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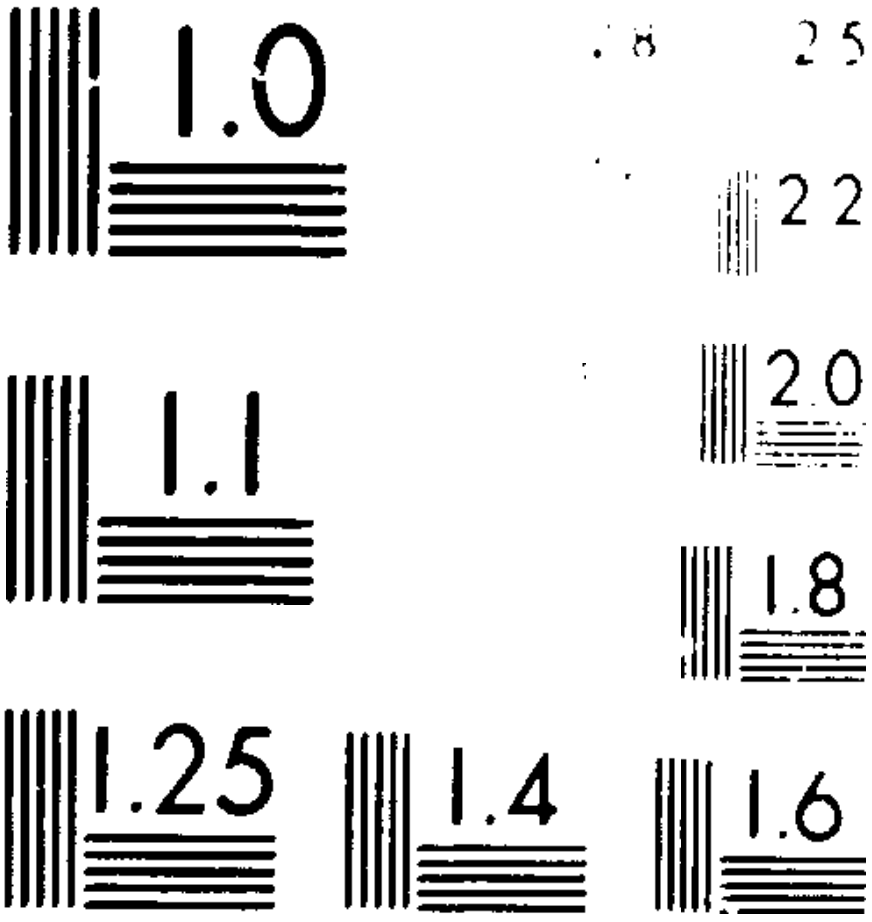
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SECTORAL STUDY ON TECHNOLOGY IMPORTS IN THE PHARMACEUTICAL SECTOR OF THE ANDEAN SUBREGION

prepared by the

Board of the Agreement of Cartagena
in Co-operation with the UNIDO Secretariat *

G.F. Guevara

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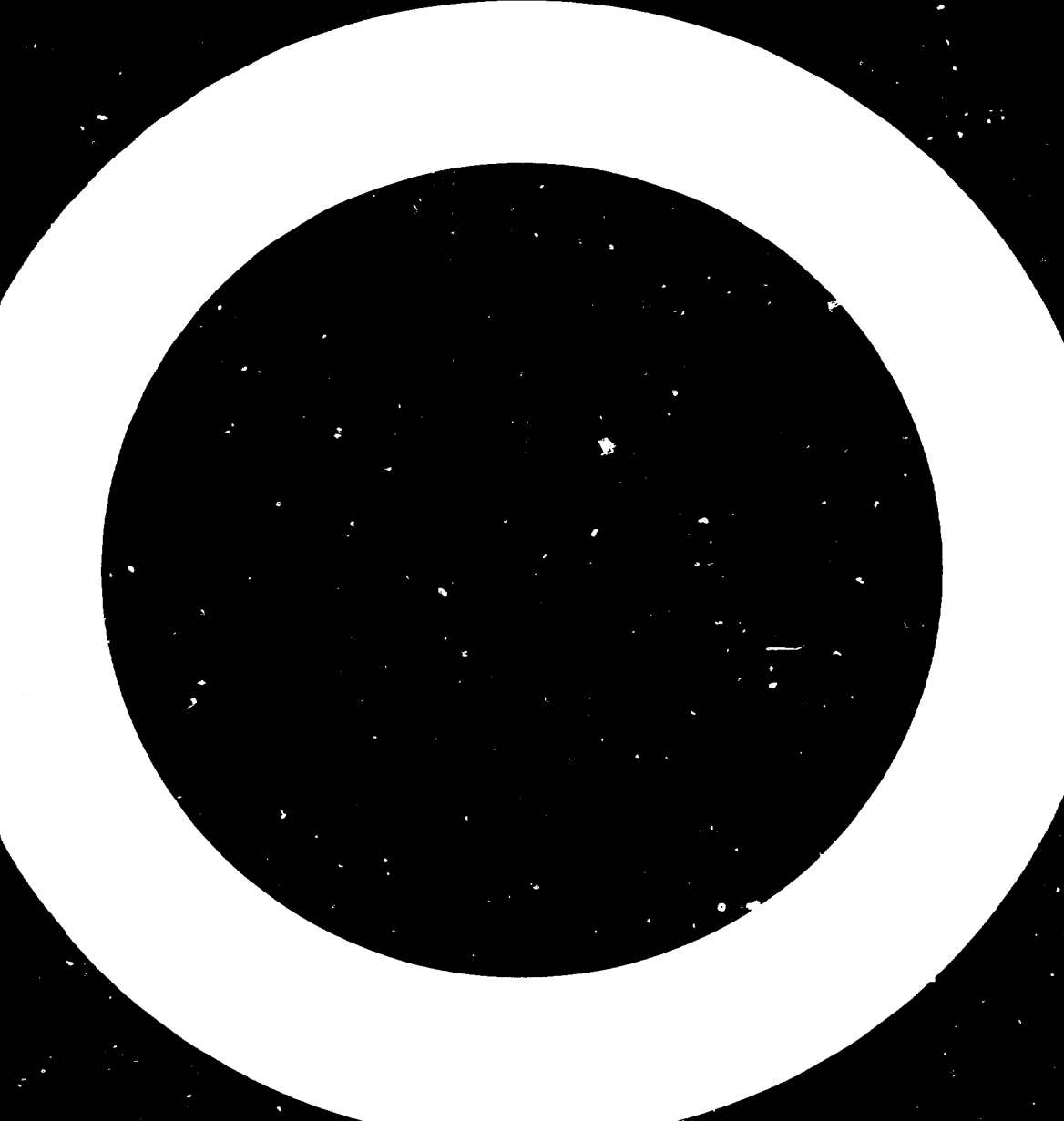

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Foreword

Under a Memorandum of Understanding signed in 1980, the secretariat of UNIDO and the Board of the Cartagena Agreement, agreed to co-operate in the area of technology. The areas of co-operation identified were as follows:

a. Information exchange on technology transfer contracts;
b. Industrial and technological information;
c. Technological support to small and medium-scale industries;
d. Technological disaggregation and compilation inventories of technological capabilities.

The present sectoral study on imports of technology in the pharmaceutical sector of the Andean subregion is the first result of this agreement. The main objective of the study has been to evaluate the impact on the development of the pharmaceutical industry of decision 24 of the Cartagena which regulated the imports of technology in the Andean subregion.

Preface

In 1969 when the Cartagena Agreement [1/] was signed, the Andean countries decided to meet the challenge of under-development in a new way. The Agreement is an endeavour to capitalize on the experiences gained from other integration schemes and to embody new elements for tackling the specific problems of the nations of the Andean Group.

One such element is its subregional technological policy and one of its instruments is the Andean Technological Information System (SAIT),[2/] designed inter alia to enhance the negotiating strength of the competent national authorities and of the entrepreneurs of the Subregion in their dealings with suppliers of technology.

The SAIT Information Network on the Transfer of Technology is being organized on the basis of information known to those competent national authorities responsible for recording and approving technology contracts, and one item on its programme is the preparation of periodic comparative studies.

Accordingly, the Board of the Cartagena Agreement, referred to in this document as the Board, and UNIDO agreed, under a memorandum of understanding signed in 1980, to carry out the present sectoral study on technology imports in the pharmaceutical sector of the Andean subregion, on the basis of guidelines prepared by UNIDO.

UNIDO contributed some of the finance for the study and the Board agreed to carry out the study through the channels of the SAIT secretariat. The central team which carried out the study was headed by Gustavo Flores Guevara, an engineer, Head of the Bureau of the Political Technology Group of the Board and secretary of SAIT, with the assistance of Jorge Osorio and Javier Masias, economists from the General Programming Department and Technological Policy Group of the Board, respectively. Dr. Bernardo Uribe, a subregional expert on the chemical-pharmaceutical industry, participated in the preparation of the final report with the collaboration of Rodrigo Donoso, an engineer of the Industrial Development Department of the Board.

1/ The Cartagena Agreement or Andean Subregional Integration Agreement, signed on 26 May 1969, establishes the Andean Group, an organization consisting at present of Bolivia, Colombia, Ecuador, Peru and Venezuela

2/ SAIT was set up by Decision 154 of the Commission of the Cartagena Agreement in May 1980.

It is hoped that this report will help to show the advantages which can be derived from co-operation between national authorities and developing countries with a view to disclosing the machinery controlling trade in technology as a means of improving the legal, economical and technical conditions governing technology imports.

SUMMARY

I. INTRODUCTION

1. The Board of the Cartagena Agreement and UNIDO agreed to prepare this sectoral study on technology imports in the pharmaceutical sector of the Andean Subregion. The aim is to give a general idea of the technology transfer process in the pharmaceutical sector of the Andean Group and to outline the machinery, terms and conditions governing the relevant technology imports and their technological impact; consequently, economic, legal and technological aspects of the sector are covered.

2. This study is particularly important for the Andean Group because of the close link between the pharmaceutical sector and satisfaction of the basic health needs of the population of the region, because it is the first assessment of the application of Decision 24 to a specific sector and because the work carried out is something of a pilot study and a model for the technological analysis of other sectors of importance for the development of the Andean Region.

3. The study analyses the technological behaviour of the pharmaceutical sector of the Andean Subregion from the economic and legal aspects and considers the technological features of this key sector for health care for those living in the region. The relevant information covers the period 1975-1980.

II. CHARACTERISTICS OF THE PHARMACEUTICAL INDUSTRY

4. There are something like 360 pharmaceutical undertakings in the Andean Subregion and they have registered tens of thousands of different get-ups for their products. Since the list of essential drugs adopted by the health ministries of the Andean area contains only 250 products, a number regarded as sufficient for the health requirements of the Andean Subregion, there is a considerable excess of products due to the existence of a segmented market.

The segmentation arises from product differentiation based mainly on trade marks, with the result that licensing agreements are concluded for the working of the trade marks. Consequently, products of identical effect and composition vary considerably in their prices; also, licensing agreements have to be concluded for the working of trade marks.

5. In 1977 the pharmaceutical industry accounted for approximately 17 per cent of numbers employed in the chemical sector and 2.5 per cent of numbers employed in the manufacturing sector. In terms of added value, the pharmaceutical industry accounted for 7.7 per cent of the chemical sector and 2.3 per cent of the manufacturing sector; 29,600 people worked in the industry, with an average of 84 workers per undertaking, a figure higher than the average for the chemical industry (75 workers per undertaking) and for manufacturing in general (41 workers per undertaking). Apparently, therefore, the pharmaceutical sector of the Subregion is significantly labour intensive.

6. In 1977 the pharmaceutical industry imported approximately 69 per cent of its raw materials. This high figure is due to the lack of any pharmo-chemical industry in the Subregion.

7. Sales of the subregional pharmaceutical industry amounted to approximately US$800 million in 1977, or almost 2 per cent of world sales of the industry.

8. A sample of 204 concerns in the pharmaceutical sector in the Subregion in 1980 shows that approximately 70 per cent were foreign, 24 domestic and 7 per cent mixed. With regard to the distribution of capital as between the different kinds of undertaking, foreign capital predominates in the Subregion except in Bolivia.

9. Approximately 34 per cent (142) of the total of sampled undertakings classified as foreign received capital from the USA, 14 per cent from Switzerland, 10 per cent from Germany, 8.5 per cent from Panama and 6.3 per cent from Canada. United States participation was in fact greater, for Panama is a transit country for United States capital and has no technology of its own. Another finding was that a significant group of transnational undertakings have branches or holdings in almost every country of the Andean Group.

III. CONTRACTING OF TECHNOLOGY

10. The undertakings in the member countries have concluded technology import contracts with suppliers residing in 27 different countries, some of them in Latin America, including contracts for intra-subregional technological co-operation.

The greatest number of contracts are with United States concerns (30.3 per cent) followed by France (13.9 per cent), Germany (10.7 per cent), Italy (7.8 per cent) and Switzerland (7.5 per cent).

11. The contracts are usually arranged to have a life of up to five years; however, most of them are either renewals of earlier contracts or are renewable.

12. Eighty-five per cent of the contracts involve licences for the use of trade marks plus, as a rule, the supply of technical information or the provision of quality control facilities.

13. None of the contracts covers engineering studies and less than 1 per cent cover training of personnel.

14. Twenty-one transnational concerns participating alone or in association with other capitalists in associated undertakings (branches, subsidiaries, foreign investment in domestic undertakings) have been identified in the member countries. The 21 concerns have invested a total of almost US$105 million in 68 "receiving" undertakings, and 13 transnational concerns have holdings in three or more countries of the Subregion.

IV. RULES GOVERNING TECHNOLOGY IMPORTS

15. 1970 saw the introduction in the Andean countries of legal measures to regulate the transfer of technology. These measures include Decisions 24 and 85 of the Cartagena Agreement, containing the subregional provisions on the control of technology imports and the setting up of competent domestic authorities for evaluating, updating and recording contracts.

16. The legal measures have resulted in eliminating royalty payments by subsidiaries to their parent companies, and between subsidiaries of the same parent, the removal of restrictive provisions from licensing agreements for pharmaceutical patents and reductions in the rate of royalties and the life of contracts.

V. IMPACT ON THE TECHNOLOGICAL LEVEL OF THE PHARMACEUTICAL INDUSTRY

17. In any study on the transfer of technology in the chemico-pharmaceutical sector it is essential to differentiate between the pharmochemical industry, which prepares active substances, and the pharmaceutical industry, which produces the dosified medicaments.

18. The technology of the pharmaceutical industry, involving processing of active substances into dosified pharmaceutical forms, is not over complex and is set out in manufacturing manuals describing conventional processes and technologies. The experts of the Andean Subregion are trained to prepare and handle the active substances.

19. However, the technology for manufacturing active substances - i.e. pharmochemical products - demands more specialized knowledge and has not yet been developed in the Andean Subregion.

20. Consequently, it can be concluded that the subregional pharmaceutical industry is not receiving foreign technological backing. This is due purely to the fact that there have been no substantial changes in the industry in the last 40 years, which might explain the little, if any, transfer of technology to the region and the proliferation of agreements concerning the use of trade marks. If the pharmochemical industry develops in the subregion, the contracting of technology will probably make an effective contribution to the chemico-pharmaceutical development of the member countries.

INTRODUCTION

Sales of technology between undertakings in developed countries and undertakings in developing countries have become one of the most significant characteristics of international economics since the Second World War. These sales lead to relationships of technological dependency, with the developing countries paying direct costs (royalties), indirect costs (price for technology included in capital goods) and "hidden" costs, in the form of overcharging for raw materials, equipment and technical advice connected with technology.

The point is that the developing countries obtain the technological knowledge developed in industrialized countries through a variety of channels including:

(a) Imports of machinery and equipment (incorporated technology);

(b) Contracting of foreign technical personnel;

(c) Contracting of technology imports.

Despite the significance of channels a and b and their crucial importance for the development of the member countries of the Andean Group, this study will be limited just to contracts for technology imports and the use of trade marks concluded by domestic, mixed and foreign undertakings which are operative in the pharmaceutical sector and based in the Subregion.

The study includes an analysis of the technological behaviour of the pharmaceutical sector of the Andean Subregion from the economic and legal aspects and considers the technological features of the key sector for health care for the inhabitants of the Andes. The relevant information covers the period 1975-1980.

Chapter I refers to the general features of the chemico-pharmaceutical industry of the Andean Group countries, including a reference to the prices of pharmaceutical and pharmochemical products and to some of the main economic indicators of the sector.

Chapter II contains information on technology imports in the pharmaceutical sector and gives an interpretation of the main data obtained. It describes the situation as it was before the approval of Decision 24 and the situation in the period under study (1975-1980).

Chapter III refers to the legal and institutional aspects of technology imports in the Andean Group. It gives the main features of Decision 24 of the Board of the Cartagena Agreement, relating to the Common Regime on the Treatment of Foreign Capital and Technology. It also contains the most important information on the member-country authorities responsible for applying Decision 24.

Chapter IV describes the present-day technological level of the chemico-pharmaceutical industry of the subregion and gives some idea of the impact of imported technology and trade mark on the development of the Subregion's pharmaceutical sector.

A summary of the study and a set of amplifying and explanatory annexes of a methodological and quantitative nature are also given.

CHAPTER I

SOME CHARACTERISTICS OF THE CHEMICO-PHARMACEUTICAL INDUSTRY IN THE ANDEAN GROUP COUNTRIES

1. Definition of some terms connected with the chemico-pharmaceutical industry

For the purposes of this study the following definitions are used; they are the ones used in the Cartagena Agreement in connection with the chemico-pharmaceutical industry.

1.1 Pharmochemical industry - This is the chemical industry subsector concerned with the manufacture of therapeutically active substances. This category covers all such organic and inorganic compounds as are used, either alone or together with other ingredients, in preparations for curing, alleviating or preventing disease or for restoring and preserving health. The active substances are produced from fairly simple chemical compounds derived from natural sources or from the petrochemical and chemical sectors, with the use of synthetic methods or microbiological fermentation processes.

1.2 Pharmaceutical industry - This is concerned with the preparation of medicaments in their final form and ready for use by patients and doctors. It takes the therapeutically active agents supplied by the pharmochemical industry and dosifies them in the form of tablets, injectables, syrups, drops and other presentations. The final formulation contains one or more active substances together with flavouring agents, stabilizers and other excipients. The pharmaceutical industry is, therefore, a formulation industry whose function is to dosify and package medicaments and which depends for its operations on being supplied with therapeutically active substances.

1.3 Chemico-pharmaceutical industry - This covers both the manufacture of active agents and the formulation of finished drugs. It therefore covers the pharmochemical and pharmaceutical industries as just defined.

These terms are sometimes used in the literature with different meanings and may even differ from article to article. For example, some writers use the term "pharmaceutical industry" for what has just been defined as the "chemico-pharmaceutical industry". For the sake of clarity we have preferred to use the definitions just given.

2. Diversity of pharmaceutical industry products

There are approximately 360 pharmaceutical undertakings in the Andean Subregion; most of them do not use generic names and prefer to give their products brand names in accordance with the world-wide practice of the industry. There is therefore an enormous proliferation of registered products in every country, for often different trade marks are used to denote products which have the same therapeutic effect and often, indeed, the same composition. For instance, there are very many similar analgesics in the Subregion and in one of the member countries something like 20 different names have been identified for 250 mg capsules of ampicillin.

This explains the large number of registered pharmaceutical products in the Subregion, amounting to tens of thousands of different get-ups [3/] and contrasting with the list of essential drugs adopted by the health ministers of the Andean area, the list consists of merely 250 products under generic names, which are considered sufficient to tackle all the diseases of the Subregion.

Businesses therefore have to spend heavily on medical promotion, publicity and marketing to try to impose their brands over other brands of identical effect and composition.

Another consequence of the use of marks or brands is the need for licensing agreements to exploit them, and agreements of this nature make up an appreciable proportion of all licences involving royalties.

3. Prices of pharmaceutical and pharmochemical products

A number of international studies on the behaviour of the pharmaceutical sector market agree that it displays inter alia the following characteristics: [4/]

Price differences as between different countries - it is common to find a concern selling the same drug at different prices in different countries;

Difference between the prices of equivalent drugs because of the brand or mark. The same product often varies widely in price according as it is being sold under a brand name or under its generic pharmacological name;

3/ In Colombia there are something like 15,000 registered pharmaceutical products, about 7,000 in Ecuador and about 5,000 in Peru.

4/ "Technology Policies in the Pharmaceutical Sector of the Philippines" - UNCTAD/TT/36, 1980.

Price fixing by the first to enter the market. Apparently, the normal practice is for the maker of a new compound to fix prices which at least for a time include monopoly profits because of the lack of competition. Also, even when other producers start to manufacture the compound, they normally tend to benefit from the price level set by the firstcomer;

Heavy promotion costs - publicity is a very important factor in product differentiation.

These features of the pharmaceutical sector are typical of an oligopolistic market and are common in the pharmochemical products sector. Also, the subsidiaries of transnational concerns usually buy their pharmochemical requirements either from their parent companies or by a trade agreement from another transnational company.

The Andean Subregion is no exception here, as the studies on pharmochemical products made in member countries, particularly Colombia and Peru, reveal. Data obtained in Peru on the prices of a group of pharmaceutical products show differences of as much as 600 per cent between the lowest and highest prices of a single product. 5/

These price differences are inevitably reflected in the costs of the pharmaceutical end products and result in the high prices consumers have to pay for the drugs they need to preserve or restore health.

The Andean Group countries are therefore preparing a programme for setting up an information system on prices of pharmochemical and pharmaceutical products, which will be included in the Andean Technological Information System, help importers to purchase therapeutically active substances at significantly below present prices and provide Governments with information on what they need to do to reduce the cost of drugs.

4. Economic indicators for the pharmaceutical sector in the Andean Subregion

To assess the weight of the sector under study in production, sales, job creation and other aspects, data were obtained from national statistical systems and from industrial concerns in the five member countries of the Andean Group.

5/ Data from the International Prices Division of Colombia and from the Pharmochemical Products Prices System of Peru.

1977 was taken as the datum year for analysis of the indicators as being the year for which the fullest information on the five Andean countries was obtained.

4.1 Position of the pharmaceutical sector in the industrial structure

In the International Standard Industrial Classification (ISIC) the pharmaceutical industry is considered within the group of chemical products manufacture in the manufacturing sector (35) and is listed as ISIC 3522. The statistical information which will now be studied [6/] has been compiled in the light of this classification.

Table 1 compares a few pharmaceutical industry indicators with the corresponding values for the chemical industry and for the total manufacturing sector.

The gross value of output of the pharmaceutical industry for 1977 is calculated to be US$669 million produced by 354 undertakings which are the most representative of the industry. This output represents 7.1 per cent of the chemical industry output for 1977 and 1.8 per cent of total manufacturing sector output.

In 1977 the pharmaceutical industry created approximately 17 per cent of jobs in the chemical sector and 2.5 per cent of the jobs in the manufacturing sector. The pharmaceutical industry accounted for 7.7 per cent of valued added in the chemical sector and 2.3 per cent in the manufacturing sector.

In recent years the member countries have experienced a decrease in participation of the pharmaceutical industry in the chemical sector. Data obtained in Peru, one of the member countries, show that participation in its pharmaceutical industry decreased from 42.9 per cent of numbers employed in the chemical industry in 1965 to 19.3 per cent in 1977, with a decrease of added value from 29.9 per cent in 1965 to 13.4 per cent in 1977. This reduction, which does not seem to be an abnormal trend, might well be explained by the substantial growth in other sectors of the chemical industry such as the manufacture of synthetic resins and textile fibres. [7/]

6/ Annex II lists the main variables for the pharmaceutical sector of the subregion from 1970 to 1979. Full information was obtained only for the period from 1975 to 1978.

Annex III gives data on the main variables of manufacturing industry in accordance with ISIC Divisions for the Andean Group and for each of the member countries in 1977.

7/ See for instance Vega Centeno, Maximo et al. "La industria farmaceutica en el Peru: Características y limitaciones" in Socialismo y Participación, No. 10, Lima 1980.

Table 1

ANDEAN GROUP: MAIN VARIABLES AND INDICATORS OF THE PHARMACEUTICAL INDUSTRY, CHEMICAL INDUSTRY AND TOTAL MANUFACTURING SECTOR

1977

Variable / Sector	Number of Establishments (Units)	Number of Employed (Units)	Remunerations	Gross Value of Output (Millions of US$)	Added Value (Millions of US$)
Pharmaceutical	354	29 600	106	669	397
Chemical Industry	2 599	170 900	682	9 394	5 150
Total manufacturing sector	23 365	1 290 471	3 820	37 281	17 000
% pharmaceutical industry/chemical industry	13.6	17.3	15.5	7.1	7.7
% pharmaceutical industry/manufacturing sector	1.2	2.3	2.8	1.8	2.3

Prepared by the SAIT Secretariat

4.2 Growth of the pharmaceutical sector

Nevertheless, it can be shown that from 1975 to 1978 the gross value of output for the pharmaceutical sector of the Subregion increased by 33.5 per cent from US$575 to 768 million, while the numbers employed rose from 27,500 to 31,000 workers, an increase of 12.7 per cent (see annex II). The increase might have been greater had there not been a marked decrease in Peru's economic activity during the period under study - from 1975 to 1978 the gross value of output rose by 95.6 per cent in Bolivia, 61.9 per cent in Colombia, 130 per cent in Ecuador and 58 per cent in Venezuela, but decreased by 20 per cent in Peru.

4.3 Relative participation of member countries in the subregional pharmaceutical industry

Table 2 shows the percentage participation of each of the member countries in the subregional pharmaceutical industry. The shares in gross value of output were as follows: Venezuela 37.5 per cent, Colombia 32.0 per cent, Peru 23.9 per cent, Ecuador 5.0 per cent and Bolivia 1.6 per cent. This pattern is similar to that for other industrial sectors, for instance, in the chemical industry.

These percentages generally reflect the share in the gross value of subregional output of each member country.

The average per capita value of remunerations in Venezuela is some US$5,600, as compared with the average for the Andean Group of US$3,600, which gives some idea of the relative cost of labour. 8/

4.4 Production inputs

Table 3 gives the value of production inputs in 1977 for each of the member countries and for the whole of the Subregion.

The inputs represented 40.6 per cent of the gross value of subregional output in 1977.

Imported raw materials account for 68 per cent of total consumption and 55 per cent of total inputs. This high proportion is the result of the virtual absence of a pharmochemical industry in the subregion, with the result that nearly all the active agents used by the pharmaceutical industry have to be

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8/ For instance, Colombia with 124 enterprises employs 37.7 per cent of the total numbers employed and pays 27.4 per cent of remunerations, whereas Venezuela, with 76 enterprises and only 28 per cent of the total numbers employed, pays almost 44 per cent of total remunerations. Peru, with 100 enterprises and employing 24.8 per cent of the total, pays 21.5 per cent of total remunerations.

Table 2

COUNTRY BREAKDOWN OF THE MAIN VARIABLES OF THE PHARMACEUTICAL INDUSTRY

1977

Countries	No. of Enterprises		Numbers Employed		Remunerations		Gross Value of Output		Added Value	
	Units	%	Units	%	Millions of US$	%	Millions of US$	%	Millions of US$	%
Bolivia	19	5.4	813	2.8	1 911	1.8	10 838	1.6	3 844	1.0
Colombia	124	35.0	11 160	37.7	28 956	27.4	213 985	32.0	119 862	30.2
Ecuador	35	9.9	1 990	6.7	5 687	5.4	33 779	5.0	21 440	5.4
Peru	100	28.2	7 347	24.8	22 701	21.5	159 820	23.9	88 460	22.3
Venezuela	76	21.5	8 290	28.0	46 398	43.9	250 815	37.5	163 295	41.1
Total Andean Group	354	100.0	29 600	100.0	105 653	100.0	669 237	100.0	396 901	100.0

Prepared by the SAIT Secretariat

Table 3

PRODUCTION INPUTS

(in thousands of US$)

Item / Countries	Raw Materials and Components			Receptacles and Packaging			Others *			TOTAL INPUTS
	Domestic	Imported	Total	Domestic	Imported	Total	Domestic	Imported	Total	
Bolivia	1 269.8	3 169.6	4 439.4	519.9	316.2	836.1	367.6	811.6	1 179.2	6 454
Colombia	29 185.1	50 194.2	79 379.4	-	-	-	-	-	14 744.7	94 124
Ecuador	2 821.4	8 221.2	11 042.5	-	-	1 063.6	-	-	232.8	12 338
Peru	6 289.3	39 346.0	45 635.3	10 508.8	2 043.1	12 551.9	12 949.1	223.1	13 172.2	71 359
Venezuela	31 106.1	50 439.6	81 545.7	-	-	5 703.0	-	-	271.2	87 519
Total Andean Group	70 671.7	151 370.6	222 042.3	11 028.7	2 359.3	20 154.6	13 316.7	1 034.7	29 600.1	271 794

* Fuels, lubricants, energy and others

Prepared by the SAIT Secretariat

imported. The lack of a pharmochemical industry is responsible for the high cost of the raw materials which have to be purchased abroad, and since the pharmaceutical industry could not provide output of appropriate quality without these foreign inputs, this strategically important sector depends on other countries.

Raw materials of domestic origin, which account for 32 per cent of the total, are mainly starting materials such as starch, sugar and alcohol.

In the case of Peru, the only country for which information is available, the total value of receptacles and packaging accounts for approximately 18 per cent of total inputs; 84 per cent of this item is of domestic origin.

4.5 Numbers employed

In the year under analysis there were 354 pharmaceutical enterprises in the subregion and they employed 29,600 people (annex II) with an average of 84 workers per enterprise.

This figure is higher than for the chemical industry (75 workers per enterprise) and is more than 100 per cent above the average for the manufacturing sector (41 workers per enterprise). The explanation is that the pharmaceutical industry is more labour intensive than other groups of the manufacturing sector and that the Subregion has not yet reached a level of automation comparable with that obtaining in developed countries.

4.6 Classification of enterprises by numbers employed

Table 4 classifies enterprises as small, medium or large in accordance with the numbers they employ. The data cover only Peru and Venezuela, the only countries for which information was obtainable.

If enterprises employing from 5 to 20 people are classified as small, enterprises employing from 21 to 100 people as medium sized and enterprises employing more than 100 people as large, the distribution of the 176 enterprises in Peru and Venezuela is uneven by country and by size of enterprise.

There is a greater concentration of production in Peru, where 27 per cent of the total number of enterprises accounts for 81.3 per cent of production, whereas in Venezuela 41 per cent of the total number of enterprises account for 74.3 per cent of output.

Table 4

TOTAL NUMBERS EMPLOYED AND BREAKDOWN BY SIZE OF ENTERPRISE IN PERU AND VENEZUELA

1977

Size of Enterprise	Numbers Employed		Number of Enterprises		Gross output (thousands of US$)	
	Peru	Venezuela	Peru	Venezuela	Peru	Venezuela
Small (5 to 20)	451	127	55	9	8 879.2	2 811
Medium (21 to 100)	984	2 120	18	36	20 972.8	61 494
Large (more than 100)	5 912	6 043	27	31	129 967.4	186 309

Prepared by the SAIT secretariat

By way of contrast, the meagre contribution made by small-sized enterprises in Peru (5.6 per cent of output from 55 per cent of the total number of enterprises) would seem to indicate that many enterprises are producing goods of low intrinsic value.

4.7 Levels of remuneration in the sector

With regard to the composition of added value in 1977 remuneration came to 28.5 per cent of the value added (annex II), a figure which is close to that for the chemical industry (31.0 per cent) and higher than the figure for the whole of manufacturing industry (22.4 per cent) (annex III).

Table 5 gives a breakdown of remuneration and numbers employed as between administrative staff and operatives. Administrative staff accounted for 50.1 per cent of numbers employed and operatives for 49.9 per cent, but administrative staff earned 72.6 per cent of remunerations, as compared with 27.4 per cent for operatives.

Table 5

EMPLOYMENT AND REMUNERATIONS

1977

Country	Numbers Employed * (Unit)			Annual Remunerations (thousands of US$)		
	Administrative	Operatives	Total	Wages	Salaries	Total
Bolivia	398	415	813	1 305	607	1 912
Colombia	5 578	5 582	11 160	-	-	28 956
Ecuador	800	1 190	1 190	-	-	5 687
Peru	4 076	3 271	7 347	15 879	6 822	22 701
Venezuela	3 929	4 361	8 290	34 439	11 959	46 398
Total Andean Group	14 781	14 819	29 600	51 623	19 388	105 654

Prepared by the SAIT Secretariat

4.8 Imports and exports of the sector

Table 6 lists the imports and exports of the pharmaceutical sector. The value of exports is barely 9.8 per cent of the value of imports. 9/

The import figures do not include all inputs since some of them are for the chemical sector.

Colombia is the leading exporter, with 73.7 per cent of the total, and most of the exports listed in Table 6 are within the Subregion.

Table 6

IMPORTS AND EXPORTS OF THE SECTOR

1977
(in thousands of US$)

Item / Country	Imports	Exports
Bolivia	17 016	39
Colombia	32 336	11 514
Ecuador	32 741	1 339
Peru	23 674	1 200
Venezuela	53 360	1 541
TOTAL ANDEAN GROUP	159 127	15 633

Prepared by the SAIT secretariat

4.9 Sales

The total sales of the pharmaceutical industry of the Subregion in 1977 were US$802 million 10/ or approximately 1.6 per cent of world sales of the industry, which were some US$50,000 million.

9/ Imported inputs amount to US$159 million, but exports were only US$15 million.

10/ See Table 7.

Table 7

ANDEAN GROUP: COUNTRY BREAKDOWN OF SALES VALUE

1977

Country	Thousands of US$	%
Bolivia	9 288	1.1
Colombia	300 450	37.4
Ecuador	66 314	8.3
Peru	190 768	23.8
Venezuela	235 495	29.4
TOTAL ANDEAN GROUP	802 315	100.0

Prepared by the SAIT secretariat

There has been some decrease in participation by developing countries in general in the world market for pharmaceuticals. In 1968 third-world consumption of drugs was 20 per cent of the total, but this figure dropped to only 15.4 per cent in 1978. The Andean Subregion, with its 1.6 per cent just mentioned, would come below Brazil, which with a figure of 2.9 per cent is the ninth biggest market in the world for pharmaceuticals. 11/

4.10 Domestic and foreign enterprises in the pharmaceutical sector

Decision 24 of the Cartagena Agreement on the Common Regime of Treatment of Foreign Capital and on trade marks, patents, licences and royalties defines as domestic enterprises those which have more than 80 per cent domestic capital, as mixed enterprises those having between 51 and 80 per cent domestic capital and as foreign enterprises those having less than 50 per cent domestic capital.

Using a representative group of 204 enterprises of the Subregion (see Table 8) which together account for approximately 90 per cent of the market, 48 have been qualified as domestic, 142 as foreign and 14 as mixed.

11/ For international comparisons see Joao Valente, Tendencias Farmaceuticas Mundiales, Aspectos del Marketing, La Habana, July 1979. (Seminar on the industrial application of microbiology to the pharmaceutical industry).

Table 8

ANDEAN GROUP

CLASSIFICATION AND PERCENTAGE DISTRIBUTION OF THE CAPITAL OF THE MAIN ENTERPRISES OF THE PHARMACEUTICAL SECTOR BY CATEGORY

1980

Country / Category	Bolivia			Colombia			Ecuador			Peru			Venezuela		
	No. of enterprises	Percentage of total enterprises considered for the country	Percentage of capital	No. of enterprises	Percentage of total enterprises considered for the country	Percentage of capital	No. of enterprises	Percentage of total enterprises considered for the country	Percentage of capital	No. of enterprises	Percentage of total enterprises considered for the country	Percentage of capital	No of enterprises	Percentage of total enterprises considered for the country	Percentage of capital
Domestic	2	33.3	93.9	8	20.0	36.9	8	20.6	6.0	13	28.2	19.1	17	23.6	19.7
Foreign	3	50.0	3.8	30	75.0	62.0	29	72.5	74.1	28	60.9	52.9	52	72.2	79.7
Mixed	1	16.7	2.3	2	5.0	1.0	3	7.5	19.9	5	10.9	28.0	3	4.2	0.6
Total	6	100.0	100.0	40	100.0	100.0	40	100.0	100.0	46	100.0	100.0	72	100.0	100.0

1/ The total capital of enterprises is considered; consequently, there is no breakdown of the amount of foreign capital invested in them.

Consideration of the relationship between the number of enterprises in each category and the percentage they have of the total capital in their respective countries reveals differences in each member country.

For instance, in the case of Bolivia, which is at the lowest level of the sample considered (6 enterprises), the great significance of the domestic enterprises can be appreciated, representing as they do virtually 94 per cent of the total capital of the sample, whereas the three foreign undertakings account for less than 4 per cent of the capital.

In Colombia, although on a much smaller scale, a relative concentration of capital again favours domestic enterprises. Of the total of 40 enterprises considered in Colombia, 75 per cent are foreign (30 enterprises) and account for 62 per cent of the capital, whereas the 20 domestic enterprises account for 37 per cent of the capital. 12/ Again, as in the case of Bolivia the mixed enterprises are virtually negligible.

The contrary prevails in Ecuador and Peru, where mixed enterprises are of considerable significance, doubtless because of internal policies encouraging participation by domestic capital in foreign enterprises. 13/ Three mixed enterprises in Ecuador, amounting to 7.5 per cent of those considered, possess almost 20 per cent of the total capital, while in Peru five enterprises own 28 per cent of the capital. In both cases the enterprises categorized as domestic have less relative importance than the foreign enterprises and, of course, than the mixed enterprises.

Mixed enterprises in Venezuela, just as in Bolivia and Colombia, have an insignificant participation but foreign enterprises have the biggest participation in both absolute and relative terms. The 52 enterprises categorized as foreign (72 per cent) control almost 80 per cent of the total capital under consideration, whereas the 17 domestic enterprises, representing almost 24 per cent of the total, own less than 20 per cent of the capital.

12/ However, the sample of 204 enterprises covers, if not all, at least a substantial percentage of the total of pharmaceutical enterprises operating in the Andean Subregion in 1980. Consequently, the fact that almost 70 per cent of the 204 enterprises considered are foreign is a signal reflection of what is happening in business. It means that in absolute terms capital is concentrated in enterprises of this kind in all member countries except Bolivia. The text refers to relative concentrations; for instance, the fact that eight enterprises account for 40 per cent of the capital indicates that at the average individual level each of these eight enterprises is bigger than each of the 30 accounting for 62 per cent of the capital, even though the 30 together have greater absolute significance.

13/ The Industrial Community Act is a good example in the case of Peru.

An analysis of the over-all sample at the subregional level shows that foreign enterprises are the biggest in number and in percentage of capital, bearing in mind also that the sample covers those which are most significant in terms of the market they supply.

CHAPTER II

CONTRACTING OF TECHNOLOGY IN THE PHARMACEUTICAL SECTOR

1. Imports of technology from 1971 to 1974

The studies of the conditions governing the marketing of technology in the Andean countries from 1971 to 1974 helped to show the restrictive practices embodied in transfer of technology contracts and the costs of technology imports. 14/ 15/

Because of the substantial proportion of contracts for the pharmaceutical sector, most of the studies refer explicitly to the pattern of the marketing of technology in that sector, which usually has considerable effect on the characteristics of the technology imports of the Andean countries.

The main results of the studies are to reveal the presence of restrictive provisions mainly concerning the "tied" supply of raw materials, management of the receiving enterprise and export limitations.

The raw material ties imposed by suppliers of technology had a very significant effect on the general costs of technology imports; they were not limited just to explicit payments, such as royalties, for the tying of patent and trade mark licences to the supply of raw materials made it possible to overcharge for the latter by amounts which in most cases were somewhere between 20 and 300 per cent, particularly in the case of the pharmaceutical industry. 16/ When it is further realized that Colombia imported 77 per cent of all ingredients and Chile 17/ 80 per cent, the great impact of these hidden technological costs on the end prices of products can readily be imagined.

The most frequent contractual provision concerning restrictions on the management of the receiving enterprises included a ban on the use of competitive technologies, the supplier's rights to fix sale and resale prices for products prepared by means of the technologies or under the trade mark, a supplier's option to total or partial purchase, compulsory participation by the supplier in the capital of the technology-purchasing enterprise and commitments going beyond the life of the contract.

14/ Constantino Vaitsos, "Comercialización de Tecnología en el Pacto Andino". Instituto de Estudios Peruanos, Lima - Peru, 1973.

15/ "Efecto del Proceso de Importación de Tecnología en el Peru", ITINTEC, Lima - Peru, 1976.

16/ See Pedro Leon Diaz, "Analisis Comparativo de Contratos de licencias en el Grupo Andino". Committee of the Cartagena Agreement, Lima, Peru. 1971.

17/ Chile withdrew from the Andean Group in October 1976.

A high percentage of contracts contained various forms of import restrictions. In the specific case of the pharmaceutical sector, of the total number of contracts studied there was a total ban on export in 65 per cent of them in the case of Colombia, 80 per cent in the case of Bolivia and 90 per cent in the case of Peru. There were also cases in which permission to export to some countries was given; this amounted to 5 per cent of the total contracts studied in the case of Colombia and 10 per cent in the case of Peru.

With regard to payments for technology, charges varied with the nature of the industrial sector with which the contracts were associated. In the case of the pharmaceutical sector there was an average charge of 8 per cent in the case of Peru and in some cases the figure was as much as 20 per cent of the net sale price. The contractual royalties are not derived from an assessment of the technological content of the contract, the concessions being given as a package, and so it was impossible to break down costs by nature of transfer.

A large proportion of trade mark licensing agreements were tied to the supply of technical information and the provision of quality control services.

Another significant feature to emerge is the high percentage of contracts with a life of more than five years and containing provisions for automatic renewal, thus converting the alleged purchase and sale of technology into what is purely a hiring charge. Also, because of restrictions on the transfer of know-how the receivers were unable to demand a complete transfer of the imported technology.

2. Technology imports from 1975 to 1980

To determine the conditions operating in the trade in technology in the Andean Group countries, all the transfer of technology contracts for the pharamceutical industry in force between 1975 and 1980 were studied.

All the contracts are for the pharmaceutical industry or for the production of finished drugs. Not one of them is for the production of active substances by synthesis or fermentation, two processes which are virtually non-existent in the Subregion, nor for research and development of new drugs.

The process of technology contracting in the Andean Subregion will now be considered in the light of the most significant criteria.

2.1 Number of contracts by nationality of receiving enterprise

A high percentage of the technology transfer contracts in the manufacturing sector of the Andean Group countries are for the pharmaceutical industry which accounted, for instance, for 20 per cent of Venezuela's total contracts and 25 per cent of Peru's.

The 346 technology transfer contracts of the pharmaceutical sector in force between 1975 and 1980 are broken down by member countries as follows:

Venezuela 50.5 per cent, Peru 36.12 per cent, Colombia 7.7 per cent, Bolivia 2.9 per cent and Ecuador 1.73 per cent. 18/

It is very striking that Venezuela and Peru concluded a large number of contracts based on the value of their pharmaceutical production whereas Colombia signed very few. This reflects in some way policy differences between member countries on the contracting of technology in the pharmaceutical industry.

In the case of Colombia, many of the contracts in force in the period under study have lapsed and were not renewed, and so 15 contracts were in force at 31 December 1980 and only five of them, signed by domestic enterprises, specify royalty payments.

Table 9 shows the breakdown of contracts by nationality of the receiving or client enterprise. The domestic enterprises are responsible for almost half the total contracts (48.8 per cent), followed by foreign companies (40.75 per cent), with the mixed enterprises bringing up the rear (9.25 per cent). Information about ownership was not obtained from a few enterprises.

The contracts of domestic enterprises predominate in Bolivia, Colombia and Venezuela while there are more foreign enterprises concerned in Ecuador and Peru. Many of the contracts concluded by foreign enterprises are contracts between subsidiaries and parent companies, although under Andean legislation payment of royalties by way of such contracts is forbidden.

2.2 Number of contracts broken down by countries of origin

Enterprises in member countries have concluded technology import contracts with enterprises based in 27 different countries, some of them Latin American countries (see Table 10) with an advanced chemico-pharmaceutical industry, such as Argentina, Brazil and Mexico, and other Latin American countries with a less developed industry, such as Cuba and Panama.

18/ At present 15 contracts are undergoing approval procedure in Ecuador and have not been considered here.

Table 9

NUMBER OF CONTRACTS AND ENTERPRISES BROKEN DOWN BY NATIONALITY OF RECEIVING ENTERPRISE

(1975 to 1980)

Country	Domestic		Foreign		Mixed		Unidentified		Total	
	No. of Enterprises	No. of Contracts	No. of Enterprises	No. of Contracts	No. of Enterprises	No. of Contracts	No. of Enterprises	No. of Contracts	No. of Enterprises	No. of Contracts
Bolivia	2	8	1	1	1	1	-	-	4	10
Colombia	6	17	12	12	1	1	-	-	19	30
Ecuador	-	-	3	5	1	1	-	-	4	6
Peru	12	44	21	57	5	24	-	-	38	125
Venezuela	20	100	22	66	2	5	4	4	48	175
Total Andean Group	40	169	59	141	10	32	4	4	113	346

Prepared by the SAIT Secretariat

Table 10

ANDEAN GROUP

CONTRACTS BROKEN DOWN BY COUNTRIES OF ORIGIN

(1975 to 1980)

Position No.	Country of Origin	Number of Contracts					Total Contracts	% Participation
		Bolivia	Colombia	Ecuador	Peru	Venezuela		
1	United States	-	9	3	40	53	105	30.3
2	France	-	1	1	18	28	48	13.9
3	Germany	6	3	1	15	12	37	10.7
4	Italy	-	5	-	6	16	27	7.8
5	Switzerland	-	1	1	10	14	26	7.5
6	United Kingdom	-	4	-	5	11	20	5.8
7	Spain	1	-	-	6	5	12	3.5
8	Argentina	2	1	-	4	3	10	2.9
9	Brazil	-	3	-	-	5	8	2.3
10	Japan	-	-	-	2	6	8	2.3
11	The Netherlands	-	-	-	4	3	7	2.0
12	Colombia	-	-	-	5	1	6	1.7
13	Denmark	-	-	-	2	3	5	1.4
14	Mexico	1	-	-	2	2	5	1.4
15	Sweden	-	1	-	1	2	4	1.1
16	Ecuador	-	-	-	1	2	3	0.9
17	Panama	-	1	-	1	1	3	0.9
18	Belgium	-	-	-	1	1	2	0.6
19	Uruguay	-	-	-	1	1	2	0.6
20	Austria	-	-	-	-	1	1	0.3
21	Canada	-	-	-	-	1	1	0.3
22	Cuba	-	1	-	-	-	1	0.3
23	Finland	-	-	-	-	1	1	0.3
24	Liechtenstein	-	-	-	-	1	1	0.3
25	Norway	-	-	-	-	1	1	0.3
26	Portugal	-	-	-	-	1	1	0.3
27	Venezuela	-	-	-	1	-	1	0.3
Total		10	30	6	125	175	346	100.0

Prepared by the SAIT Secretariat

Twelve per cent of Peru's contracts originate from Latin America and almost half of this total (seven contracts) originate from other countries of the Andean Group; however, the receiving enterprises are foreign and mixed, and so there are likely to be links between the suppliers of technology and the investors in the receiving enterprises.

The majority of contracts concluded by member countries (30.3 per cent) are with the United States, followed in decreasing order by France (13.9 per cent), Germany (10.7 per cent), Italy (7.8 per cent) and Switzerland (7.5 per cent). This distribution reflects to some extent the location of the head offices of the parent companies which have subsidiaries in the Andean Subregion.

Clearly, a small number of countries - 5 - with 70.2 per cent of the technology contracts, have a marked technological control over the Andean Subregion.

The heavy concentration of technology origins corresponds in turn to the countries having the greatest number of subsidiaries in the Subregion and is evidence of the existence of an oligopolistic market in the pharmaceutical sector.

As will be shown in greater detail subsequently, the origin of technology is linked with foreign investment, which is concentrated among the same suppliers. If origin of technology is linked with origin of imports or inputs, intermediates and capital goods, such imports are found to come mainly from the same countries that originate the technological know-how.

2.3 Distribution of contracts in the Subregion broken down by subject matter of contract

It is interesting to study the elements involved in the contracting of technology as a means of drawing conclusions about the real contribution which importing technology into the Subregion makes and of distinguishing the various specific policies applied by the member countries, even though all of them have incorporated Decision 24 into their legislation. It also shows the flexibility of application possible under the Andean Common Regime.

Most of the contracts studied relate to more than one subject matter and refer to the use of trade marks accompanied, as a rule, by some form of supply of technical information and/or quality control.

It can be gathered from Table 11 that 85 per cent of the contracts involve licences for the use of trade marks which do not in themselves constitute a transfer of technology. Some of these contracts refer to the trade mark or trade name of a drug and others to the general trade mark of company for use with a set of drugs.

Table 11

NUMBER OF CONTRACTS BROKEN DOWN BY SUBJECT MATTER

(1975 to 1980)

Country	Total No. Contr.	Trade Mark	Process	Product	Technical Assistance	Marketing Advice	Training	Visit by Engineers To Receiving Enterprise	Quality Control	Technical Information	Unspecified
Bolivia	10	8	9	9	10	-	1	3	9	9	-
Colombia 1/	30	26	3	10	12	-	-	5	6	17	-
Ecuador 2/	6	6	5	1	3	-	1	1	2	4	-
Peru	125	113	2	1	10	32	-	10	83	121	-
Venezuela	175	141	29	-	69	-	1	-	1	44	37
Total Andean Group	346	294	48	21	104	32	3	19	101	195	37

Prepared by the SAIT Secretariat

1/ Includes 16 contracts in force, only 5 of which specify royalties, 3 in course of renewal and 11 lapsed.

2/ Includes 5 contracts in force and 1 where renewal is pending.

One of the possible reasons for this behaviour is that after a substance has been invented, tested and accepted on the market, it can be imitated at significantly lower cost by other firms, which is why transnational companies use trade marks as the main element of their marketing policy.

This tendency to protect pharmaceutical products through the agency of registered trade marks is responsible for a marked preference for branded goods, due to doctors recommending them (see comments on high publicity costs), even though the therapeutic effect is the same as that of the basic and much cheaper drugs.

The next most common item in contracts is the supply of technical information, which is mentioned in 56.3 per cent of them, followed by quality control (29.2 per cent) and technical assistance (30 per cent).

In practice technical information and quality control come down to supplying "operating manuals" which will be described later on.

The technical information in the Operating Manuals can be contracted by national producers with a view to using a trade mark considered to confer status on the product and in some cases in order to obtain formulas or processes readily even though the know-how and resources to develop them are available locally. Foreign producers often contract the technological information of their parent companies in order to ensure that the subregional subsidiary produces the same products as those produced by other subsidiaries elsewhere in the world, thus maintaining the "status of the trade mark". This kind of contracting is useful for transnational concerns but does not make any great technological contribution to the Subregion.

Only 13.5 per cent of contracts refer to processes and 6.1 per cent to products. Training, which could be a useful technological contribution, is mentioned in less than 1 per cent of contracts.

2.4 Conditions of contracting technology

(a) Life of contracts

Of a sample of 216 contracts on which information as to their life could be obtained (see Table 12), it was found that 78 per cent have a life of up to five years, [19/] but only 11 per cent have a life of more than 8 years.

19/ It is clear from studying each individual contract that many of them have an authorized life of five years.

Table 12

ANDEAN GROUP: LIFE OF CONTRACTS BROKEN DOWN BY TYPE */

Life in Years / Type of Contract	Up to 3	3 to 5	5 to 8	More than 8	Unspecified	Total	% Participation
First between the parties	19	31	5	8	3	66	30.6
Modification of existing contract	12	39	4	4	2	61	28.2
Substitution of earlier contract	12	22	1	2	1	38	17.6
Extension of existing contract	22	12	4	11	1	50	23.1
Unspecified	-	-	-	-	-	1	0.5
Total	65	104	14	25	8	216	100.0

Prepared by the SAIT Secretariat

*/ In the case of Venezuela, of the 175 contracts covered by the period of study only 45 have been considered, the information from the remainder appearing to be irrelevant.

Contract life is tending to shorten because some member countries are refusing to authorize new contracts with a life of more than five years. However, most of the contracts analysed involve automatic renewal despite the absence of specific provisions on this point, which means in practice that the contracts are for an indefinite period or in any case subject to some kind of condition relating to an effective transfer of technology. 20/ In this context it is enlightening to note that more than 23 per cent of contracts are extensions of previous contracts, the figure rising to 69 per cent of the sample if it includes contracts approved subject to amendments or substitutions, many of which could be regarded as extensions of previous contracts with variants.

(b) Contractual royalties and forms of payment

The commonest form of payment noted in technology contracts for both the pharmaceutical sector and generally in the Subregion is a fixed percentage on the value of net sales; some contracts specify fixed payments or a fixed charge per unit produced but their number is negligible.

The reason for there being so many royalty contracts based on a fixed percentage on net sales is the ease with which the assignor can check the payments once the user's volume of sales is known. It would also help the assignor to increase his income by means of technology, since it is usually the assignor who provides the inputs and raw materials at a cost which represents a substantial proportion of end product total cost and is reflected correspondingly in the sale price.

The study of contractual royalties was carried out on the basis of linking royalties with the number of contracts (see Table 13). It emerg that approximately 25 per cent of contracts say nothing about royalty payments, most of the contracts of this kind being between a parent company and a subsidiary and therefore falling under the royalties [illegible] Governments of the Andean countries. Forty per cent of [illegible] specified royalties of less than 5 per cent and 25 per cent of contracts specified higher figures.

20/ As a rule, a minor amendment to the conditions of a contract seems to be sufficient to renew it. The amendment usually consists of adding a new feature said not to have been permanently taken up by the user or not yet to be public property.

Table 13

NUMBER OF CONTRACTS BROKEN DOWN BY CONTRACTUAL ROYALTIES

(1975 to 1980)

Contractual Royalties (% on net sales)	Bolivia	Colombia	Ecuador	Peru	Venezuela	Total Andean Group
None	-	11	-	28	50	89
Up to 3	-	6	1	10	11	28
From 3 to 5	2	5	1	72	31	111
From 5 to 8	2	4	3	13	31	53
From 8 to 10	6	-	-	-	21	27
Above 10	-	1	1	-	5	7
Other forms of payment	-	2	-	2	3	7
Contracts not specifying type of payment	-	1	-	-	23	24
Total	10	30	6	125	175	346

Prepared by the SAIT Secretariat

With regard to total royalty payments from 1975 to 1980, data are available only for Colombia and Peru. In this period Colombia remitted royalties abroad to the value of US$364,000, averaging US$60,800 per annum or less than 0.001 of the added value of the production.

In the same period Peru remitted pharmaceutical royalties abroad to the value of US$3,600,000, representing approximately 10 per cent of total royalties paid by Peru and averaging out at US$600,000 per annum or almost 1 per cent of the value added of production.

These figures show that the amounts paid directly for transfer of technology in the pharmaceutical sector vary considerably, although other indirect payments for technology, such as the purchase by a subsidiary of raw materials from its parent company, must be borne in mind.

3. Participation of transnational undertakings

It is interesting to observe the behaviour of transnational capital in the pharmaceutical sector of the Andean Subregion and its importance as compared with that of undertakings classified as domestic or mixed.

What makes this aspect interesting is that much of the technology imported by the Andean Subregion comes from a readily identifiable group of transnational concerns whose world-wide production compels Andean Group enterprises to contract trade marks in order to stay in the market. Also, the transnationals offer not just technology but also direct participation through the agency of inputs of capital either in association with domestic capitalists or more often by setting up subsidiaries, a step which, in a business as highly competitive as pharmaceuticals, gives the transnationals a great advantage over the domestic entrepreneur, for there are apparently no restrictions on the conditions in which technology is offered to subsidiaries, not to mention the advantage of belonging to an organization with world-wide operations.

Table 14 gives details of the country of origin of foreign capital for a significant number of foreign, domestic and mixed enterprises about which information was obtainable. Foreign capital is supplied to the pharmaceutical sector of the Andean Group by a relatively small group of countries, five of which at most are of major significance.

Table 14

COUNTRY OF ORIGIN OF FOREIGN CAPITAL BROKEN DOWN BY THE NUMBER OF LARGER ENTERPRISES IN THE PHARMACEUTICAL SECTOR OF THE ANDEAN SUBREGION

Country of Origin of Capital	Number of Receiving Enterprises											
	Bolivia		Colombia	%	Ecuador	%	Peru	%	Venezuela	%	Grand Total	%
1. Argentina	2				1	3.0					3	2.1
2. Belgium									2	3.2	2	1.4
3. Bermuda			1	5.0	2	6.1	-		1	1.6	4	2.8
4. Canada			1	5.0	2	6.1	3	13.0	3	4.8	9	6.3
5. Colombia									1	1.6	1	0.7
6. Denmark					1	3.0					1	0.7
7. France					2	6.1	1	4.4	3	4.8	6	4.2
8. Germany	1	25.0	2	10.0	7	21.2	1	4.4	3	4.8	14	9.9
9. Italy			1	5.0			2	8.7	1	1.6	4	2.8
10. Liechtenstein			1	5.0							1	0.7
11. The Netherlands									1	1.6	1	0.7
12. Panama			2	10.0	2	6.1	3	13.0	5	8.1	12	8.5
13. South Africa									1	1.6	1	0.7
14. Spain	1	25.0			1	3.0			2	3.2	4	2.8
15. Switzerland			4	20.0	4	12.1	4	17.4	8	12.9	20	14.1
16. United Kingdom			2	10.0					4	6.5	6	4.2
17. United States of America			6	30.0	10	30.0	8	34.8	24	38.7	48	33.8
18. Uruguay			-	-	-	-	1	4.4	-	-	1	0.7
Unspecified					1	3.0			3	4.8	4	2.8
	4	100.0	20	100.0	33	100.0	23	100.0	62	100.0	142	100.0

N.B.: In addition to this breakdown it must be remembered that:

(a) Capital from Panama and Bermuda participates in one Colombian enterprise and capital from Canada, Uruguay and Bermuda in another.

(b) Swiss, US and Canadian capital participate in one enterprise in Peru, Uruguayan and Bermudan capital in another and Canadian and Swiss capital in another.

(c) Bermudan, Uruguayan and Canadian capital participate jointly in an enterprise in Ecuador.

(d) In Venezuela Bermudan and Uruguayan capital participate jointly in one enterprise and Italian and French capital in another.

In the Table only one country in each case has been considered as a supplier of capital (the first mentioned).

In approximately 34 per cent - 142 - [21] of the total number of enterprises classified as foreign, there was participation by United States capital in 48 of them, followed in descending order by Switzerland (20; 14 per cent), Germany (14; almost 10 per cent), Panama (12; 8.5 per cent) and Canada (9; 6.3 per cent). It is interesting to note that this geographic distribution of capital is virtually the same for each individual country of the Andean area except for Bolivia, about which further information was not obtainable.

In general terms, the significance of the United States as a supplier of capital to the subregional pharmaceutical industry merely corroborates the trend observed in the behaviour of foreign investment as a whole. For instance, from 1971 to 1977 53.3 per cent of total foreign investment in the Andean Group [22] originated in the United States, 8.9 per cent in Panama and 6 per cent in Switzerland. [23] Germany and Canada, however, contribute considerably below 2 per cent despite their relative importance as a source of investment in the pharmaceutical sector.

To illustrate the role of transnational capital in the pharmaceutical sector, it is very important to consider the behaviour in the Andean Subregion of the concerns which dominate drug production world wide. For the present study it proved possible to identify 21 transnational concerns [24] participating alone or in association with domestic capitalists and with other smaller foreign capitalists (see Table 15). Two conclusions can be drawn immediately, one concerning the extent of participation (measured by the number of subsidiaries) and the other connected with relative size based on the amount of capital invested. For instance, there are transnational concerns which have subsidiaries or participations in almost all the member countries of the Andean Group (except Bolivia). [25] This is the case with Abbott (participating in four enterprises), Ciba-Geigy (in four enterprises), Merck-Sharp and Dohme (in four enterprises) and Roussel Uclaf (in five enterprises, two of them in Venezuela). Special mention should be made of the case of the German Schering group

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21/ As noted in Table 8, the total number of enterprises is 204, 142 of which are classified as foreign.

22/ Excluding investments in oil.

23/ "Evaluacion del Proceso de Integracion 1969-1979", Anexo Tecnico No. 4: Inversión Extranjera. Junta del Acuerdo de Cartagena. (JUN/di 360, 30 March 1979).

24/ A few concerns of substantial importance, such as Bayer, Wyeth and others, had to be left out for lack of information. Similarly, in the case of some concerns such as Sydney Ross or Squibb and Squibb Sons, information was obtainable for only some countries of the area although of course they operate virtually throughout the Andean Group.

25/ United Nations Centre on Transnational Corporations. List of enterprises in the Andean Group.

Table 15

DEGREE OF CONCENTRATION OF TRANSNATIONAL CAPITAL IN THE PHARMACEUTICAL SECTOR OF THE ANDEAN GROUP

TRANSNATIONAL UNDERTAKINGS	REGISTERED OFFICES AND OFFICES OF SUBSIDIARIES	ANDEAN GROUP			
		No. of capital-receiving enterprises	No. of countries of the Subregion in which they participate	Capital supplied	Percentage
1. Abbott Laboratorios	Panama	4	4	4 409	4.2
2. American Cyanamid	USA	2	2	12 449	11.9
3. Bristol-Meyers	USA				
	Panama	3	3	386	0.4
4. Canadian Pharm., Chem. & Trading, Pluto, SAPAC	Bermuda				
	Canada				
	Uruguay	4	4	12 163	11.6
5. Carlo Erba	Italy	2	2	556	0.5
6. Ciba-Geigy	Switzerland	4	4	8 461	8.1
7. Glaxo Group	UK	2	2	1 816	1.7
8. Johnson & Johnson	USA	2	2	3 568	3.4
9. Merck Holding	Switzerland	2	2	412	0.4
10. Merck-Sharp & Dohme	USA	4	4	10 393	9.9
	Panama				
11. Parke Davis & Co.	USA	2	2	1 571	1.5
12. Pfizer Inc.	USA				
	Panama	4	4	6 864	6.6
13. Pharma Investment, Chem. Pharm. (BOEHRINGER)	Canada	3	3	2 288	2.2
14. Roussel Uclaf	France	5	4	4 703	4.5
15. Sandoz	Switzerland	4	2	5 990	5.7
16. Schering AG, Chebag, Duco AG	Germany	6	3	4 510	4.3
17. Schering	Switzerland				
	Bermuda				
	USA	5	4	9 564	9.2
18. Squibb Sons	Switzerland				
	USA	3	3	1 544	1.5
19. The Sydney Ross Co.	USA	2	2	2 708	2.6
20. Transamerican Chemical (HOESCHT)	Canada	3	3	6 295	6.0
21. Upjohn Co.	USA				
	Panama	2	2	3 980	3.8
TOTAL		68	-	104 630	100.0

1/ The figures compiled for capital supplied might be higher in some cases, e.g. Bristol-Meyers and Johnson & Johnson, but no alternative data sources were available to check them.

(consisting of Schering AG, Chebag and Ducc AG) which participates in the capital of three foreign pharmaceutical enterprises in Ecuador - and is therefore the second largest contributor of capital after Merck-Sharp and Dohme - in two smaller concerns in Venezuela and in one in Peru. Noteworthy too is a group of undertakings which are apparently not among those usually identified as the biggest in the sector world wide. These concerns are Canadian Pharm, Chemical and Trading, Pluto and Sapac, a group which, apparently without obvious ties, 26/ participates as a unit in all the countries of the area except Bolivia, providing very significant amounts of investment. Together they make up 11.6 per cent - the second highest percentage - of the almost US$105 million invested in the Andean Region Group by the 21 concerns considered and are outstripped only by American Cyanamid (11.9 per cent), which has a much smaller spread (one concern in Ecuador and one in Venezuela); they are bigger than Merck-Sharp and Dohme (9.9 per cent), which has a similar spread. On the other hand, two of the transnationals which participate in the relatively large number of concerns (the German Schering group and Roussel Uclaf) contribute relatively little capital (4.3 per cent and 4.5 per cent respectively).

The percentage participation of transnationals in the undertakings they have set up in the Subregion is another interesting point. In the case of Peru, none of the 13 receiving enterprises identified has 100 per cent foreign capital. The highest percentage found in the sample was 89.2 per cent (Schering group in one enterprise). However, the situation was quite different in the other Andean countries, as in Bolivia, where 99.9 per cent of the capital of one enterprise is provided by a transnational corporation, and in Colombia, where nine of the 11 receiving enterprises identified were found to have 100 per cent transnational capital, in Ecuador, where eight out of 18 companies had 100 per cent transnational capital and three had more than 99 per cent, and in Venezuela, where 14 out of 25 concerns had 100 per cent transnational capital. This difference follows from the law passed in Peru setting up the Industrial Community 27/ and compelling every enterprise of the industrial manufacturing sector, whether classified as domestic or mixed or foreign, to arrange for its workers to participate in the business capital and in management.

A study of Table 15 further corroborates the importance of the United States as a main geographical source of foreign capital in the pharmaceutical sector of the Andean Group and also of Panama 28/ and Switzerland.

26/ Note that they have their registered office and offices of subsidiaries in Bermuda, Canada and Uruguay.

27/ Subsequently modified.

28/ The percentage participation of the United States would be greater if Panama was to be regarded as a country which serves for the transit of United States capital and produces no technology of its own.

CHAPTER III

CONTROL OF TECHNOLOGY IMPORTS

1. Instruments and machinery

One of the first measures to issue from the Commission of the Cartagena Agreement to harmonize subregional policy was Decision 24 on the common regime for treating foreign capital and on trade marks, patents, licences and royalties. Decision 24 was incorporated 29/ in the domestic legislation of member countries, whereafter national authorities were set up to apply it.

Except for Colombia, where the Royalties Committee was set up in 1967, the other countries of the Subregion had no experience in studying, approving and recording technology import contracts, which are gradually increasing in number as a result of the import substitution policies initiated by member countries with effect from the decade of the 1960s.

Different studies of the matter show that the technology marketing process had features which were detrimental to the economy of the enterprises and of the receiving countries and which in the end really worked against the interests of the consumers of the products produced under the contracts, since the direct, indirect and "hidden" costs of technology imports are easily transferred to end product prices in the monopolistic or oligopolistic structure of the economy of the Andean countries.

The Andean countries therefore adopted Decision 24, which is the first rule in the world on the treatment of technology imports. Developing countries which adopted similar laws subsequently included the basic principles of Decision 24, such as the elimination of restrictive provisions or practices in import technology contracts, a ban on royalty payments between a technology supplier and a technology receiver when the transfer is between a parent company and a subsidiary or between subsidiaries of the same parent company, the decision that technological contributions cannot be regarded as contributions of capital, and the undertaking to respect the domestic jurisdiction and competence of the receiving country to solve disputes arising from such contracts.

Also, under Decision 24 technology import contracts must cover at least the following points:

29/ Bolivia, D.L. 9788 of 30 June 1971. Colombia, D.1900 of 5 September 1973. Ecuador, D.S. 974 of 30 June 1971. Peru, D.L. 18900 of 30 June 1971. Venezuela, Act of Congress of 26 September 1973.

(a) Identification of the modalities of the transfer of the technology being imported;

(b) The contractual value of each of the elements involved in the transfer of the technology;

(c) Determination of life of contracts.

All these provisions are aimed at checking the excesses committed by suppliers of technology dealing with a receiver who is negotiating from a position of weakness precisely because the receiver is unaware of the characteristics of the "goods" he is trying to obtain and will not become aware of them until he pays for them. In a technology market of a monopolistic or oligopolistic nature, the intrinsic structural weakness of the purchaser could only be strengthened by indirect participation of the State of the receiving country in technology negotiations.

Consequently, Decision 24 sets up competent national authorities 30/ responsible for evaluating, licensing and recording technology import contracts.

Decision 24 was not inspired, nor has it been applied, by the member countries in order to look for confrontation with those having the technological know-how necessary for the development of the Andean Group. It was devised to define clearly rules which will safeguard the legitimate rights of suppliers and receivers of technology by trying to clarify relations between them and to improve the ability to absorb imported technological know-how and by clearly showing the contractual value of each of the elements involved in the transfer of technology.

The setting up of competent national authorities for licensing and recording foreign technology investment in the countries of the Subregion is one of the most important pieces of institutional machinery of the Andean Group's technology policy, even though the application of Decision 24 is not completely uniform in the Andean countries.

Now that it has been institutionalized in the various member countries, the conditions in which technology contracts are negotiated are beginning to improve for various reasons, including:

30/ Bolivia: National Investments Institute, Central Bank. Colombia: Royalties Committee, Industry and Trade Board; Bank of the Republic (Exchange Office). Ecuador: Foreign Investment Authority of the Ministry of Industry, Trade and Integration and the Central Bank. Peru: National Committee on Foreign Investment and Technologies (CONITE) and Ministry of Economy and Finances. Venezuela: Foreign Investment Authority (SIEX).

(a) Training of subregional personnel in the legal, economic and technological aspects of the marketing of technology;

(b) Systematic processing of information about the conditions of technological marketing;

(c) The link between the new authorities and the Subregion's institutions for generating technology, enabling the latter to identify areas of know-how of interest for the local productive sector;

(d) The presence of the national interest in private negotiations on technology, as represented by the authorities mentioned.

One of the main reasons for mistakes made in technology marketing is without any doubt the lack of experience in negotiation procedures, for many enterprises need to purchase technologies only once throughout their existence, because thereafter they stay bound to one supplier and either do not need to look for alternatives or have insufficient initiative to do so. The personnel of the competent national authorities has an opportunity of thoroughly revising many contracts in a short time and thus accumulates information and negotiating experience which can be used subsequently in the form of appropriate advice to the entrepreneurs of the Subregion.

The national authorities of the member countries are organized in two different ways. Colombia, Ecuador and Peru have a two-tier organization with a Technical Secretariat and a Committee for Evaluating Technology Contracts. The Technical Secretariat studies contracts and prepares the corresponding legal, economical and technical reports and transmits them to the Committee, which is the decision-making body.

The Venezuelan authority is a single body performing both functions, the final decision being taken by a top executive of the authority. Bolivia has a decision-making authority which is advised by another public body for the technical evaluation of contracts.

All the competent national authorities of the member countries form part of the SAIT Information Network on the Transfer of Technology, enabling them to have a continuous exchange of the data and experiences accumulated by each authority, with a multiplier effect on the information available at subregional level.

2. Possession of know-how (Decision 85)

The studies carried out in the Andean Group and in Latin America helped to formulate a critique aimed particularly at traditional industrial property systems based on the criteria of the developed European countries. Criticism of the traditional industrial property systems 31/ has been directed more particularly against patent rules and regulations, although it is applicable to other industrial property rights too. The main thrust of the criticism has been to question the validity of the assumptions behind those rights and the principles governing them.

A number of adverse economic and social effects have been identified as stemming from traditional industrial property systems, such as the high concentration of patenting in a small number of transnational or foreign concerns, control and capture of domestic markets by foreign concerns, hampering of local inventiveness, a share-out of the world market between the major internationals by patent cartels or cross-licensing, control of technology-using enterprises through the agency of tying clauses, delays in the possibilities of local research and political dependence.

Decision 85 on industrial property goes a long way towards establishing the legal framework for eliminating the problems arising from earlier patent and trade mark laws. In brief, Decision 85 bans the granting of patents for pharmaceutical products, active therapeutic substances and foods for human and animal use and it reserves the right for governments of member countries to ban the granting of patents affecting national development. It introduces the conditional patent 32/ and it states expressly that a patent does not grant an exclusive right to import the product covered by the patent or made by the patented process.

Patents lapse if not worked and the burden of proof of working is transferred from the Patent Office to the owner of the patent; 33/ also the principle of compulsory licensing 34/ and routine licensing 35/ is introduced.

31/ See inter alia Constantino VAITSOS, "Comercialización de Tecnologia en el Grupo Andino", Instituto de Estudios, Peruanos, Lima, Peru, 1973.

32/ Member countries can grant patents with conditions for working.

33/ The patent is granted for 10 years and in the fifth year of its life the owner must prove working, otherwise the patent lapses.

34/ The owner of a patent must grant a compulsory licence if after three years the patented invention has not been worked in the country or if working has been suspended for a year or if the working does not satisfy national requirements of quantity, quality or price. Also, the competent national patent office can, five years from the date of grant of a patent, grant a compulsory licence irrespective of the grounds mentioned.

35/ The government of the respective country can compel the licensing of any patents related to public health or national development needs.

The technology policy aimed at independent development of the Andean Group and at controlling and removing factors reducing independence in technology decisions is expressed in Decision 85 by provisions which do not discriminate against technology-owning foreign concerns but reduces the period of the privilege of monopoly working, provisions compelling permanent working of the patent from the third year of its grant and provisions for compulsory licensing or the lapsing of patents inadequately worked within the specified terms.

3. Effects of government control machinery on the conditions of technology imports

As a result of Decisions 24 and 85 of the Cartagena Agreement and of the setting up of national authorities for licensing technology transfer contracts, such contracts have been controlled in the Andean Subregion more particularly in respect of the following aspects:

(a) Royalty payments from a subsidiary to its parent company and between subsidiaries of any one parent company are completely banned;

(b) Licences to work patents covering pharmaceutical products have been banned in the Andean Group countries, since under Decision 85 patents cannot be granted for them. In the past, contracts covering this kind of licence were very common;

(c) The rates of royalties permitted to be sent abroad has been reduced. For instance, the average permitted royalty in Colombia is about 3 per cent on net sales, while in Peru, where royalty payments of between 10 and 20 per cent were common, they have been reduced to a maximum of 5 per cent; 36/

(d) The life of contracts has been shortened. In Colombia, the practice used to be to contract for 10 to 15 years, but the maximum now permitted is five years and the commonest is three years. These regulations help to study the benefits of the contract over a reasonably short time and see whether or not it should be extended;

(e) Since under Decision 24 technology transfer contracts must not contain certain restrictive provisions, there is a ban in the Andean countries on contracts making it obligatory, for instance, to purchase raw materials or capital goods from a particular source or banning the use of supplementary technologies or containing restrictions on the volume and structure of production or any other provision of equivalent effect;

36/ Rules on rights and obligations of assignors and assignees of foreign technologies, trade marks and patents. Resolution of the Directorate of CONITE No. 0005-81-EFC-35.

(f) In some of the countries the competent national authorities have introduced additional rules for controlling their technology transfer contracts; for instance, in Colombia the following are grounds for refusal of contract:

Similar products are produced in the country and do not pay royalties;

Inadequate contribution to national economic and social development;

There is no actual transfer of technology, which has already been assimilated by the country's own engineers;

Contracts with established concerns are approved only if such concerns implement them directly or themselves produce in their own facilities the products covered by the contracts, to the exclusion of marketing concerns.

Peru and Venezuela take into account some of the foregoing considerations plus the technological contribution in the use of local labour.

CHAPTER IV

IMPACT ON THE TECHNOLOGICAL LEVEL OF THE PHARMACEUTICAL INDUSTRY

1. Present state of development of the chemico-pharmaceutical industry

The supply of drugs to meet a country's therapeutic requirements can, depending upon the state of its development and integration, be in one of the following phases:

(a) No existing chemico-pharmaceutical industry: import of finished drugs;

(b) Primary pharmaceutical industry: import of dosified pharmaceutical forms for packaging;

(c) Existence of a pharmaceutical industry and imports only of the active ingredients necessary for the formulation and packaging of the drugs;

(d) Existence of a pharmaceutical industry and of pharmochemical plants for the manufacture of at least some of the chief active ingredients;

(e) Advanced development and level of integration of the chemico-pharmaceutical industry and ability to create new products.

The developed countries are characterized by their integrated domination of the latter phases, whereas the developing countries are in most cases concerned with activities at levels (a) and (b) and in just a few cases at level (c).

Most of the countries of the Andean Subregion have reached level (c).

All the Andean Group countries have a very highly developed pharmaceutical industry which can supply approximately 90 per cent of drug requirements, except for Bolivia, which supplies approximately 30 per cent of requirements.

The pharmochemical industry, on the other hand, is only just beginning, although it is producing a few therapeutically active substances including ampicillin and chloramphenicol, for which the final stages of synthesis are carried out in Peru, and acetylsalicylic acid and aluminium hydroxide, which are manufactured in Colombia.

Some of the countries of the Andean Subregion also produce auxiliary products for the chemico-pharmaceutical industry such as citric acid, glucose, sorbitol, glycerin, starch and ethyl alcohol.

The production of ancillary items such as glass bottles, flasks, rubber stoppers, metal stoppers, cellophane and aluminium strip and other items, is fairly well developed, but with differences between individual member countries.

2. Technological characteristics of the sector

In any study on the transfer of technology in the chemico-pharmaceutical sector it is essential to make a clear differentiation between the pharmochemical industry, producing active substances, and the pharmaceutical industry, preparing dosified drugs, since the technological characteristics and the problems arising in connection with the transfer of technology are very different in these two branches of the industry.

2.1 Technological characteristics of the pharmaceutical industry

The technology of the pharmaceutical industry is not particularly complex. To process active substances into dosified pharmaceutical forms, formulations must be designed which include the pharmochemical substances together with inert substances or excipients which have no pharmacological action and which serve to impart desirable properties to the end product such as exact dosification, ease of administration, stability, proper absorption by the organism, taste and colour. In some cases features such as rapid or slow release of the drug are required.

Formulations must also take account of the behaviour of the product in the machinery used for industrial production.

The technology of the pharmaceutical industry also includes the selection of packaging which will preserve the product in the environmental conditions in which it will be stored until distribution.

The technology also includes quality control procedures, described in pharmacopeias, and the selection of manufacturing equipment.

The technologies used for the production of pharmaceuticals in each laboratory are described in manuals describing raw materials specifications, product formulation and packaging and quality control processes.

Although the preparation and use of the manuals calls for expert knowledge, the processes and techniques they contain are conventional in this kind of industry. The experts of the Subregion have sufficient knowledge and experience not only to learn from the manuals but also to prepare them and to devise their own formulations and production processes, as shown by the fact that many domestic laboratories have not purchased any foreign technology. Also, practically all the engineers of the domestic and foreign laboratories of the Subregion are nationals of the countries where the laboratories are set up.

2.2 Technological characteristics of the pharmochemical industry

The technology for manufacturing active substances requires more advanced and expert knowledge than the technology needed for the pharmaceutical industry.

Most therapeutically active substances are organic chemical compounds produced by synthesizing relatively simple molecules or by microbiological fermentation methods combined with some synthesizing processes.

The synthesis necessary to prepare pharmochemical compounds uses the conventional reactions of the organic chemical industry and is carried out in one or more stages, depending upon end product complexity and the availability of chemical intermediates.

Antibiotics such as penicillin, erythromycin and tetracycline are manufactured by fermentation processes consisting mainly of seeding with a variety of fungi specific to each antibiotic, an aqueous fermentation agent containing substances such as glucose, crushed maize liquor, saccharose, soya and some mineral salts.

The antibiotic is produced in the agent by metabolism of the fungi and is extracted with solvents upon completion of fermentation. The process may be supplemented with synthesizing operations.

The chemical and petrochemical industries of the Subregion are sufficiently developed to assimilate technologies in their sectors, but many of the synthesizing processes used in the pharmochemical industry are very specialized and nothing is known about them in the Subregion.

The technological difficulty is even greater in the fermentation processes, where it is essential to have very strict control of conditions such as selection of appropriate micro-organisms, accurate composition of the culture agents and carefully controlled purification and sterilization of the end products, all of which govern the yield and quality of the antibiotic.

Clearly, therefore, when the pharmochemical industry is set up in the Subregion, the necessary technology will have to be contracted with the transnational concern which already has it.

In connection with such contracts, the pharmochemical industry would very probably begin with the production of products which have been on the market for several years, the patents of which have lapsed or are about to lapse and for whose production various technologies are offered by transnational or independent concerns. Technology which is available in Latin American countries such as Argentina, Brazil and Mexico could also be obtained.

2.3 Research and development of new drugs

This is the most specialized phase of the whole chemico-pharmaceutical industry and requires highly skilled personnel and heavy capital investments.

The birth of a new product starts with chemical research aimed at synthesizing new substances or with microbiological research aimed at the preparation of antibiotics by fermentation.

The next step is biochemical research, which studies the effect of the resulting compounds on living organisms, usually animals, and this is followed by pharmacological research to determine the potency of the drugs and to find out about their toxicity and probable side effects.

The final stage is to determine the technical and economic conditions for production on an industrial scale, involving design of equipment, raw materials availability and so on.

This basic research is very expensive and failures may occur when the compounds prepared do not come up to expectations.

Consequently, the development work for many drugs seems to be carried out in the main by transnational companies big enough to deal with this kind of work.

Nevertheless, the Andean countries have done some research and development work on formulation and production processes in the pharmaceutical industry and on medicinal plants and strains likely to be useful for antibiotics production.

3. Impact of technology imports on the Subregion

The contribution of technology imports to the development of the pharmaceutical industry of the Subregion in the period under study has been virtually zero if inter alia the following factors are considered:

(a) The technology of the pharmaceutical industry has now been assimilated by national engineers and is basically the same for the foreign laboratories;

(b) Most contracts specify licences for the use of trade marks assigned by transnational companies to their subsidiaries or by foreign companies to domestic laboratories, which latter use them to give their products a status name which is considered to ensure better reception by doctors and the public than local names;

(c) Trade mark licences are often accompanied by "Manuals of Manufacture" containing formulas and production processes which could have been developed locally, their main purpose being to ensure uniformity of the products made by transnational companies in different parts of the world; however, they do not provide the Andean Group countries with new technology;

(d) None of the contracts involves process engineering and only a few of them specify training;

(e) There is no real transfer of foreign technology to the various pharmaceutical enterprises of the Subregion, the pharmaceutical sector has stagnated and there is no research and development of products or active substances;

(f) Some enterprises do not have their own plant and do not directly prepare the products on which they pay royalties, being nothing more than marketing organizations whose products are prepared by third parties under production contracts, so that there is little need for foreign technology;

(g) The dependence of pharmaceutical products on foreign trade marks often leads to tied supplies of active substances when the latter are prepared by patented processes in countries of origin by the technology supplier. Even if not proved legally, "gentlemens' agreements" are a hard fact in this sense.

Nevertheless, when the pharmaceutical industry started up in the Andean countries about 40 years ago, the technology of the transnational concerns setting up in them was assimilated, leading to the subsequent development of national laboratories and the training of experts.

In the near future the Andean Subregion might need to purchase technology for the pharmochemical industry in order to produce active substances, beginning probably with the preparation of fairly well-known products and with the extraction of active principles from medicinal plants which abound in the Andean countries.

Contracting of technology in appropriate conditions for the pharmochemical sector might, therefore, make a substantial contribution to the Subregion's technological development.

CONCLUSIONS AND RECOMMENDATIONS

This sectoral study on the transfer of technology in the pharmaceutical sector of the Andean Subregion is the first study prepared by the Board of the Cartagena Agreement on the import of technology for an industrial branch since the approval of Decision 24. The main conclusions to be drawn from the study and the corresponding recommendations will now be given.

A. CONCLUSIONS

1. The comparative study of the characteristics of the pharmaceutical industry in the Andean Subregion and of the conditions in which imported technology is contracted have helped to identify the existence of differences in the criteria with which Decision 24 is applied to technology imports. It has been done within the framework of a strict respect for spirit and letter of Decision 24 but making use of the flexibility thereof, thus ensuring proper adaptation to the differing conditions in member countries.

2. Each member country has available sufficient organized information on the conditions in which technology import contracts are concluded and on the experience gained by the competent national authorities responsible for evaluating, recording and checking the contracts. The pharmaceutical sector, selected for the present study, covers a significant sample (between 20 and 25 per cent) of the field of technology contracts in the manufacturing sector which have been operative in the Andean countries in the period 1975-1980.

3. The information so far existing in the Subregion has not helped to increase the technology-negotiating ability of the receiving concerns since the ability has not been sufficiently accessible to potential users nor shared between member countries, which explains why some countries have obtained better conditions than others in contracting for imported technology.

4. Even if the subject of investment of transnational companies in the pharmaceutical sector of the Subregion was not the main theme of the present study, the information on this point is abundant too, which may make it possible in the near future to prepare studies aimed at discovering the operating strategy of transnationals and implementation of the provisions of Decision 24 on foreign capital.

B. RECOMMENDATIONS

1. There is an urgent need to define the operating machinery and provide the conditions which will stimulate permanent flow of information in the Andean Group on technology imports in association with the SAIT Information Network on Technology Transfer;

2. In order to amplify the amount of information available in each of the member countries, links should be strengthened with other regional and international information systems such as the Latin American Technological Information Network (RITLA), the Technological Information Exchange System (TIES) of UNIDO and the Information Bank of the United Nations Centre on Transnational Corporations.

3. In addition to further study of those aspects of pharmaceutical technology imports which were not covered adequately in this report, the links established with UNIDO's Technology Transfer Division should be maintained in order to carry out other sectoral studies on technology imports in the Andean Subregion.

ANNEX I

METHODOLOGICAL ASPECTS OF THE STUDY

To carry out the study information had to be obtained on technology contracts and the use of trade marks and on enterprises set up in the Andean Group and on the over-all behaviour of the pharmaceutical sector in the pharmaceutical industry of the Subregion.

The procedure used to carry out the study was as follows:

(a) Definition of forms

In the light of the results which the study was required to give and of the information normally present in technology contracts and available from the public authorities connected with industrial development, three forms for compiling information were prepared. The forms used, which are included in this Annex, were as follows:

(i) Survey of technology transfer contracts;
(ii) Survey of sector enterprises;
(iii) Survey for diagnosis of the sector.

As can be observed, the aim in each form is to obtain economic and legal information about the contracts, data about the receiving enterprises and general parameters about the behaviour of the pharmaceutical sector, with a view to defining indices on the influence of imported technology on industrial behaviour.

(b) Selection of the sample

To obtain the information needed for this study, the following criteria were adopted:

Obtaining information about all such contracts on technology imports and the use of trade marks as were operative during all or some of the period 1975-1980;

Identifying information about the most significant enterprises of the pharmaceutical sector in each of the member countries, more particularly those where there is foreign participation in the business capital. The parameters concerning enterprises refer to the most recent year for which information on each member country is available;

Seeking information on the behaviour of the industrial sector of the manufacturing sector for sufficient years to show its development.

(c) Compiling information

On the basis of the forms prepared by the SAIT secretariat, information was compiled in each of the member countries, to which end contact had to be made with the competent national authorities responsible for recording and checking investment and foreign technology and with the national authorities responsible for industrial development policy. Contact with the competent national authorities was greatly facilitated by the fact that all of them form part of the Andean Technological Information System.

Upon completion of the phase of filling in the forms, the information contained therein was checked to obviate transmission of possible mistakes to the next phase of the study.

(d) Data processing

To process the information, tables were designed to facilitate rapid comparison by contracts and by enterprises. The tables prepared for this phase helped to consolidate the data appearing in this document.

(e) Analysis and evaluation of information

This aspect was carried out by a multidisciplinary team of the Committee, with the advice of an expert from the chemico-pharmaceutical industry. In this phase the data from the various countries had to be compatibilized and the tables appearing in this report were devised.

(f) Drafting of the report

The final part of the study consisted of the preparation of a report containing a diagnosis of the sector and a collection of the main data on technology importation in the pharmaceutical sector, together with a view of its development from 1975 to 1980.

STUDY OF THE PHARMACEUTICAL SECTOR

SURVEY OF TECHNOLOGY TRANSFER CONTRACTS

Lima, 3 September 1981

SURVEY OF TECHNOLOGY TRANSFER CONTRACTS OF THE PHARMACEUTICAL SECTOR OF THE ANDEAN GROUP

ISIC INDUSTRIAL BRANCH: 3522

I. IDENTIFICATION OF ENTERPRISE RECEIVING TECHNOLOGY

1.1 Style:

1.2 Management:

1.3 Main activity:

1.4 Kind of enterprise:

Private ( ) Mixed ( )

State ( ) Co-operative ( )

1.5 Nationality:

Domestic ( ) Mixed ( )

Foreign ( )

Country or countries of origin of investment:

1.6 Affiliation:

Direct ( ) None ( )

Indirect ( )

1.7 Capital (in thousands of national currency)

Structure	Total	Origin		
		Domestic	Andean	Other countries
Subscribed capital				
Paid-up capital				
Reserves				

II. IDENTIFICATION OF TECHNOLOGY-SUPPLYING CONCERN

2.1 Style:

2.2 Management:

2.3 Nationality:

2.4 Ownership relation to receiver:
Parent-subsidiary ( )
Subsidiary-subsidiary ( )
None ( )

III. LIFE OF TECHNOLOGY CONTRACT

3.1 Date of entry into force:

3.2 Life: Number of years: Months:

3.3 Finalization date:

3.4 State whether contract is:
The first between the parties ( )
A modification of existing contract ( )
A replacement of a previous contract ( )
An extension of an existing contract ( )

IV. OTHER CONTRACTS CONCLUDED BETWEEN A SUPPLIER AND A RECEIVER

State whether contracts other than those evaluated in this form exist:
Transfer of technology ( )
Marketing ( )
Supply of equipment and machinery ( )
Loan ( )

V. SUBJECT MATTER OF TECHNOLOGY CONTRACT

Put an X against the various items included in the contract:

1. Trade mark ( )
2. Patented process ( )
3. Patented product ( )
4. Industrial design ( )
5. Technical assistance during installation ( )

6. Technical assistance for start-up of production ( )

7. Technical assistance during production ( )

8. Training of personnel in the country ( )

9. Training of personnel abroad ( )

10. Visit by engineers to receiving enterprise ( )

11. Quality control ( )

12. Technical information ( )

VI. SCOPE OF CONTRACTS

The contract authorizes the receiver to manufacture the following products:

1. Antibiotics ( )
2. Hormones ( )
3. Vitamins ( )
4. Analgesics ( )
5. Cardiovasculars ( )
6. Nutrients ( )
7. Antianaemics ( )
8. Therapy of respiratory tract ( )
9. Psychotropics ( )
10. Antispasmodics ( )
11. Antacids ( )
12. Antituberculars ( )
13. Others ( )

VII. METHOD OF PAYMENT

7.1 Fixed sum (in thousands of national currency)

Single

Annual

Invoice

7.2 Royalties on sales (state percentage)

	Trade Marks	Patents	Technical Assistance	Total
Fixed on net or gross sales				
Variable on net or gross sales				

7.3 Other forms (specify)

VIII. FREQUENCY OF PAYMENTS

8.1 Starting date of payments

8.2 Frequency:

Monthly ( )
Bimonthly ( )
Quarterly ( )
Six-monthly ( )
Annually ( )

IX. PAYMENTS FOR TECHNOLOGY (in thousands of national currency)

Item / Years	Volume of production or amount of sales	Gross royalty	Tax	Net royalty
1975				
1976				
1977				
1978				
1979				
1980				

STUDY OF THE PHARMACEUTICAL SECTOR

SURVEY FOR DIAGNOSIS OF THE SECTOR

Lima, 3 September 1981

I. MAIN VARIABLES OF THE SECTOR

(in thousands of national currency)

Item / Years	Number of Enterprises (units)	Gross Value of Output	Added Value	Numbers Employed (units)	Total Remunerations	Fixed Assets (*)
1965						
1980						

(*) The fixed assets are referred to those accumulated at 31 December of every year.

II. OUTPUT AND ADDED VALUE BY ORIGIN OF ENTERPRISES

(in thousands of national currency)

Item / Years	Gross value of output			Added value		
	Domestic enterprises	Foreign enterprises	Total	Domestic enterprises	Foreign enterprises	Total
1965						
1970						
1975						
1976						
1977						
1978						
1979						
1980						

III. TOTAL NUMBERS IN WORK AND THEIR BREAKDOWN BY SIZE OF ENTERPRISE (*)

Size of Establishment in Terms of Numbers Employed (**)	Numbers Employed	Number of Enterprises	Gross Output (in thousands of national currency)
Small			
Medium			
Large			

(*) Most recent year.

(**) State criteria for determining size in your country and, in the absence of such criteria, specify the ranks per numbers employed.

IV. EMPLOYMENT AND REMUNERATIONS

Years	Numbers Employed (*) (Units)					Remunerations (in thousands of national currency)		
	Directors and Managers	Experts and Production Engineers	Administrative or Office	Operatives	Total	Wages	Salaries	Total
1965								
1970-1								
1975								
1976								
1977								
1978								
1979								
1980								

(*) If the information is not available in this breakdown, please indicate how it is put together.

V. PRODUCTION INPUTS

(in thousands of national currency)

Item / Years	Raw materials and ingredients			Packaging			Others (*)		
	Domestic	Imported	Total	Domestic	Imported	Total	Domestic	Imported	Total
1965									
1970									
1975									
1976									
1977									
1978									
1979									
1980									

(*) Fuels, lubricants, energy and others.

VI. EVOLUTION OF TOTAL CAPITAL IN THE SECTOR

(in thousands of national currency)

Item / Years	Subscribed				Paid Up			
	Domestic	Foreign	Subregional	Total	Domestic	Foreign	Subregional	Total
1965								
1970								
1975								
1976								
1977								
1978								
1979								
1980								

VII. VALUE OF SALES BY DESTINATION

(in thousands of national currency)

Item / Years	Number of Enterprises (Units)	Foreign Sales	Domestic Sales			Total Sales
			Pharmacies and Hospitals	Health Areas	Total	
1965						
1970						
1975						
1976						
1977						
1978						
1979						
1980						

VIII. IMPORTS AND EXPORTS OF THE SECTOR

(in thousands of national currency)

Item / Years	Imports	Exports
1965		
1970		
1975		
1976		
1977		
1978		
1979		
1980		

IX. STRUCTURE OF PRODUCTION OF THE PHARMACEUTICAL SECTOR BY THERAPEUTIC FUNCTION (*)

Item	Value (in thousands of national currency)
A. Antibiotics	
B. Hormones	
C. Vitamins	
D. Analgesics	
E. Cardiovasculars	
F. Nutrients	
G. Antianaemics	
H. Respiratory tract therapy	
I. Psychotropics	
J. Antispasmodics	
K. Antacids	
L. Antituberculars	
M. Others	
N. Total	

(*) Most recent year

X. OUTPUT AND ADDED VALUE OF MANUFACTURING INDUSTRY (*)

(in thousands of national currency)

Item / Years	Gross value of output			Added value		
	Domestic enterprises	Foreign enterprises	Total	Domestic enterprises	Foreign enterprises	Total
1965						
1970						
975						
1976						
1977						
1978						
1979						
1980						

(*) Major division 3. Manufacturing industries of the International Standard Industrial Classification of all Economic Activities (ISIC). United Nations.

STUDY OF THE PHARMACEUTICAL SECTOR

SURVEY OF ENTERPRISES OF THE SECTOR

Lima, 3 September 1981

I. GENERAL INFORMATION

A. Name or style of enterprise

B. Registered office (main seat of operations)

C. State of incorporation in country

D. Date of registration

E. Category 1/

1. Domestic ( )

2. Mixed ( )

3. Foreign ( )

3.1 Branch ( )

3.2 Subsidiary ( )

F. Agreement of conversion to mixed or national undertakings: 1/

1. Yes ( ) No ( )

2. If "yes" indicate:

2.1 Initial date of Agreement

2.2 Date of termination of Agreement

G. Merger (state whether enterprise participated in any merger in the country):

1. Yes ( ) No ( )

2. Date of merger

3. Participants in merger

II. DATA ON CAPITAL OF ENTERPRISE (*)

Origin / Capital	Domestic	Foreign	Subregional
1. Subscribed 2. Paid-up			

(*) In current national currency

1/ As set forth in Decision 24 et sim of the Cartagena Agreement.

III. FOREIGN AND SUBREGIONAL INVESTORS IN THE ENTERPRISE

Name or style	Contribution (*)	Country of origin of investment	Date of authorization of investment
1. _____ 2. _____ 3. _____ 4. _____ 5. _____			

(*) In current national currency

IV. UTILITIES (*)

A. Totals

B. Remitted abroad

C. Reinvested

C.1. In the same enterprise

C.2. In other enterprises

(*) In current national currency

V. NUMBERS EMPLOYED (*)

Category \ Origin	Domestic	Foreign	Total
1. Directors and Managers 2. Production engineers or workers 3. Administrative or office workers 4. Operatives			

(*) In numbers of people at the date on which recorded

SUPPLEMENTARY INFORMATION

VI. SALES (*)

YEAR _____ (**)

Kind of product	Foreign market	Domestic Market	
		Pharmacies and hospitals	Health areas
1. Pharmaceutical products			
2. Others			
3. Total			

(*) In current national currency

(**) The information requested is to be compiled for the financial year preceding the date of registration.

VII. INPUTS USED (*)

YEAR _____ (**)

Origin / Category	Domestic	Foreign	Total
1. Raw materials and ingredients			
2. Packaging			
3. Others			

(*) In current national currency

(**) The information requested is to be compiled for the financial year preceding the date of registration.

ANNEX II

MAIN VARIABLES OF THE PHARMACEUTICAL SECTOR

Annex II-1

ANDEAN GROUP

MAIN VARIABLES OF THE PHARMACEUTICAL SECTOR

(in thousands of US$)

Item / Year	Number of Enterprises (Units)	Gross Value of Output	Added Value	Numbers Employed (Units)	Total Remunerations (Wages and Salaries)
1975	321	575 459.1	320 546.9	27 584	98 856.7
1976	330	655 973.0	380 513.4	29 307	100 373.6
1977	354	669 236.7	396 901.0	29 600	105 653.3
1978	361	768 014.1	403 426.1 1/	31 010	118 959.0

1/ Estimated.

Prepared by the SAIT Secretariat

Annex II-2

BOLIVIA

MAIN VARIABLES OF THE PHARMACEUTICAL SECTOR

(in thousands of US$)

Item / Year	Number of Enterprises (Units)	Gross Value of Output	Added Value	Numbers Employed (Units)	Total Remunerations (Wages and Salaries)
1970	9	2 594.5	-	-	-
1975	14	7 548.8	2 379.9	629	1 146.3
1976	16	8 382.7	2 907.1	722	1 410.3
1977	19	10 837.9	3 844.3	813	1 910.9
1978	24	12 228.5	4 508.2 1/	865	2 283.0
1979	26	16 765.9		997	3 351.3

1/ Estimated.

Prepared by the SAIT Secretariat

Annex II-3

COLOMBIA

MAIN VARIABLES OF THE PHARMACEUTICAL SECTOR

(in thousands of US$)

Item / Year	Number of Enterprises (Units)	Gross Value of Output	Added value	Numbers Employed (Units)	Total Remunerations (Wages and Salaries)
1970	104	95 180.1	55 349.3	8 505	14 860.4
1975	124	181 788.8	93 587.2	11 317	22 989.0
1976	125	208 503.3	114 363.7	11 399	25 533.6
1977	124	213 [illegible]5.6	119 861.6	11 160	28 956.4
1978	124	278 096.0	151 429.7	12 564	42 163.5
1979	130	356 961.9	171 073.9	13 884	45 823.5

Prepared by the SAIT Secretariat

Annex II-4

ECUADOR

MAIN VARIABLES OF THE PHARMACEUTICAL SECTOR

(in thousands of US$)

Item / Year	Number of Enterprises (Units)	Gross Value of Output	Added value	Numbers Employed (Units)	Total Remunerations (Wages and Salaries)
1970					
1975	28	18 686.4	11 144.6	1 487	2 965.1
1976	29	20 863.7	12 186.8	1 656	4 514.6
1977	35	33 778.8	21 440.0	1 990	5 686.6
1978	39	43 013.3	26 042.6	1 873	6 534.4
1979					

Prepared by the SAIT Secretariat

Annex II-5

PERU

MAIN VARIABLES OF THE PHARMACEUTICAL SECTOR

(in thousands of US$)

Item / Year	Number of Enterprises (Units)	Gross Value of Output	Added value	Numbers Employed (Units)	Total Remunerations (Wages and Salaries)
1970	84	94 869.7	53 876.5	6 363	14 372.8
1975	88	185 985.1	100 826.1	7 756	31 941.6
1976	85	189 290.7	102 604.6	7 658	27 532.3
1977	100	159 819.5	88 460.1	7 347	22 701.3
1978	100	147 704.8	59 173.3	7 229	17 241.0
1979	104	163 168.5	60 449.0	7 457	18 911.5

Prepared by the SAIT Secretariat

Annex II-6

VENEZUELA

MAIN VARIABLES OF THE PHARMACEUTICAL SECTOR

(in thousands of US$)

Item. / Year	Number of Enterprises (Units)	Gross Value of Output	Added value	Numbers Employed (Units)	Total Remunerations (Wages and Salaries)
1971	74	78 691.3	54 260.4	4 929	17 240.2
1975	67	181 450.0	112 609.1	6 395	29 494.7
1976	75	228 933.5	148 451.2	7 872	41 382.8
1977	76	250 814.9	163 295.0	8 290	46 398.1
1978	74	286 971.5	162 272.3	8 479	50 737.1
1979					

Prepared by the SAIT Secretariat

ANNEX III

MAIN VARIABLES OF THE MANUFACTURING SECTOR BY ISIC DIVISIONS

Annex III-1

ANDEAN GROUP: MAIN VARIABLES OF MANUFACTURING INDUSTRY BY ISIC DIVISIONS IN 1977

(in millions of US$)

ISIC	Description	Number of Enterprises (Units)	Numbers Employed (Units)	Total Remunerations	Gross Value of Output	Added Value
31	Food, beverages and tobacco	6 812	263 960	759	10 306	3 968
32	Textiles and leather	6 239	304 551	728	4 644	2 168
33	Timber industry, furniture	3 143	62 739	141	865	393
34	Paper making, printing and publishing	2 131	83 128	273	2 047	1 000
35	Chemical industry, oil, carbon and rubber derivatives, plastics	2 599	170 900	682	9 394	5 150
36	Manufacture of non-metallic mineral products	1 808	87 304	249	1 433	802
37	Basic metal industries	446	57 537	228	2 033	816
38	Manufacture of metal products, machinery and equipment	5 337	239 871	711	6 257	2 529
39	Other manufacturing industries	850	20 481	49	302	174
	Total Manufacturing Sector	29 365	1 290 471	3 820	37 281	17 000

Source: Document J/DS-E/94 (Board of the Cartagena Agreement)

Annex III-2

BOLIVIA: MAIN VARIABLES OF MANUFACTURING INDUSTRY BY ISIC DIVISIONS IN 1977
(in millions of US$)

ISIC	Description	Number of Enterprises (Units)	Numbers Employed (Units)	Total Remunerations	Gross Value of Output	Added Value
31	Food, beverages and tobacco	535	10 089	24	338	138
32	Textiles and leather	374	8 259	15	82	34
33	Timber industry, furniture	296	3 419	4	30	10
34	Paper making, printing and publishing	132	1 585	3	23	9
35	Chemical industry, oil, carbon and rubber derivatives, plastics	114	3 304	8	120	26
36	Manufacture of non-metallic mineral products	85	2 291	4	22	11
37	Basic metal industries	12	1 702	2	154	16
38	Manufacture of metal products, machinery and equipment	176	2 655	5	34	10
39	Other manufacturing industries	55	568	1	4	2
	Total Manufacturing Sector	1 789	33 872	66	807	256

Source: Document J/DS-E/94 (Board of the Cartagena Agreement)

Annex III-3

ECUADOR: MAIN VARIABLES OF MANUFACTURING INDUSTRY BY ISIC DIVISIONS IN 1977
(in millions of US$)

ISIC	Description	Number of Enterprises (Units)	Numbers Employed (Units)	Total Remunerations	Gross Value of Output	Added Value
31	Food, beverages and tobacco	465	28 040	65	961	275
32	Textiles and leather	346	18 687	33	215	102
33	Timber industry, furniture	134	5 434	10	50	28
34	Paper making, printing and publishing	163	5 999	15	131	49
35	Chemical industry, oil, carbon and rubber derivatives, plastics	227	10 357	25	228	102
36	Manufacture of non-metallic mineral products	78	4 596	11	76	45
37	Basic metal industries	21	1 049	3	41	14
38	Manufacture of metal products, machinery and equipment	251	12 296	27	221	99
39	Other manufacturing industries	53	1 103	2	12	6
	Total Manufacturing Sector	1 738	87 561	191	1 935	720

Source: Document J/DS-E/94 (Board of the Cartagena Agreement)

Annex III-4

COLOMBIA: MAIN VARIABLES OF MANUFACTURING INDUSTRY BY ISIC DIVISIONS IN 1977
(in millions of US$)

ISIC	Description	Number of Enterprises (Units)	Numbers Employed (Units)	Total Remunerations	Gross Value of Output	Added Value
31	Food, beverages and tobacco	1 403	90 902	234	3 226	1 185
32	Textiles and leather	1 537	139 987	275	1 686	786
33	Timber industry, furniture	418	13 740	21	115	63
34	Paper making, printing and publishing	489	30 413	82	591	292
35	Chemical industry, oil, carbon and rubber derivatives, plastics	713	62 872	226	1 990	942
36	Manufacture of non-metallic mineral products	444	32 648	80	370	189
37	Basic metal industries	100	17 285	64	289	134
38	Manufacture of metal products, machinery and equipment	1 389	87 448	193	1 356	579
39	Other manufacturing industries	178	8 646	16	82	45
	Total Manufacturing Sector	6 671	483 941	1 191	9 705	4 215

Source: Document J/DS-E/94 (Board of the Cartagena Agreement)

Annex III-5

PERU: MAIN VARIABLES OF MANUFACTURING INDUSTRY BY ISIC DIVISIONS IN 1977
(in millions of US$)

ISIC	Description	Number of Enterprises (Units)	Numbers Employed (Units)	Total Remunerations	Gross Value of Output	Added Value
31	Food, beverages and tobacco	2 118	52 935	133	1 670	812
32	Textiles and leather	2 060	57 409	123	800	422
33	Timber industry, furniture	910	14 475	23	139	68
34	Paper making, printing and publishing	573	16 922	51	302	151
35	Chemical industry, oil, carbon and rubber derivatives, plastics	790	37 997	122	1 567	657
36	Manufacture of non-metallic mineral products	492	16 738	43	236	135
37	Basic metal industries	95	11 558	41	533	210
38	Manufacture of metal products, machinery and equipment	1 554	52 910	143	1 182	584
39	Other manufacturing industries	353	4 512	10	58	35
	Total Manufacturing Sector	8 945	265 456	689	6 487	3 074

Source: Document J/DS-E/94 (Board of the Cartagena Agreement)

Annex III-6

VENEZUELA: MAIN VARIABLES OF MANUFACTURING INDUSTRY BY ISIC DIVISIONS IN 1977
(in millions of US$)

ISIC	Description	Number of Enterprises (Units)	Numbers Employed (Units)	Total Remunerations	Gross Value of Output	Added Value
31	Food, beverages and tobacco	2 291	81 994	303	4 111	1 558
32	Textiles and leather	1 922	80 209	282	1 861	824
33	Timber industry, furn	1 385	25 671	83	531	224
34	Paper making, printing and publishing	764	28 209	122	1 000	499
35	Chemical industry, oil, carton and rubber derivatives, plastics	755	56 370	301	5 489	3 423
36	Manufacture of non-metallic mineral products	709	31 031	111	729	422
37	Basic metal industries	218	25 943	118	1 016	442
38	Manufacture of metal products, machinery and equipment	1 967	84 562	343	3 464	1 257
39	Other manufacturing industries	211	5 652	20	146	86
	Total Manufacturing Sector	10 222	419 641	1 683	18 347	8 735

Source: Document J/DS-E94 (Board of the Cartagena Agreement)