180 (Starting 1995 with a five year duration) (ongoing)

The project aims at converting progressively compressors manufactured by ELGIN from CFC use to non-CFC use with a planned phasing out 89 Tons of ozone depleting substances per year.

In the developed world the conversion has been complete but in developing countries the conversion is being done in a progressive manner with the help of the Montreal Protocol.

The project started with a meeting called by ABINEE where the recipient company - ELGIN was the only one present. The two other companies in the compressor manufacture business in Brazil are multinational one of them with Brazilian capital.

There are still no mandatory requirements in Brazil to phase out CFCs but some final users (Pepsi, McDonald) demand this technology in the equipment they use. The legislation is expected to come into force around 2000. Until then the production of compressors without CFC use will be in line with market requirements while CFC technology will continue alongside until it is prohibited. The technology for the phasing out comes from Europe which is paid by the project as a one-off fee. Training is also supplied under the project. The National Agency dealing with the environment IBAMA in São Paulo does not seem to have much intervention in the project.

Relevance: The project is relevant since it will help a national manufacturer to phase out CFCs from their products. The question may be asked whether the company (a very dynamic private group) would not do it on their own, in face of mandatory legislation.

Efficiency }
Impact } *Too early to determine. The project just started but prospects are good.*
Sustainability }

ICS FELLOW

Alberto Dos Santos
CTA-Centro Técnico Aeroespacial
Instituto de Estudos Avançados
Divisão de Lasers

Professor Alberto dos Santos is a specialist in lasers and works for CTA - Aerospace Technical Centre, an entity of the Brazilian Government under the Ministry of Aeronautics. According to his views the use of lasers in chemistry is mainly oriented to methods of analysis and as an inducer of chemical reactions.

In 1993, he took part in two events promoted by ICS in Trieste, Italy:

- *Advanced International School of Exploration Geophysics International Course on Seismic for Hydrocarbon Exploration;*

- *Second Conference on lasers in Chemistry.*

The information about these events reached CTA through the releases and invitations sent at intervals by ICS to other organisms with regard to forthcoming courses and congresses.

All costs concerning Mr. dos Santos' travel and stay abroad have been borne by CNPq (National Scientific and Technological Development Council of Brazil).

Mr. dos Santos rates very high the level of these two events and his only criticism is related to the low participation of Latin American nationals, as compared to nationals coming mainly from Asian countries. Notwithstanding his sincere comment that he did not establish or keep professional links with other participants or the organizers he met in Trieste, Mr. dos Santos recognizes that the technical knowledge he assimilated during his stay with ICS are being useful in his professional activities in CTA.

ICGEB FELLOW

Marcelo Brochi
University of Campinas

Marcelo Brochi, a researcher in the Department of Microbiology and Immunology of the Institute of Biology of UNICAMP (Campinas University, in São Paulo State) was awarded in 1993 a fellowship by CNPq (Conselho Nacional de Desenvolvimento Científico e Technológico - National Scientific and Technological Development Council, an organism of the Brazilian Government).

With this fellowship, received through the RHAE Programme (Recursos Humanos Aplicados a Áreas Estratégicas, i.e. Human Resources Applied to Strategic Areas), Mr. Brochi could attend course in the ICGEB (International Centre for Genetic Engineering and Biotechnology) in Trieste, Italy.

After 1 year supported by the CNPq fellowship this could not be renewed, and ICGEB addressed to UNIDO a request for assistance, aiming at the extension of Mr. Brochi's stay. An extension of 14 months was granted in 1994 with UNIDO funds and Mr. Brochi is now back to his university, after 26 months in ICGEB where he worked on his thesis for a doctorate.

Mr. Brochi, who is now 27 years old, demonstrated a deep recognition to UNIDO for its support and is now publishing a thesis entitled "Mutant Toxin Gene LTK63 into Alternated Salmonella Strain", which is to be completed early 1996.

ICS FELLOW

Francisco P.T. Pessine
Professor for Photochemistry
Chemical Institute
University of Campinas

Conference: Utilization of lasers in chemistry (ICS sponsored)

Mr. Pessine attended the above conference (two weeks each) three times, in 1989, 1991 and 1993. He expects to return to the 1996 conference.

During the last visit, in addition to the Conference there was a two week workshop on Photochemistry. The conferences deal with the new advances in the theme. In Brazil there is no critical mass to discuss these subjects so the conferences are very useful for his academic curriculum and to keep him updated.

The use of the conference is essentially for academic purposes with little if any direct connection to industry.

The conferences have two components:

- *Speeches by top researchers;*
- *Presentation of research projects (papers) to get reviews.*

Mr. Pessine submitted the following papers:

"Time Resolved Spectroscopy of the lamellar compound KUO PO 3H O (KUP)"
"Optimization of a Box Car/Integrator Average System for Excited State Lifetime Measurements"

These papers were subsequently published in the magazine of the "Society for Applied Spectroscopy".

ICGEB FELLOW

Valeria Bevilacqua
University of Campinas
Department of Computer Science

Ms. Bevilacqua was awarded a fellowship in 1992 by the International Centre for Genetic Engineering and Biotechnology, Trieste, Italy.

Contacts established with the University of Campinas and a consultation to the University Register of Personnel were fruitless to find the present whereabouts of Ms. Bevilacqua.

Study Tour on Cassava Processing Equipment in Brazil
XA/RAF/92/615/31-01

Participant: ***Jules Tetka (Cameroon)***

The study tour of Mr. Tetka to Brazil included visits to the following entities, according to the registry of study tours undertaken in Brazil with UNIDO support:

- *DZ S.A. Engenharia, Equipamentos e Sistemas (an engineering firm and a manufacturer of equipment, particularly those destined to agribusiness, with special emphasis on sugar and alcohol production);*

- *Instituto de Pesquisas Tecnológicas do Estado de São Paulo S.A.-IPT (see this institution);*

- *Associação Brasileira para o Desenvolvimento das Indústrias de Base-ABDIB (The Brazilian Association for the Development of Capital Goods Industry).*

In spite of contacts established with the above entities envisaging to evaluate the results of the visit of Mr. Tetka, no traces of this visit could be identified. DZ engenharia informs that it is usual to receive visitors from abroad, but this visit particularly could not be tracked. According to Mr. Mauro Miranda, Commercial Manager of DZ, the visitor could have been received by a former affiliated DZ Trading Company that do no exist any more.

Study Tour on Essential Oils in Brazil
US/BOL/93/818/31-01

Participants: ***Jose Cabezas Escobar***
Felix Chavarria Chavarria
Emilio Mattos Aslla
(Bolivia)

This study tour is a consequence of previous contacts held by Mr. João Dierberger, who visited Bolivia as a consultant for a British research institute(he does not recall the name of this institution).

Mr. Dierberger owns a company that produces essential oils in Brazil. His company, Dierberger Óleos Essenciais SA, runs a distillery and a farm in Barra Bonita, interior of São Paulo State.

The visit of Mr. Dieberger to Bolivia aimed at the evaluation of two local distilleries already in operation. The strategic objective of these activities in Bolivia is the replacement of coca plantation for other agribusiness activities. As a result of this visit, two truck-loads of Brazilian seedlings cultivated by Dierberger were exported to Bolivia.

In 1994, the three specialists above designated came from Bolivia to visit Dierberger installations and to get acquainted with alternative cultures that could be introduced into Bolivia, instead of native species and menthe, that was already cultivated without much success. In addition to these contacts regarding essential oils they were also interested in banana cultivation methods, having visited banana plantations in a programme arranged by Mr. Dierberger himself. Since then no more contacts have been established by Dierberger with the visitors.

EVALUACIÓN DEL PROYECTO US/RLA/90/004

PROGRAMA REGIONAL DE MODERNIZACIÓN INDUSTRIAL DEL SECTOR DE BIENES DE CAPITAL EN AMÉRICA LATINA

PAÍS: ***Brasil***

1. DIRECTOR NACIONAL: Ingeniero Sérgio Darcy Munhoz

2. COORDINADOR TÉCNICO: Antonio Cantizani Filho

3. INSTITUCIÓN DE CONTRAPARTE: ABIMAQ - Associação Brasileira da Indústria de Máquinas e Equipamentos

4. RESUMEN DE LA SITUACIÓN ECONÓMICA EN EL PAÍS:

Durante el periodo en que transcurrió el Programa la situación económica en Brasil ha sufrido cambios importantes y pasado por sucesivos planes económicos orientados para la contención de la inflación.

La elevada deuda externa y las consecuencias de un régimen inflacionário que llegó a superar los 2000% al año generaron condiciones muy negativas para la industria de bienes de capital. Las inversiones extranjeras se mantuvieron en niveles muy bajos durante eses años al mismo tiempo que las inversiones gubernamentales se redujeron hasta la situación actual de una casi inexistencia. De otra parte en un régimen inflacionario tan agudizado la captación de inversiones internas privadas es casi imposible.

Diversos programas nacionales de obras fueron drasticamente reducidos o mismo cancelados, como la industria nuclear, la construcción naval, las obras de hidreléctricas etc. Esa reducción en las inversiones de base resultó en una disminución progresiva y intensa en las actividades de las empresas de bienes de capital.

Si bien que la cuestión de la deuda externa y la inflación estéan bajo control en los meses más recientes, el costo de ese control es una contención rigurosa del crédito y tasas de interés extremamente elevadas.

Se cree que el programa nacional de privatización, en curso, y un reanudamiento de las inversiones extranjeras propicien una recuperación de los niveles de consumo que favorezca las actividades industriales.

5 SITUACIÓN ECONÓMICA DE LAS EMPRESAS PARTICIPANTES:

Los reflejos de la situación macroeconómica sobre las actividades empresariales han tenido consecuencias positivas en lo que concerne la concienciación de los empresarios con respecto a los servicios ofertados por el Programa. Así es que la calidad de los productos y la estrategia empresarial son temas constantes en las preocupaciones de los empresarios. La

necesidad de sobrevivir obliga a reconsiderar lo métodos de trabajo y la eficiencia de los procesos productivos. La redución de los custos de mano de obra (un de los puntos críticos en el costeo de bienes producidos en Brasil) tiene generado importantes reducciones en el efectivo de personal empleado por las empresas. Los programas de reingeniería empresarial son muy divulgados y practicados por la mayoría de las empresas, teniendo como objetivo principal la reducción de costos para asegurar la supervivencia de la empresa.

6. PARTICIPACIÓN DE LAS EMPRESAS EN EL PROGRAMA:

La participación de las empresas en el Programa varió entre casos de extremo interés y casos de empresas que desistieron en el principio del Programa. De las ocho empresas que se interesaron por participar en el Programa en Brasil solamente cinco siguen participando. De esas, dos se manifestan muy satisfechas y las otras tres consideran el Programa razonable. Desde el principio del Programa hubo una desistencia. Otra más ocurrió por que la empresa ya se consideró satisfactoriamente habilitada en los temas ofrecidos.

Es oportuno registrar que en Brasil las empresas que participan del Programa practicamente no fueron seleccionadas entre otras más, puesto que los candidaturas no superaron las diez plazas disponibles.

Los puntos comunes observados en las varias empresas visitadas son la inquietud con el mercadeo, frente a la liberalización de las importaciones que posibilita el ingreso de productos más competitivos producidos en el exterior, y la necesidad de presentar niveles de calidad compatibles com las nuevas exigencias de competencia internacional, incluso la certificación en las normas ISO 9000.

7. OBSERVACIONES SOBRE EL PROGRAMA EN EL PAÍS:

El Programa en Brasil tuve como contraparte nacional un organismo con tradición en la gestión de proyectos de mejoramiento empresarial, que organiza cursos, patrocina conferencias y publicaciones técnicas, estimula los contactos de sus asociados con nuevas tecnologias y participa de eventos industriales y comerciales, particularmente ferias técnicas, en Brasil y el exterior. ABIMAQ tiene un total de 1100 empresas asociadas por todo Brasil.

Los expertos nacionales seleccionados por el Programa han tenido una muy buena acojida en las empresas y la opinión expresada por los empresarios encuestados ha sido positiva y prácticamente unánime con respecto a la calidad de los servicios rendidos por eses expertos. Es de considerar que eses expertos no pertenecen a una única entidad, como pasó con el Programa en otros paises, y son personas con experiencia directa en las actividades industriales.

Hubo una aceptación también muy favorable de los eventos internacionales organizados por el Programa, con mención especial para aquellos realizados en Suiza y Japón. El experto internacional Serge Widmer ha sido considerado muy bueno y capacitado por todos los empresarios que lo conoceran. El experto internacional en operaciones industriales (en principo Italiano) no llegó.

Las empresas consideran que hubo falta de sinergia entre ellas.

La distribución geográfica de las empresas participantes se concentró en la región metropolitana de São Paulo y en el Estado de Paraná (tres de las nueve empresas que partiparon efectivamente se localizan en Curitiba, capital de aquél Estado).

La continuidad del Programa se está asegurando a través del PROMAQ, Programa integrado de apoyo a la gestión tecnológica para las empresas asociadas de ABIMAQ, organizado por esa entidad.