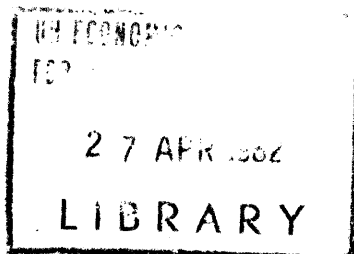




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THE EXPERIENCE OF THE ANDRAN COUNTRIES IN DESIGNING  
AND IMPLEMENTING POLICIES AIMING AT THE DEVELOPMENT  
OF INDIGENOUS ENGINEERING AND CONSULTING SERVICES

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\* The opinion expressed in this document are those of the author and do not necessarily reflect the views of the Junta del Acuerdo de Cartagena or those of the United Nations Economic Commission for Western Asia.

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## INTRODUCTION

The advancement of science and technology, in addition to the satisfaction of human inquisitiveness and the promotion of culture through the pursuit of knowledge, has meant the expansion of production frontiers to unprecedented levels and often resulted in significant changes of the structural characteristics of a country. Such changes are reflected not only in areas of production that satisfy the consumption, investment or overall social needs of a country but also in the political and economic power relations as well as the structure of ownership and control within a country and its interdependence with the rest of the world.

In this context the promotion of local scientific and technological activities, which includes, research and development, technical services, control over the acquisition of technology, education, etc. and all those interrelating factors, can have a critical role in the shaping of the development process. Hence, the planning, organization and execution of policies in this area constitute an important part of the overall effort directed towards the fulfillment of development objectives.

This paper will briefly describe the technology policy within the Andean Pact, the basis on which the member countries designed such policy and some of the instruments designed for its implementation; efforts will be made to show some of the important results obtained in the application of policy instruments with special regard to those aspects related to the development of indigenous engineering and consulting services. As an example of these results, one case study will be discussed in more detail.

I. PRINCIPLES AND BASES FOR THE DESIGN OF A TECHNOLOGY POLICY  
IN THE ANDEAN PACT

The formulation of the policy and the technology development strategy of the Andean Pact is based on the recognition of the importance which the possession of knowledge and the capacity of using it has for the development of the region as a whole and the member countries individually.

Here, it should be stressed that this capacity means the ability to make appropriate technological decisions that will influence the allocation of resources and the efficiency of production units and not only the technological infrastructure composed of different types of public and private institutions as well as human and financial resources, etc.

In general, in developing countries, decisions have frequently been taken without due consideration of their impact on the image of society or their effects in the short or medium term on different multidimensional aspects, specially non-economic ones (social, cultural, environmental) which characterized the living conditions of people.

Related to these decisions are the different technological alternatives which are not examined and which could be selected for a given project, such a project is usually created and designed as a function of an already predetermined technological solution.

This "poverty" of technology options, in a world which offers a huge amount of knowledge developed and accumulated throughout the years is one of the most dramatic characteristics of those countries whose underdevelopment is determined more by its relations of dependance, vulnerability and lack of autonomous power, in front of the developed world, than by absolute or relative indexes of its internal condition of access to goods and services.

The technology policy of the Andean Pact takes into consideration these aspects and is directed to enable its Member Countries to place at the disposal of their production sectors the expertise and personnel required for undertaking their own development. The bases which led to the formulation of a technology policy were laid upon several principles, amongst them: (1) principle of domestic policies; (2) principles on policies directed towards the outside world; (3) consideration of the specific scientific and technological activities; and (4) principles on industrial property, which will be discussed briefly below.

1. Principles on Domestic Policies

In terms of content as well as institutionally, policies on science and technology in the Andean countries were in the past often circumvented within certain narrowly defined limits. Institutionally, decision making and policy orientation on science and technology were to a great extent concentrated under the broader context of education and the corresponding ministerial structure.

Considering the need to promote a more direct linkage between science and technology with the productive activities, the production for policies on science and technology for the Andean countries were based on the recognition that the planning and execution of policies on science and technology should follow and contribute to the planning and execution of policies of global development. Institutionally as well as with respect to the content of allocation of resources and efforts such an orientation implied in various cases new mechanisms and approaches.

Furthermore, a second principle on domestic activities is related to the implications of the role of the supply oriented versus the demand focused policies for activities on science and technology. The former, in addition to institutional structures, refers to the availability of resources that enable the execution of corresponding projects. Supply orientation policies stem from practices of advanced countries which assume the existence of two critical prerequisites: defined government objectives with a capacity to execute them, and existence of firms or institutions whose business strategy is matched by the commitment and possibility of translating them into viable technological and commercial projects, the existence of which had a limited presence in the Andean countries. For this reason and the experience of the countries, a more precise demand focused policy was developed.

## 2. Principles on Policies Directed Towards the Outside World

The greatest part of technology utilized by developing countries is being imported, through various mechanisms, mostly from the advanced world. In the more dynamic technology-intensive sectors, foreign technological inputs often account for more than 90 per cent or 95 per cent of the know-how involved. The principal mechanisms of foreign originated technology include, among others, foreign direct investments, licensing agreements, equipment and semiprocessed imported intermediates. There exist three basic characteristics of the importation process of technology with distinct effects on the technological advancement of the host countries.

(a) The objectives of the technology suppliers are not technological but commercial. To the extent that the technological advancement of the host countries contributes to this commercial objective such advancement is reinforced.

At the same time, significant technology regarding effects can take place for the host countries as a direct result of these commercial interests. In the Andean Pact, the study of contracts relating to technology licensing revealed various forms of restrictive practices: prohibition of exports, tie-in clauses on inputs, etc. Some of them explicitly prohibited the utilization and hence restricted the inducement for developing competitive technologies while others restricted the production of similar goods with the same or alternative technologies.

(b) The specific properties of the technology market are such that they induce monopolistic structures not only in the sales of know-how but also in other markets affected by the traded technology. These monopolistic structures are the result of the compounded effects of the particular properties of technology as a commerciable unit.

Another property of the market of technology stems from the frequent incorporation of know-how in other inputs, such as equipment, intermediate products, factory designs, etc. The joint sale of more than one input in a package form results in non-competitive market structures for each one of such inputs. Generated phenomena of sequential monopoly involve implicit costs in terms of payments or foregone learning and production opportunities that could far exceed explicitly registered costs, such as royalty payments.

Also, the market for technology refers to the great difference in marginal costs confronting a seller for an already developed know-how and a buyer for the development of an alternative one. Given other opportunities of purchase and sale, a market, in which prices are settled between such marginal cost considerations on the part of the participants, behaves on the basis of crude bargaining power with resulting monopoly rents.

Recognizing the significance of the above mentioned characteristics for the importation of technology, policy formulation was based on an understanding of the process of "commercialization of technology". The latter signalled out technology as a commerciable entity with a particular market structure and properties characterizing buyers and sellers as well as the particular institutional framework within which technology is being traded.

(c) Technologically, the importation of know-how in the Andean countries often approximated the turn-key type of purchases. In addition to process know-how, which constitutes the modular aspects of a particular technology, other forms of technological requirements, those called peripheral, are also imported in a package. The former, includes, among others, process engineering, plant and lay-out design, construction know-how, equipment specifications and design, production arrangements, product specifications and packaging, etc. These technological requirements need not and often are not specific to a process or industry. Rather, they include elements of knowledge common to various projects and sectors. Thus, once developed and mastered in a particular country they can serve multiple activities.

Furthermore, the skilled manpower utilization in the "peripheral" industry non-specific, yet work specific, technologies for the application of an already developed process know-how often constitutes the bulk of employment requirements.

Finally, interdisciplinary development of peripheral technologies enables not only the production and commercial utilization of modular know-how, it also constitutes an important prerequisite for the adequate understanding of the imported "modular" know-how, thus reducing external dependence over time. In addition, it

constitutes one of the infrastructural elements that prompt the development and commercial exploitation of new technologies. It is through the full understanding of such a process that imported technology can truly be assimilated in the receiving country.

Given the importance of the above considerations, the policy proposals presented to the Andean Pact countries included a program of actions directed towards the process of "unpackaging of imported technology", that is, the itemization and grouping into separate categories of the diverse technical, economical, financial and commercial elements that jointly form the package of imported know-how.

### 3. The Diversity of Scientific and Technological Activities

Traditional thinking on policies in science and technology usually circumvents the area of required activities to that of research and development (R & D). It is well known that both research as well as development imply a series of activities that start from basic non-oriented research and end in specific product or process improvements. Despite its complexity, R & D do not include a lot of other activities all of which are conducive to scientific and technological advancement. Their explicit consideration and the prescription of required supportive policies constituted part of the overall strategy in this area. Their understanding was of particular importance for the Andean countries given the level of their technological advancement at the time. Amongst these activities, there was recognition of:

- Activities which included different forms of international search, evaluation, assesment and assimilation of know-how, technology, etc.
- activities which included a host of scientific and technological efforts that attempt to modify existing know-how so as to fit more adequately local resources or inputs, competitive capacities, market sizes and structures;
  - activities of R & D which referred to the creation of knowledge as well as the development of new products and/or processes;
  - activities in training



which included both institution building to manage and promote scientific and technological development as well as creation of human capital, basically through training in undertaking activities in science and technology.

4. Principles on Industrial Property

Practically the totality of patents in the Andean countries were foreign-owned and as such they did not have any direct relationship with domestic inventive activities. Since most of these patents were owned by large foreign corporations their implications were directly related to the overall business policies of these firms, furthermore, patents were aimed at market segmentation through cross licensing and monopoly control. The monopoly privileges enjoyed through patents constituted one of the main factors blocking the market conditions which stimulate foreign investments in the Andean countries. When foreign investments take place, patents serve as an effective vehicle for the acquisition of nationally owned firms.

Far from constitution a vehicle of technology transfer, patents appeared to hinder the flow of technology as well as to restrict local technological advancement through imitation and adaptation. The function of patents in technology contracts appeared to be more related to the achievement of restrictive business practices. Such practices, most probably, would not have been achieved under a more competitive technology market or under the applications of antimonopoly legislation without the limitations imposed by patents. For the Andean countries the licensing of patent constituted import permits given under certain restrictive conditions.

Finally, the legal structure of the presently existing patent system in developing countries is built upon arbitrary economic foundations which adversely affect the interests of such nations. From this structure, among others, a legal concept of "ownership" has been developed in ideas or innovations, exercised through artificially created monopoly privileges.

Therefore, policy formulation in the Andean Pact, took into account such factors and attempted to overcome the negative aspects which the traditional patent system could have on the development process.

## II. TECHNOLOGY POLICY AND INSTRUMENTS IN THE ANDEAN PACT

### 1. National Experience

Due to the fact that the science and technology variables affect many activities, all Member Countries of the Andean Pact (Bolivia, Colombia, Ecuador, Peru and Venezuela), have considered incorporating it as part of their governmental policies.

A very general analysis of the state of development in science and technology in the countries, shows that all of them have created institutional arrangements at different levels, and embarked on the planning and formulation of policies; co-ordination and execution of science and technology activities; control and services. All have formulated national plans for the development of science and technology and assigned resources to them and some have created special financial mechanisms.

The impact of all this effort on the development process cannot be easily quantified, although it is recognized that it is still not large enough to influence a substantive change which is needed to produce a sustained and balanced development.

### 2. Subregional Policy

The policy and the technological development strategy of the Andean Pact are contained at present in three Decisions of the Commission of the Andean Pact. These are: Decision 24 "Common Regime to the Foreign Investment and of Trademarks, Patents, Licences and Royalties"<sup>1/</sup>, Decision 84 "Bases for a Subregional Technology Policy"<sup>2/</sup> and Decision 85 "Procedures for the Application of Norms of Industrial Property"<sup>3/</sup>, oriented to reinforce, create and develop the technological infrastructure and the technological capacity of the member countries.

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<sup>1/</sup> Approved at the Third Period of Extraordinary Sessions of the Commission of the Cartagena Agreement. December 14-31, 1970.

<sup>2/</sup> Approved at the Thirteenth Period of Extraordinary Sessions of the Commission of the Cartagena Agreement. 22 May - 5 June 1974.

<sup>3/</sup> Approved at the same sessions as above.

In order to attain the goals set forth in the Andean Pact, these legal instruments, which are binding to the countries, are oriented to act principally upon the import of technology and the development of the local capacity to assimilate, and generate knowledge, through the formation of personnel, the constitution of working groups and the insertion of results and practices in national development plans. The rise of these instruments are meant to produce valid alternatives facing foreign offers and to generate demand for a national capacity for the production of capital end consumption goods, as well as services.

A brief description of these Decisions is given below:

(a) Control over the commercialization of technology (Decision 24)

In December 1970 the Commission of the Andean Pact adopted a policy which, through legislative procedures as well as institution building, regulates the mechanism of technology acquisition. This technology policy was rightly presented jointly and in accordance with the overall philosophy and procedures which govern foreign direct investments. This is so because a large part of the contractually obtained know-how took place through foreign owned companies.

An evaluation of these broader economic issues and their underlying political positions necessitate much more elaboration than it can be made in the present paper. Thus, here, a brief description is given of the scope of policies that are explicitly directed towards technology, acknowledging that their understanding necessitate a broader comprehension of other interrelated political and economic phenomena.

(i) Institutional Structure for the Importation of Technology

Article 6 of Decision No. 24 refers to the creation of competent government agencies which, in each one of the countries, will regulate and execute all relevant policies concerning technology imports together with policies on foreign investment.

These government agencies are authorized, through Article 28, to evaluate and approve all contracts of technology commercialization and those related to the licensing of industrial property privileges (patents, trademarks, industrial models and designs, etc.). Thus, it

enables the government to strengthen and complement the bargaining power of the locally-owned firms through means for approving the access of foreign technology to the local market. The government position in these negotiations reflects the overall national interests with respect to technology contracts included between foreign owned subsidiaries and their mother companies. In the process of negotiations, as indicated by Article 19, imported technology is broken up into various elements, in order to evaluate the contractual value of each element or groups of them.

(ii) The Management of Technology Commercialization

The importation of intermediate products and capital goods in the commercialization of technology and foreign direct investments were identified as a key element within the overall procedures of present industrialization programs. As formulated in Paragraph (c) Article 6, the Andean countries were to establish an information and control system that attempts to bring the prices of such imports within acceptable ranges close to the international market prices. In so doing, monopolistic structures, resulting from the joint transfer of products tied to technology and/or capital imports, are regulated. As far as nationally owned firms are concerned, these provisions apply to standardized imported products, and therefore have important bargaining effects by excluding prices of such imports from the negotiable terms. For highly differentiated products lacking quotations in other markets, progressive national participation in the ownership of foreign companies could, through intra-company bargaining, achieve similar results.

Importation of know-how, according to Article 21, is compensated by payment of royalties from nationally owned firms to their foreign licensors and by increasing the profitability of foreign owned subsidiaries in the Andean countries. As such, capitalization of imported know-how is not permitted.

As far as foreign owned subsidiaries are concerned, know-how capitalization was leading, among others, to domestic tax reductions through depreciation "charges" on intangibles as well as capital repatriation claims. Thus, in the latter case, capitalization of technology was constituting a depletion of the capital of the host country through repatriation of "investments" rather than a contribution to capital formation.

In addition, Article 21 does not permit the payment of royalties from a subsidiary to its parent or its affiliates. Such a policy, which is also applied in various other nations, stems from the principle that the effect of technological inputs in a foreign owned subsidiary should be reflected in its declared profitability rather than being transferred to another country's tax jurisdiction. In order to increase the information available on technology commercialization and, thus, enhance the bargaining power of the recipient countries as well as improve the conditions of its use, Article 48 establishes a permanent system for the exchange of information and Articles 20 and 25 establish for the first time in the Andean Pact a legal base to deal with restrictive business practices that result from the purchase of technology and licensing of patents and trademarks. Export restrictions, tie-in arrangements, control of size and structure of production, hiring personnel, usage of alternative technologies, etc. are regulated by the above articles. The absence of overall and comprehensive anti-monopoly legislation which, among others, results from the lack of adequate analysis on the effects of monopoly and economic concentration in developing countries (whose markets' size often conduces to monopoly) necessitate specific legislation directed towards restrictive business practices in the sale of technology.

Finally, Article 51 establishes the important principle that any controversy or conflict in the purchase of technology or in foreign direct investments should be treated under the jurisdiction and competence of the national laws of the host country.

(b) Bases for a Subregional Technology Policy (Decision 84)

Decision 84 was approved in 1974 and it contains the principles for a subregional technology policy. The instrument is oriented towards the improvement of the technological capacity and infrastructure for development and creating the conditions for a proper management of the technology factor in the subregion.

These basic objectives are approached by the establishment of goals and the implementation and execution of specific projects.

The substantive elements in Decision 84 can be divided into several components:

- (i) Import and assimilation of technology. Besides the provisions of Decision 24, the requests for the import of technology are considered taking into account the effects on the local creation of demand for the scientific and technological activities, the effects of technology in employment, its contribution to development plans and their effect on the environment.
- (ii) Assimilation and generation of technology. Besides the creation of stimulus to secure a demand for research results and to give preference in comparable circumstances to consulting firms in all member countries, Decision 84, calls for the creation of financing systems or risk capitals to finance expenses required by technology activities.
- (iii) Support to the joint Programming. Seen in the perspective of the vital relationship which must exist between the industrial programming of the Andean Pact and the technological development, Decision 84 proposes that in any of the present Industrial Sectoral Development Programmes, which covers the automotive, metal-mechanic, petro-chemical sectors the demand for science and technology activities be considered.

(iv) Financing. From the point of view of financing, Decision 84 calls for the countries to negotiate, within the Andean Finance Corporation (Corporation Andina de Fomento) the adoption of means and ways to secure the active participation of such an organization in the activities derived from the common technology policy.

(v) Instruments. The strategy approved by Decision 84 has as its main instruments:

- Technology unpackaging; - International search for technology;
- Classified inventories; - Andean projects for technological development; - Subregional Information System. In this paper the Andean Projects for Technological Development and the Technology Unpacking Programme will be described in detail in the next chapter, as they are closely related to the development of engineering and consulting services in the subregion.

(c) Control over the Possession of Knowledge (Industrial Property- Decision 85)

The third instrument used in the technology policy of the Andean Pact is Decision 85 related to industrial property. This Decision provides the legal framework within which the problems derived from old patent and trademark laws, based on criteria of developed countries, can be overcome.

In general, this instrument establishes the prohibition to grant patents for certain products and reserves the right of each country to prohibit patent granting in strategic areas. It introduces the idea of "conditional patent" (the country can grant a patent under exploitation conditions), and, it is explicitly established that the patent does not grant the exclusive right to import the patented product or the fabrication of the patented process.

The Decision adopts the principle of the termination of patent rights by lack of exploitation and incorporates the principle of the "compulsory licence". In this way, Decision 85 establishes a patenting system that, on the one hand recognizes the rights of the patentee and on the other surpasses the negative effects derived from the technological dependence or those produced in the economics of the countries with traditional legislation. Also, this instrument is structured in such a way as to complement Decision 24 and 84.

### III. POLICY INSTRUMENTS, THEIR APPLICATION AND RESULTS

Amongst the instruments designed in the adopted policy, there are two which as mentioned earlier, are closely related to the development of engineering and consulting services; the Andean Projects for Technological Development (PADT) and the Technology Unpackaging Programme. These will be described here, and one experience will be analyzed in more detail to show the results obtained by the application of one of the above mentioned instruments.

It should be mentioned however, that while the instruments to be described are means by which engineering and consulting services are developed, other applications of Decisions 24, 84 and 85 also lead to this end, as have been shown by the experience of the last five years. Also, special mention should be made of the Andean System for Technological Information, approved by Decision 154 in 1980, as a way to increase and strengthen the institutions responsible for the application of policy decisions and instruments.

#### 1. Technology unpackaging and inventories

Of specific relevance to the "building up of engineering and consulting services", the programme of "Unpackaging and Inventories" was developed. It is directed towards the achievement of the following basic objectives; strengthen the capacity of analysis and execution of industrial projects; improve the condition of purchase and negotiation of goods and services; identify systematically the necessary resources for a given project and allow to the fullest possible extent the participation of the local capacity for the production of goods, technologies, engineering and consulting services.

The activities involved in this programme cover different phases in the formulation of projects, right from its conceptualization to determine the technical and economic feasibility, its goals, alternatives, human resources needs and other relevant information for its development, conducive to a stage ready to look for financing.



It involves the search for information needed not only from the financial point of view but also that which will be used by the prospective investor and the public or private enterprise which will carry it out. In this way, decision makers have an important basis on which to determine the validity of a given project from different points of view.

In the financial aspects, the purpose of the programmes is to develop analytical methods on alternatives, breaking up **conditions linked with financial operations**. In the analysis, particular emphasis is placed on the local purchase of contracting capital goods and services for the purpose of establishing and proposing mechanisms for use of the subregional capacity, in order to provide a much needed capability to compete with foreign suppliers.

In order to select sources of financing for a given project, the methods that can be developed in this programme can allow to identify and analyse the conditions offered by these sources and the alternatives related to various factors involved in the financial procedures such as, means of payment, interests, commissions, etc. A similar procedure can also be developed for an analysis of the work capital.

With the quantified knowledge of the conditions, the unpackaging method permits the identification of conditions under which technology is purchased (control over the production volume, market restrictions, royalties, etc.); purchase of equipment; consulting services and technical assistance; condition for sales. Conceived in this way, unpackaging permits also an analysis of the capacity of the purchaser to obtain a loan or his access to one.

The implementation phase includes all activities which aim at materializing the project both financially and technologically. Related to activities mentioned, the method also permits an analysis of the commercial phase, networks and channels of distribution. In this way, this phase involves a procedure which covers the preparation of a given product for its introduction to the consumer, and consider the market conditions, including, pricing policies, quality standards, etc.

To implement this instrument, the Andean Pact has already produced a "Basic Model for Technology Unpacking" whose use is directed towards different national enterprises. This model has been structured around a practical working method to unpackage petrochemical projects in their implementation stage.

Also, an inventory of the installed infrastructure for the production of capital goods has been completed. This inventory covers again the petrochemical area.

Even though the programme has been designed for one industrial sector it is applicable with some modifications to other areas. In particular, work has already started to apply the model to mining and other industrial activities.

## 2. Andean Projects for Technological Development (PADTs)

The common technology policy adopted by the Andean countries introduced the Projects for Technological Development (PADTs) as an instrument whereby multinational projects could be planned, organized and executed. The overall objectives pursued by such projects include:

- The attempt to demonstrate that investment in science and technology activities has relatively high pay-offs within short periods of time if projects are adequately organized, administered and executed.
- The intention to create through such projects a scientific and technological capacity and infrastructure including the engineering and consulting services, and, in particular, to generate knowledge and ensure its utilizations and,
- the determination to undertake scientific and technological activities which directly contribute to the development goals and objectives of the member countries.

The results so far obtained show that this policy instrument is one of the most relevant for the fulfillment of development objectives, technology development and the creation or strengthening of engineering and consulting services.

As opposed to technical collaborations schemes, programmes of technical assistance or exchange of scientific and technological information, such projects are distinguished by a set of specific characteristics, some of which will be discussed here in some detail.

(a) The Presence of the Andean Pact

It is convenient first to try to establish whether the projects undertaken and the results obtained have been due to the presence of the Andean Pact or could have been carried out for example under a bilateral, multilateral basis or under some broader programme of an international or regional organization.

To answer this question, it is important to understand how projects of this nature are adopted and executed under the Cartagena Agreement (which instruments the Andean Pact).

All Decisions taken by the Commission are incorporated into the legislation of the member countries (by virtue of the Treaty instituting the Pact). In this way, even Decisions which establish projects such as the PADTs, and do not change the legal framework of the country, are strongly enforced by the participating governments in any given project, once they are approved.

Hence, the identification and preparation of any project leading to the adoption of a Decision is by itself a major undertaking. (This aspect will be further developed later on). These activities characterize the projects in contrast to the way other projects are developed under programmes of technical assistance or by bilateral or multilateral agreements. In the case of the Andean countries the projects have been the results of intentions drawn up as political or diplomatic instruments, and the results, when they were put into effect, have not always produced a major impact on the development process.

The second consideration regarding the need of the Pact for the development of common projects, involves the presence of a technical secretariat (absent in other bilateral or multilateral agreements) acting as a co-ordinator from both the technical and administrative points of view. This body is able by virtue of its creation under the Cartagena Agreement to ensure the collective interests of the subregion, as well as the successful and prompt completion of the projects undertaken.

Furthermore, PADTs have so far required external financial support, the proper and adequate management, control and administration of allocated resources by the Technical Secretariat. It has also proven to be an efficient and effective way to obtain such resources and redistributing them among the participating institutions according to well established work plans and chronograms.





(b) Identification of Problem Areas

One of the successes so far obtained in the development of technology projects within the Andean Pact is due to their proper selection; in effect, the preparation and approval of projects are in conformity with the decision-making mechanism and related to the bodies that are established by the Cartagena Agreement.

The adopted selection process has been to analyze development plans, identify problem areas in the productive or social sector, and in order to give the programmes a subregional character, choose those areas of common interest.

Here, it is of interest to point out the different mechanisms in existence within the Pact, which permit an important exchange of ideas and which establish a permanent communication among the member countries and the Technical Secretariat. These mechanisms are among others:

- The Andean Planning Council; - The Andean Agriculture Council; - The Andean Infrastructure Council; - The Socio-Economic Council, and five autonomous bodies, the Andres Bello Agreement (Science, Culture and Education); The Hipolito Unanue Agreement (Health); The Simon Rodriguez Agreement (Labor); The Andean Financial Corporations and The Andean Reserve Fund.

In addition, there are other bodies which participate in orienting or implementing the integration process. These are: The Andean Council (Foreign Ministers); The Andean Court of Justice and the Andean Parliament are important elements.

Therefore, the Technical Secretariat, in continuous communication with these bodies and following the general objectives of the Pact as signalled out in the Cartagena Agreement, is able to select projects whose objectives are to solve problems in areas of immediate interest to the development process of the countries involved.

(c) Establishment of Projects (Planning Phase)

One of the most important activities undertaken after the selection of a problem area is the formulation stage of the specific projects. Here, there are several steps which are carried out, the most relevant being:

- The recognition in each member country of the existing institutions and human infrastructure concerned with the treatment of the selected problem area.
- An extensive programme (undertaken by the Technical Secretariat) of contacts with the identified institutions. This programme usually consists of visits to the countries by a person in the Secretariat in charge of the project.
- The preparation of a document covering all interests shown by the countries, including the identification of needs, plans, programmes, policies, legal aspects, etc.
- The selection of those areas of common interest and discussion of their bearing on the technological development aspects.
- The selection of areas of particular interest to a single country and the study of the possibilities of ~~accommodating~~ those into the general framework of the project.
- This selection which usually includes areas of processes, engineering, marketing, etc. permit the detection of imperfections in the productive sector which lead the way to the identification of new projects, and the structuring of new policies. For this reason, once a programme or project is executed, the results obtained experience gained coupled with the improvement of the productive sector itself, serve to guide the different countries in the adoption of internal decisions for the formulation of policies at the sectoral level.
- During the design stage of a project, an important result obtained before the execution is the establishment of co-ordination of activities not only among the participating countries but also within them.

This is due to the fact that in the initial phases, one institution in the country is recognized as the responsible agency for the preparation and is requested to call upon all other national organizations to contribute to the planning stage.

- The phase relating to the planning and design of a specific project, apart from its execution, has become one of the most important instruments of technical co-operation among the countries concerned.
- The formulation stage of such projects constitute an important activity through which technological needs are identified. It also permits the selection of the most important ones for which solutions should be formed.

This shows the importance of having strong engineering and consulting firms at the design stage. It should also be mentioned, that it is during this stage of the projects preparation, that the technical teams start to interact with decision makers and they themselves take active part in the design of the general and sometimes particular aspects of the projects. This participation is of particular importance because the compromises made at this early stage by the countries and their governments guarantee a successful completion of the projects and of their execution.

Thus, the ultimate power regarding the selection of areas of interest for such projects rests on the political leaders and official representatives of the Andean countries. In this way, projects are directed towards the solution of such scientific and technological issues that are conducive to the social and economic advancement of the subregion.

(d) Design Phase

It is when the general coverage of the project and the area it will deal with are decided upon and the linkages of the project with other sectors are established that the design phase commences.



It should be stressed that all projects within the Andean Pact are designed by experts of the member countries. Also, consulting services of firms or individuals are obtained locally, and only under certain special circumstances they are obtained from outside the subregion. In this manner, the local consulting firm or independent consultants have the chance to be involved and hence to accumulate **additional** skills and improve their capacities.

One important stage in this phase is that related to the gathering of available information on the areas selected for the projects. As these are designed to improve the technological capacity, the projects should pave the way for the selection during the design phase of all technological alternatives. These are incorporated into the projects and so they do not contain an already predetermined technological solution, as the case is in many other projects developed in the past.

This activity also helps to enhance the capacity of the local consultants or engineering firms participating in the design phase of the project. As is the case of public or private enterprises in most developing countries, these have permanently lacked research and development departments as well as organized groups dealing with the development of indigenous engineering or consulting capabilities. Most of the technology incorporated into their production lines was purchased from abroad. Furthermore, consulting services were usually carried out by foreign firms. Under the Andean Pact the design phase of projects is helping to improve this situation.

One particular aspect in the design phase refers to the type of activities which should be examined in the projects. These activities will depend among other things on the existing institutions or on the needs of creating new ones in a particular country. So far, projects have been designed so as to use local capacity and create, only as needed, new institutions. However, with the exception of one case, the creation of new institutions have meant the establishment of a subregional centre and the objectives have always been to reinforce and create a local national capacity.

It may be instructive to comment briefly on the experience of regional centres against strong national centres well co-ordinated and above all well connected, (for which there is a need of some kind of a co-ordination system). In the case of the Arlean Group this has been made possible by the existence of a Technical Secretariat under the Pact.

One very common (and a few times valid) argument for establishing regional centres is that, among developing countries in particular, much effort is made in duplicating activities which would be made more efficient by "pooling" the existing limited resources, people and experience.

The existence of such common centres are of course of value, but only when a country is already technologically developed and can make an important contribution to the objectives pursued by those common facilities.

In the case of scientific activities, it is important to have permanent joint centres, designed to create an atmosphere for the exchange of ideas on research activities and to put in contact scientists of developing countries. An excellent example of this is the International Centre for Theoretical Physics in Trieste, Italy.

However, the generation of technology and its use in the production sections of a country is altogether a different matter. Only when the technology to be developed is highly sophisticated or expensive (i.e. space programme, satellites, etc.) it may be convenient to make an effort towards centralization, but for technologies which can be made available, developed or copied are generated, it is of importance to have national centres, which will then act as motivators of technology development. These centres will perform using permanently installed capacities, in particular engineering and consulting services, a function not easily rendered by a regional centre (sometimes hundreds of miles away, managed by specialists of other countries and to which only few selected countries have access to, for education, training or research).

One of the keys to technology development is the participation of the whole community in the design and execution of activities. This can be obtained essentially in strong national centres. The process of technology development is quite different from that of science development.

International technology co-operation is important, but the efforts should be endogenous. This is one of the reasons why the Andean group orients its efforts towards the establishment of national centres, based on open co-operation, and also to the establishment of world mechanisms which facilitate access to the flow of know how or technology (codes of conduct, control and regulation of foreign investment, patents and so on).

For achieving technology development, it is probably better to establish multinational mechanism such as "regional technology enterprises" the costs to which are shared by local enterprises (of sectoral nature). The Andean Pact provides for the existence of such mechanisms (Decision 46). In general, it should be noted that both science and technology development are made possible only through competition and excellence, and this can only be made possible by having strong and locally supported national centres.

The PADT scheme is of value because it incorporates, - local needs, - local objectives, - local people, - local planning. PADTs are for the reasons stated earlier not small projects but large ones, involving substantial effort and resources. Small catalyzing funds are of value to bring about awareness concerning problem areas but do not help to achieve a final solution.

What is needed for this endeavour are resources. To this end, several industrial countries and groups of countries are beginning to understand these principles and co-operating towards attaining the declared goals and objectives.

(e) Execution of Projects

Once a project is approved by the Commission, it would be immediately carried out. The participating countries appoint national heads of the project. These together with a co-ordinator appointed by the Technical Secretariat would constitute the "Contracting Committee". The main responsibility of the latter is to orient, conduct and evaluate the project at all stages of its development.

It is important to note that, contrary to other co-operative arrangements, here the countries themselves which take on the responsibility not only for the implementation of the project but for its administration too.

The administration of course would be facilitated when the funds allotted to the project are clearly identified in the national or institutional budgets and by flexibility when funds are obtained from international donors.

It is also important to note that at all phases the projects are implemented by the participating countries, and not by the Technical secretariat in a centralized way.

(f) Efforts and Costs

It can be seen that great efforts would be needed, involved in the identification, design and execution of projects.

Due to the fact that a formal Decision must be taken in order to implement a given project, the phases leading to it have been rather long so far, and should be reduced in the future. The following table shows the time and cost of the preparation and the execution phases involved in some of the projects which are under execution or are planned for the near future.

Table 1

Programme (PADT)	<u>Copper</u>	<u>Woods</u>		<u>Foods</u>	<u>Coal</u>	<u>Rural</u>
		<u>I phase</u>	<u>II Phase</u>			
A. Time (months)						
i. Preparation and design	36	36	12	30	42	36
ii. Execution	60	48	36	36	48	42
B. Preparation (design cost) (thousands of US \$)						
i. personnel	54	85	24	60	84	72
ii. travel	20	24	10	54	45	25
iii. administration and services	36	40	15	25	36	20
C. Execution Costs (million US \$)	1.6	2.5	5.4	6.6	10.5	7.7
Cost covered by countries	35%	60%	46%	45%	49%	52%
International Co-operation	65%	40%	54%	55%	51%	48%

DATE  
PAGE

It should be stressed that the projects undertaken so far have an international component. This component has been provided in the most flexible way and for direct administration of the Technical Secretariat. This is probably one of the reasons why the projects have been quite successful, as they can be managed and administered by the people directly involved in the execution and who well understand the conditions under which they are being implemented in the countries.

This situation is quite different from other schemes when project directors are appointed, who tend to be new to the environment in which they will work or who receive a large share, together with experts or consultants of the budget allocated to the project.

Also, the solutions to the problems of a given country usually do not "accept" universal formulas or variations. This may be a reason why so many costly projects which are undertaken in many countries, are managed and implemented by foreign experts and do not have an impact proportionate with the volume of investment.

This should not be taken to imply that international co-operation is not needed. In fact the Andean Pact countries firmly believe that international co-operation provides an additional support for a strong national effort and commitment.

This has an important bearing on the creation and strengthening of local engineering and consulting firms, because in the traditional technical and economic co-operation agreements, local firms are rarely made use of, except may be through a forced association with a foreign firm. And in most such cases, local consultants have served only to provide information not to assimilate know how from foreign partners.

Although the present projects for Technological Development with the Andean Pact aims at improving the engineering capacity already installed in the participating institutions, it can be foreseen that the local consulting services will also participate in the future of the benefits provided by these instruments.

In any case, the methodology developed with the PADTS or the Unpacking Programme, have already provided elements which are of importance to the local consulting firms. But they should also allow further specialization so that new labor markets are opened for specialists in different areas.

It should also be mentioned, that the PADTs in connection with other programmes within the Andean Pact (such as the industrial programming), will provide a much better basis for the improvement of the local engineering and consulting services.

3. The Andean Project for Technological Development in Copper  
A case Study

As an example of the application of the PADTs as a policy instrument, some of the results obtained in one of the projects is described below.

In 1974 the Commission of the Cartagena Agreement, approved through Decisions 86 and 87 the PADT-Copper, whose main objectives were to allow the participating countries (Peru and Bolivia), to assimilate, adapt, and generate technologies related to the hydrometallurgy of copper, through the training of personnel and the implementation of R & D subprogrammes to be carried out from the laboratory stage up to the operation of pilot and industrial plants, including the structuring of pre-feasibility and feasibility projects.

The specific goals of the programmes were directed towards the treatment and recuperation of copper contained as a marginal mineral in left overs produced as a consequence of mining activities of larger copper and tin deposits.

The PADT-Copper was divided into three subprojects:

- treatment of oxide copper minerals by leaching and cementation with scrap iron.
- acid or bacterial leaching of marginal minerals in piles or dumps.
- recuperation of copper from copper sulfate solutions by ionic exchange - electrodeposition.

The execution of this project started in 1975, and the results obtained can be summarized as follows:

(a) A number of multidisciplinary groups have been trained in the existing laboratories in the countries. These groups have reached a very high standard in the managing of techniques in hydrometallurgy. Also, new facilities have been created in the laboratories, permitting original research and development activities. A total of 58 people has been trained both in Peru and Bolivia. Here it should be noted that this number corresponds to the so called "critical mass", which permits a country to count on an ample base of human resources for the appropriate execution of industrial projects.

The training programme has consisted of seminars, visits to other facilities in and out of the subregion, the presence of international experts and the exchange of personnel.

It should be noted that this intense training programme was successful due to the fact that the planning stage had carefully drawn up the programmes, the national organizations were able to fill in the gaps left by the personnel when it was absent from their duties, sometimes for extended periods of time.

Also, the type of programme designed allowed the trainees to readily make use of the experience acquired in their organizations.

(b) Eight pilot piles and dumps were constructed in Peru, where about 150,000 metric tons of marginal minerals were accumulated with about 0.5 per cent copper content. The application of the developed technique of bacterial leaching has permitted the extraction of 80 per cent of the copper contained in those wastes.

Also, with this unit several parameters related to the leaching technique have been evaluated. Actually, with the pile operations, the mean flux of solution is of the order of 800 liters per minute with a mean copper content of 0.7 grams per liter.

(c) Construction of a copper cementation plant with scrap iron with a production capacity of 16 metric tons per month of copper cement, and in which by 1980, 350 metric tons of copper cement have been recuperated, ready to be shipped to the smelting plant of La Oroya, Peru.

(d) Design of industrial piles for the efficient use of copper contained in mine waters which is generated in the order of 6,000 to 12,000 liters, by underground mining activities. The piles will operate in closed circuits with ionic exchange - electrodeposition processes to produce 18 metric tons per day of cathode copper (99.9 per cent pure). Further, by the time the leaching technique is applied (1980) it is expected that in the piles, 1,200,000 metric tons of marginal minerals will be accumulated, by 1981 the total volume of this marginal minerals is expected to reach 25,000,000 metric tons.

(e) Design and financing of the Corocoro project in Bolivia to treat 600 metric tons per day of mixed copper minerals of 2 per cent grade which will yield 2450 metric tons per year of cathode copper, 1,050 metric tons of copper sulfate, 2,100 metric tons of copper concentrates and 500 gr/metric ton treated, of silver.

(f) Pilot trials of the use of the leaching technique on marginal minerals in piles or dumps in closed circuit with a Krupp plant of ionic exchange electrodeposition, to produce 14 metric tons of cathode copper per year.

(g) Conclusions of a polymetalurgy pre-feasibility project in Bolivia which includes the processing of 750 metric tons of wastes with tin, copper and silver content. The treatment of these wastes should allow the production of 100 metric tons/year of tin pre-concentrates, 3 metric ton/year of crystalized copper sulfate, a 56 kg of metallic silver per year.

(h) Initiation of a new study in southern Bolivia for the treatment of marginal minerals, with a deposit of 6.170.822 metric tons of tin, copper and silver content. The plant will consist of a floatation and leaching capacity for a volume of 1.000 metric tons/day. The feasibility project is being financed by the Pre-Investment Institute and the Andean Financial Corporation.



(i) The structuring of a technical Co-operation and Services System within the PADT, which involves the creation of a new institution acting as an engineering and consulting firm in the subregion (this firm is not yet operational but should be ready to start in 1981).

It should be mentioned, that several mining companies in Peru and Bolivia, and also in other Andean countries have already requested to participate in the results of this project and in particular to licence the technology developed under it.

Finally, as the PADT project was developed, the presence of other minerals was detected by the techniques applied, among them, uranium zinc, silver, molibdenum, bismuth, tin and gold. All of these are subject to be treated, and therefore an extension of the PADT which was to end in March 1981 is now being considered.

Table 2 shows the production volumes being produced or expected and the sales value of the products, which are being marketed or shall be marketed in the near future as the project proceeds.

As can be seen from the brief description given above there has been quite important results and in the process of execution, the engineering capacity of the institutions has been greatly enhanced as well as a new engineering and consulting firm organized.

This result can apply also to the other programmes carried out within the Pact, it is foreseeable that in the near future an ample and solid consulting system will be established due to the Pact policies and also due to the applications of national policies being undertaken individually by each member country.

The Annex includes some selected bibliography on this and other matters pertaining to the programmes, policies, etc. of the Andean Pact.

Table 2

Production and Sales Value of Products

<u>Source</u>	<u>Metals</u>	<u>Annual Production</u>	<u>Sales US\$/year</u>
<u>PADT-Copper:</u>			
			1/
I. Toromocho	Copper cement	192 MT	249,600
	Cathode Copper	14 MT	24,600
II. Cerro de Pasco	Cathode Copper	6000 MT	10,560,000
III. Corocoro	Cathode Copper	2450 MT	4,312,000
	Copper Sulfate	1050 MT	756,000
IV. San Miguel	Copper Sulfate	700 MT	504,000
V. Telamayu (matas)	Copper Sulfate	1826 MT	1,314,700
<u>PADT-Copper: Extension: 2/</u>			
I. Cerro de Pasco	Silver	350,000 ounce.T.	7,000,000
II. Corocoro	Silver	33,000 ounce.T.	660,000
III. San Miguel	Silver	605,000 ounce.T.	12,100,000
	Tin pre-concentrates	42,000 MT	3,360,000
IV. Telamaya (matas)	Silver	38,700 ounce.T.	774,000
<u>Total</u>	Copper Cement	192 MT	249,000
	Copper Sulfate	3,576 MT	2,574,700
	Cathode Copper	8,464 MT	14,896,600
	Tin pre-concentrates	42,000 MT	3,360,000
	Silver	1,026,700 ounce.T.	20,534,000
			US\$ <u>41,614,000</u>

- 1/ Price: a) MT Cu 99%, 1,760 US\$ MT;  
 b) Ag, 20 US\$ ounce.  
 c) CuSo4, 720 US\$ MT.  
 d) P.C. Sn, 80 US\$ MT.  
 e) Cement Cu, 1,300 US\$ MT.

2/ Also, Bismuth, Molibdenum and gold should be produced.

#### IV. CONCLUSION

The Andean Pact possesses the necessary instruments to enable the member countries to progressively integrate until, in the coming decade, they become a true and solid economic unit able to work in common, not only internally but also with regard to their relations with the international community.

In the technological field, these instruments have permitted a greater access to expertise, both local and international so as to apply it to their autonomously identified needs. With them, it has also been possible to enhance the local technological capacity and in particular the existing engineering and consulting services.

It is expected that in the next years, an even greater improvement will occur with the adoption of new policies, instruments and programmes, amongst which some new problem areas will be dealt with, namely, energy; environment; science as a special topic to enhance the capacity for generating new knowledge and linking the universities, laboratories, etc. with production activities; special programmes to improve the situation of small and medium size industries, etc.

Also, with the purpose of establishing a more permanent channel of communications among the member countries and the technical secretariat of the Andean Pact, and making policies on science and technology an effective instrument, a Permanent System of Co-ordination will be established.

The objectives and goals of such System will be among others:

- To constitute an appropriate forum to advise, orient, and suggest the different organs of the Pact, the ways of applying the different methods developed by science and technology policy to the problems of development, in such a way as to orient this process from the point of view of a methodic management of science and technology.

- To serve as a forum dedicated to the harmonization of national policies and to suggest the best ways to develop a capacity in science and technology. Also, it should serve to evaluate and permanently keep up the policy adopted and review of its instruments. A particular attention will be given to the promotion of horizontal co-operation.
- Continuous identification of new policy instruments in areas of interest to the countries.
- To serve as a permanent consulting body for the adoption of common positions in international negotiations.
- To serve as a co-ordinating body giving priority to activities which tend to improve the links between the scientific and technological communities and supporting their work.

Finally, it should be mentioned, the need of a specialized fund for the development of science and technology activities, including consulting services, the planning of which has already started in the subregion.

Selected Bibliography

The following bibliography is divided into 2 parts. Part A is a selected bibliography on integration topics related to the Andean Pact of more general nature. The list is not by all means exhaustive.

Part B contains a list of some relevant publications made by the Technology Policy Group. This list includes reports, informative and working documents.

Part A

1. Armstrong, Frances "Political Component and Practical Effects of the Andean Foreign Investment Code" Stanford Law Review 27 (July 1975) 1597-1628.
2. Arrow, K "The Economic Implications of Learning by Doing" Review of Economic Studies 29 (1962) 155-72.
3. Avery, William P. "Oil Politics and Economic Policy Making: Venezuela and the Andean Common Market" International Organization 30, No. 4 (1976) 541-72.
4. Avery, William P., and James D. Cochrane "Innovation in Latin American Regionalism: The Andean Common Market" International Organization 27 (1973) 181-223.
5. Axline, W. Andrew and Lynn Mytelka "Société multinationale et intégration régionale dans le Groupe Andin et dans la Communauté des Caraïbes". Etudes Internationales 7 (June 1976) 163-92.
6. Avila, Marcelo "Programación de la industria metalmetánica en el Acuerdo de Cartagena" Revista de la Integración No. 13 (May 1973) 193-232.
7. Bernaldes R. Enrique "Perú: Actores y Agentes Políticos Internos del Proceso de Integración Andina" In Instituto de Ciencia Política, Universidad Católica de Chile y Centro Interuniversitario de Desarrollo Andino (eds.) Variables Políticas de la Integración Andina. Santiago, 1974.
8. Briones, Alvaro "The Andean Pact Crisis and Development Options in Latin America" Comercio Exterior 22 (July 1976) 259-62.
9. Camacho Omiste, Edgar. Integración Andina. La Paz: Editorial Los Amigos del Libro, 1975.

10. Colciencias, Las Regalías y la Acción Gubernamental en Colombia. Trabajo elaborado por OFISEL LTDA, para Colciencias, Bogotá, Colciencias 1975.
11. Dell Sidney, A. Latin American Common Market? London: Oxford University Press, 1966.
12. Fernandez, Raul A., and José F. Ocampo "The Andean Pact and State Capitalism in Colombia" Latin American Perspective 11 (Fall 1975) 19-35.
13. French Davis, Ricardo "Evolución reciente del Pacto Andino" Estudios Sociales No. 10 (December 1976):
14. Gana, Eduardo. La Programación metalmeccánica del Acuerdo de Cartagena y las empresas transnacionales. Santiago :CEPAL Doc. No. CEPAL DIDE ET/Version Preliminar, AR/164 December 1976).
15. Garay Salamanca, Carlos Alberto. El Programa petroquímico Andino: antecedentes, perspectivas y su relación con las empresas transnacionales. CEPAL, División de Desarrollo Económico Dependencia Conjunta CEPAL/CET, Documento de Trabajo No. 8, December 1977.
16. Grupo Andino. Carta Informativa oficial de la Junta del Acuerdo de Cartagena (Lima: monthly) 1971-80.
17. Guerrero Mauricio. "El régimen común de la inversión extranjera en el Grupo Andino" Derecho de la Integración No. 8 (April 1971) 8-33.
18. Hunt Shane "Direct Foreign Investment in Peru: New Rules for an Old Game" Research Program in Economic Development, Woodrow Wilson School. Princeton University, May 1974.
19. Instituto de Investigaciones Tecnológicas (IIT) Tecnología del Sector Metalmeccánico para las Unidades asignadas a Colombia en la Decisión 57, Bogotá IIT, February 1974.
20. Integración Latinoamericana, Buenos Aires, Intal, monthly. Various issues. International Development Research Centre (IDRC) Briefing of the Andean Pact: Origins and Evolutions. Bogotá: Oficina Regional para La América Latina, December 1976.
21. Instituto Latinoamericano de Planificación Económica y Social (INTAL). Grupo Andino: Análisis de realizaciones y perspectivas. Doc. No. INST/80. Buenos Aires: Banco Interamericano de Desarrollo, INTAL (January 1973).
22. Katz, Jorge. Importación de tecnología, aprendizaje local e industrialización dependiente. Washington D. C. OAS Programa Regional de Desarrollo Científico y Tecnológico, Doc. No. AC/PE-5, 1972.

23. Milenky, Edward S. "From Integration to Development Nationalism: The Andean Group, 1965-1971" *Inter - American Economic Affairs* 25 (Winter 1971) 77-91.

24. Moncada, José, *Integración Andina y desarrollo económico: el caso ecuatoriano*. Caracas. Instituto Latinoamericano de Investigaciones Sociales Fundación Friedrich Ebert, Serie Materiales de Trabajo No. 3 (December, 1975).

25. Morawetz, David. *The Andean Group: A case Study in Economic Integration Among Developing Countries*, Cambridge, Mass: The MIT, Press 1974.

26. Moreno F. Félix: *Cartilla sobre adquisición de tecnología*. Prepared for Colciencias, Bogotá, February 1975.

27. Mortimore, Michael with Eduardo Gana. *La Programación Andina y su aplicación en Colombia: el papel de las empresas transnacionales*, Santiago: CEPAL Division de Desarrollo Económico, Documento de Trabajo No. 11 (April 1978).

28. Mytelka Lynn K. "International Capital and Regional Integration in UDEAC". In L. Gould and H. Targ (eds.) *Global Dominance and Dependence*. Ohio: King's Court, 1978.

"Regulating Direct Foreign Investment and Technology Transfer in the Andean Group" *Journal of Peace Research* No. 2 (June 1977): 155-84.

"The Saliency of Gains in Third World Integrative Systems" *World Politics* 25 (January 1973) 236-46.

*Regional Development in a Global Economy*. Yale University Press, 1979.

29. Oxman, Gaston and Francisco Sagasti. *Transferencia de Tecnología hacia los países del Grupo Andino*. Washington D. C. OAS, 1972.

30. PREALC "Evaluación del posible impacto ocupacional del programa metalmeccánico y de las propuestas automotrices y petroquímicas del Grupo Andino" Doc. de Trabajo, versión preliminar PREALC/8a. October 1975. Mimeo.

31. Roca, José Luis. "Bolivia: Actores y agentes políticos internos del proceso de integración andina". In *Instituto de Ciencia Política, Universidad Católica de Chile y Centro Inter-Universitario de Desarrollo Andino (ed.) Variables Políticas de la Integración Andina*, Santiago, 1974, pp.188-99.

32. Salgado, Peñaherrera Germánico. "Integración, conciliación de políticas y diferencias de estructura económica" *Integración Latinoamérica* No. 13 (May 1977) 4-14

33. *La Integración económica de países en desarrollo y la función de la planificación industrial conjunta*". Trabajo preparado para las Naciones Unidas, No. 8 de la Revista de Planificación del Desarrollo. June 1974, mimeo.

34. Tironi, Ernesto "Economic Integration and Foreign Direct Investment Policies. The Andean Case" Ph. D. Dissertation, M.I.T. 1976.  
Customs Unions Theory and Foreign Direct Investment. Boston University Center for Latin American Development Studies, Discussion Paper Series No. 21, November 1976.  
Customs Union Theory in the Presence of Foreign Firms. Santiago:CIEPLAN, October 1977.
35. Tokman, Victor "Income Distribution, Technology and Employment in Developing Countries: An application to Ecuador" Journal of Development Economics 2 (1975) 49-80.  
U.N. CEPAL/ILPES, Elementos para una futura estrategia subregional andina considerando especialmente la incorporación de Venezuela, and Anexo. Santiago, CEPAL/ILPES, 22 November 1974.  
U.N. ECOSOC. Evolution in the Cartagena Agreement. E/CN. 12/888. 14 April 1971.
36. Vaitsos, Constantino, "Crisis in Regional Economic Cooperation (Integration) Among Developing Countries: A Survey" World Development 6 (1978) 719-69.  
"Foreign Investment Policies and Economic Development in Latin America" Journal of World Trade Law 7 (November-December 1973) 619-65.
37. Venezuela, Instituto de Comercio Exterior "Interes nacional y control de decisiones en el proceso de integración" Notas del ICE 118 (September 1975); 5-10.
38. Wionczek, Miguel (ed.) Latin American Economic Integration: Experience and Prospects. New York: Praeger, 1966.
39. "El Grupo Andino y la inversión extranjera privada" JUNAC Doc. JUN/di.2 20 October 1970.
40. "Problemas involucrados en el establecimiento de un tratado comun para la inversión extranjera en el Mercado Comun Andino" JUNAC, Doc. JUN/di 5, 20 October 1970.



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Part B

<u>Report Number</u>	<u>Title</u>
J/GT/5	Employment Effects of Foreign Direct Investments In Developing Countries (Septiembre 18 1973).
J/GT/8 Rev.2	Proyectos Andinos de Desarrollo Tecnológico en el Area de Recursos Forestales Tropicales (Abril 18 1973)
J/GT/10	Summary Notes on the Presentation by Constantine V. Vaitsos Before the United Nations Group of Eminent Persons on the Role of Multinational Corporation. (October 25, 1973).
J/GT/13 Rev. 1	Power, Knowledge and Development Policy: Relations Between Transnational Enterprises and Developing Countries (February 8, 1975)
J/GT/16 Rev. 1	Proyectos Andinos de Desarrollo Tecnológico en el Area de la Hidrometalurgia del Cobre (Decisiones 86 y 87 de la Comisión del Acuerdo de Cartagena ( 12 Junio 1976)
J/GT/19	Potencial de la Lixiviación Bacteriana en el Perú (Octubre 30 1975)
J/GT/21	Lixiviación Bacteriana de Minerales de Cobre (Abril 1 1976)
J/GT/22	Technology within the Andean Group (April 5, 1976)
J/GT/24	Situación Alimentaria y Nutricional de los Países del Area Andina (Abril 8 1976)
J/GT/25	Proyectos Andinos de Desarrollo Tecnológico en la Hidrometalurgia del Cobre. Dec. 87. Informe de la Representación Peruana (Junio 2 1976).
J/GT/26	Proyecto Andino de Desarrollo Tecnológico en el Area de la Hidrometalurgia del Cobre. Proyecto II. Lixiviación Bacteriana (Junio 10 1976).
J/GT/27	PADT-Cobre. Decisión 87. Informe de la Representación Peruana al Comité Contratante. Lixiviación Bacterial de Minerales de Cobre. (Junio 21 1976)
J/GT/28	PADT-Cobre. Decisión 87. Informe de la Representación Peruana al Comité Contratante. Aplicación de la Tecnología de Lixiviación Bacteriana en Minería Perú (Agosto 10 1976).

- J/GT/29 Informe de la Representación Peruana al Comité Contratante. Seminario Tarma Mayo 1976 (Septiembre 8 1976)
- J/GT/32 Informe de la Representación Peruana al Comité Contratante "Mecanismos de Reacción Involucrados en la Acción Lixivante de las Bacterias" (Septiembre 22 1976)
- J/GT/34 PADT-Cobre. Decisión 87. Informe de la Representación Peruana al Comité Contratante "Lixiviación Bacterial de Minerales Marginales de Cobre - Toromocho" (Noviembre 12, 1976)
- J/GT/35 Rev.1 Proyectos Andinos de Desarrollo Tecnológico en el Area de los Alimentos (Enero 26 1977).
- J/GT/36 Informe de la Representación Peruana al Comité Contratante "Lixiviación Bacteriana en Columnas Mineral Marginal Sulfurado de Cerro Verde" (Enero 30 1977).
- J/GT/37 PADT-Cobre. Decisión 87. Informe de la Representación Peruana al Comité Contratante. "Avance de las Pruebas de Lixiviación Química-Bacteriana en Columnas y Frlenmeyers". Cultivos y Adaptaciones de Bacterias. Pruebas de Cementación e Intercambio iónico. (Enero 30 1977).
- J/GT/38 PADT-Cobre. Decisión 87. Informe de la Representación Peruana al Comité Contratante "Lixiviación Bacteriana en Columnas Mineral Marginal de Cerro Verde" (Febrero 21 1977).
- J/GT/41 PADT-Cobre. Decisión 87. Proyecto II. Informe de la Representación Peruana al Comité Contratante "Seminario de Electroquímica semi-conductores y Lixiviación Bacteriana" (Abril 20 1977).
- J/GT/43 PADT-Cobre. Proyecto II. Decisión 87. Seminario Teórico-Práctico sobre Electrodeposición de Semiconductores y Lixiviación Bacteriana. (Mayo 5 1977).
- J/GT/44 PADT.-Cobre. Proyecto III. Decisión 87. Seminario de Intercambio Iónico. (Mayo 17 1977).
- J/GT/45 PADT-Cobre. Decisión 87. Informe de la Representación Peruana "Lixiviación Bacterial de Minerales Marginales de Cobre -Toromocho" (Agosto 10 1977).

- J/GT/47 PADI-Cobre. Proyecto II. Decisión 87. Seminario Teórico-Práctico sobre Disolución de Sulfuros por Acción Bacteriana y Electroquímica de Semiconductores (Septiembre 6 1977).
- J/GT/48 PAD-Cobre. Proyecto II. Decisión 87. Informe de la Representación Peruana. Lixiviación Bacterial de los Minerales Marginales de Cobre. Proyecto Toromocho. (Octubre 13 1977).
- J/GT/49 PADT-Cobre. Decisión 87. Proyecto III. Informe de la Representación Peruana "Seminario de Intercambio Iónico y Electrodeposición" (Enero 2 1978).
- J/GT/50 PADT-Refort. Proyecto Estudio Integral de la Madera para la Construcción. Perspectivas de Desarrollo en Segunda Fase. (Noviembre 25 1978).
- J/GT/51 PADT-Cobre. Proyecto II. Decisión 87. Seminario Internacional de Lixiviación y Cementación (Enero 4 1978).
- J/GT/53 PADT-Cobre. Decisión 87. Proyecto II. Informe de la Representación Peruana. Proyecto Toromocho de Tratamiento de Minerales Marginales de Cobre. Estudio del Proceso de Extracción por Solventes y Electrodeposición. Primer Informe Progresivo (Enero 31 1978).
- J/GT/54 PADT-Cobre. Decisión 87. Proyecto III. Informe de la Representación Peruana. Estudios Preliminares sobre Producción de Sulfato de Cobre por Extracción con Solventes. (Febrero 7 1978).
- J/GT/55 PADT-Cobre. Proyecto II. Decisión 87. Informe de la Representación Peruana. Lixiviación Bacteriana en Columnas Mineral Mixto de Baja Ley de Cerro Verde (Marzo 6 1978).
- J/GT/59 PADT-Cobre. Decisión 87. Bases Electroquímicas para la Electrolisis de Extracción de Metales no Ferruginosos.
- J/GT/60 PADT-Cobre. Proyecto II. Decisión 87. Informe de la Representación Peruana. Resultados Finales de las Pruebas semi-piloto Lixiviación Bacterial de Minerales Marginales de Cobre. Proyecto Toromocho (Abril 27 1978).

- J/GT/61 Informe del Estado de Progreso del Proyecto "Desagregación de Proyectos Petroquímicos e Inventarios de Fabricantes de Bienes de Capital". (Mayo 22 1978)
- J/GT/68 PADI-Cobre. Proyecto II. Decisión 87. Informe de la Representación Peruana. Lixiviación de Minerales de Cobre de Cerro de Pasco. Pruebas a Escala de Laboratorio y Piloto. (Septiembre 8 1978).
- J/GT/69 Desagregación Tecnológica de Proyectos Petroquímicos e Inventario Analítico de Fabricantes de Bienes de Capital en la Subregión Andina. (Noviembre 10 1978)
- J/GT/70 Rev.2 Los Proyectos Andinos de Desarrollo Tecnológico para el Medio Rural ( Agosto 8 1979)
- J/GT/74 PADI-Cobre. Proyecto II. Decisión 87. Informe de la Representación Peruana "Primer Año de La Operación en Pilas Lixiviación Bacterial de Minerales Marginales de Cobre Proyecto Toromocho". (Diciembre 4 1978)
- J/GT/75 The Andean Group before the United Nations Conference of Science and Technology for Development" (Diciembre 27 1978)
- J/GT/76 Some Ideas Regarding and Information System for the Countries of the Andean Group (December 27 1978)
- J/GT/79 Rev.1  
Add 2. Definición del Sistema Andino de Información Tecnológica y Programa para su Establecimiento Progresivo. (Septiembre 21 1979)
- J/GT/80 Desagregación Tecnológica de Proyectos Petroquímicos e Inventario Analítico de Fabricantes de Bienes de Capital en la Subregión Andina.
- J/GT/83 PADI-Cobre. Proyecto III. Decisión 87. Informe de la Representación Peruana "Viaje de Estudios e Instalaciones Hidrometalúrgicas de Cobre y Uranio a EE.UU.". (Febrero 20 1979).
- J/GT/89 Correg. Programa Andino de Desarrollo Tecnológico en el Area de Carbones - PADI-Carbones. (Julio 21 1980).

J/GT/91

Informe del Jefe Nacional PADT-Cobre, Peru. Decisión 87 (Marzo 6 1980).

J/GT/93

Identificación y Análisis Comparativo de Estilos de Desarrollo Rural y Mecanismos de Generación y Transferencia de Tecnología. (Abril 14 1980)

J/GT/95

Manejo de la Propiedad Industrial en los Países Miembros del Acuerdo de Cartagena (Septiembre 4 1980)

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