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PHILIPPINES PHARMACEUTICAL INDUSTRY DEVELOPMENT STUDY

DP/PHI/87/019

PHILIPPINES

Terminal report*

Prepared for the Government of the Philippines
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of Dr. K. Ivanov, Chief Technical Adviser and
Dr. W.N. Walker, Consultant

Backstopping Officer: Dr. Zoltan Csizer, Chemical Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

V.89-54877

FOREWORD

This executive summary report has been prepared for the express attention of:

Department of Health (DOH)	Philippines
National Economic Development Authority (NEDA)	Philippines
Board of Investment	Philippines
Department of Science and Technology (in part)	Philippines

Furthermore this document may encourage the potential foreign and local investors for realization of possible investment projects. This would comply with the Philippine Government's policy to stimulate private sector's involvement in the execution of this development plan.

STATUS

The Government of the Philippines, realising the interest of several potential investors in actively participating in the second phase of the project, decided to seek further UNIDO assistance in providing independent, secure and reliable advice to strengthen its position through negotiations with any such potential and interested investors.

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SUMMARY

This study entitled "Philippines Pharmaceutical Industry Development Study", was carried out by a team of international and national experts covering a wide and overlapping spectrum of disciplines to analyse the existing state of the pharmaceutical industry in the Philippines.

The project was entirely funded by UNDP/IPF funds and executed by UNIDO.

As a result of the study recommendations were proposed covering a wide range of areas and disciplines. The consensus of opinion suggested that the prime efforts in the field of up-stream development of production of pharmaceutical chemicals manufacture should initially be largely focused on the utilization of indigenously available raw materials and energy sources. These recommendations are detailed in Section 5, p. 38-40.

In order to validate the recommendations UNIDO convened a meeting at UNIDO headquarters, Vienna of an ad hoc panel of independent international experts.

The panel, representing private and governmental pharmaceutical industry and representatives of the Philippine Government discussed the major recommendations of the study which were presented as individual profiles by the UNIDO Consultants involved in the project.

The composition of the international panel and the representatives of the Philippine Government can be found in Annex 1.

As a result of the meeting, the panel identified several areas in which further investigations could be supported.

In view of the fact that no solid technical data was available to discuss the biological sub-sector, the panel also recommended that the Philippine Government might like to consider inviting the UNIDO "Advisory Panel on Preventive Medicine" to Manila in order to validate an "Intercare Study on the Alabang Vaccine Complex".

Initial financial and economic studies were subsequently performed on the projects which had been validated by the ad hoc panel of international experts.

The results of the validations can be referred to in Section 6, tables 6 and 7 (p. 42-43).

Subsequent to a review by the Government of the Philippines, several priority areas are being actively pursued.

These comprise:

1. Establishment of a multipurpose fermentation pilot-plant on the premises of Bio-tech at Los Baños.

2. Pre-feasibility studies on each of the following:
   (a) Cultivation and processing of Cinchona to manufacture Quinine and its derivatives
   (b) Establishment of an industrial scale fermentation plant for Penicillin, including enzymatic conversion of Penicillin G into 6-APA
   (c) Establishment of an Erythromycin derivatives and Rifampicin synthetic production plant at the site of Chemfields
   (d) Establishment of a multi-purpose chemical pilot-plant

3. Meeting of UNIDO "Advisory Panel on Preventive Medicine" to validate the technical premises of the "Intercare Study on the Alabang Vaccine Complex", 4-6 April 1989.

As a separate project the Government of the Philippine requested UNIDO to provide a High Level Advice on Hospital-Based Intravenous (IV) Fluid Production at DOH-UP Manila.

1. PROJECT HISTORY AND DEVELOPMENT

1.1 Government Health Policy

On 30 April 1987, during the inauguration of the new building of the Bureau of Food and Drugs (BFAD) in Alabang, Metro Manila, President Corazon C. Aquino enunciated for the first time a four-point National Drug Policy (NDP) designed to "ensure that safe and effective drugs are made available to all Filipinos at any time and place and at a reasonable and affordable cost".

The components of the Policy, called its Four Pillars, reflect: -

a) Quality Assurance of Drugs
b) Rational Use of Drugs by Health Professionals and Consumers
c) National Self-sufficiency in Pharmaceuticals
d) Rationalization of the DOH's Procurement Program

Progress has already been made in incorporating at least the first two pillars into the new Food, Drugs and devices, and Cosmetics Act when the President promulgated EO. 175 on 22 May, 1987.

Thus Quality Assurance, the First Pillar, is covered by:

- adopt measures to ensure pure and safe supply of foods and cosmetics, and pure, safe, efficacious and good quality drugs and devices in the country.

Rational use, the Second Pillar, is covered by:

- adopt measures to ensure the rational use of drugs and devices such as, but not limited to, banning, recalling or withdrawing from the market drugs and devices which are not registered, unsafe, inefficacious, or of doubtful therapeutic value, the adoption of a National Drug Formulary, and the use of generic names in the labelling of drugs.

Further implementation has been achieved, in respect of the Second Pillar, by the signing into law by President Aquino on 13 September 1988 the Republic Act (RA) No. 6675 entitled "Generic Drugs Act of 1988".

Progress is being made in terms of application through the Department of Health in respect of:

(1) reorganization of the Bureau of Food and Drugs (BFAD),
(2) reviewing BFAD systems,

(3) initiation of a programme of delisting selected drugs and
(4) the preparation of the National Drugs Formulary which is well in hand and should be complete by the first quarter of 1989.

The "Third Pillar", the main subject of this report, is the development of a relative self-sufficiency in the local pharmaceutical industry.

The "Fourth Pillar" relates to the targeted procurement of drugs by the Government with the objective of making available to the Government-owned and operated hospitals and health centers quality of drugs at an affordable cost to the low-income sectors of the society.

1.2 Project History

A project was initiated by the Government of the Philippines utilising financial assistance of UNDP and technical assistance of UNIDO.

The project was originally entitled "Establishment of a Master Plan for the Development of an Integrated Pharmaceutical Industry" but subsequently re-named "Philippines Pharmaceutical Industry Development Study" as result of revision.

The respective project document was signed on 19 November, 1987 by the Secretary of Health, Dr. A. Bengzon and the Secretary of Economic Planning, Ms. M. Monsod on behalf of the Philippine Government, by the Director General of UNIDO, Mr. Domingo L. Siazon Jr. and by the UNDP Resident Representative in the Philippines, Mr. T. Mangun.

The Government Agency entrusted with the implementation was the Department of Health (in association with the Departments of Trade and Industry and of Science and Technology).

The executing Agency was the United Nations Industrial Development Organization (UNIDO).

1.3 Development Objective and Revision

The development objective was defined as "the establishment and development of an integrated pharmaceutical industry in the Philippines to achieve relative self-reliance in selected strategic pharmaceutical items and meet domestic demand for affordable pharmaceutical products in support of national health objectives".

In the early stages of the study, in February 1988, it was recognized that a shift of emphasis was necessary to reflect the priorities of upstream integration.

A new approach was adopted which called for a higher level of technical expertise, for a more intensive interaction of experts with overlapping areas of interest and a more cohesive programme of activities which would lead to a more intensive study than that originally planned.

This resulted in the necessity for a revision of the Project Document which principally resulted in: -

(1) re-naming the project as "Philippines Pharmaceutical Industry Development Study";
(2) the objective is to achieve relative self-reliance;
(3) replacement of activities in the fields of formulation and packaging of finished pharmaceutical dosage forms by excipients production (this field could subsequently not be fully covered due to difficulties in recruitment for such a broad field);
(4) cancelling activities in the fields of quality assurance, medical supplies, glass and plastic packaging materials and design engineering;
(5) expanding chemical synthesis and fermentation to cover chemical synthesis, fermentation and semi-synthesis of antibiotics;
(6) expanding biotechnology to cover genetic engineering and industrial biotechnology.

1.4 Expert Coverage of Disciplines[1]

The study was undertaken by a team of international experts and national experts being guided and co-ordinated by the Chief Technical Adviser.

International experts were engaged in the disciplines of:

Bioactive substances (Animal Origin)	Industrial Biotechnology
Blood derivatives	Industrial Economics
Chemical synthesis	Medicinal Plants
Fermentation (Antibiotics)	Semi-synthesis Antibiotics
Genetic Engineering	Vaccines and Sera

1. Responsible experts listed in Report DP/ID/SER.A/1166 of 9 March 1989

National experts fields of expertise covered disciplines of:

Biotechnology	Human Resources
Economics	Law

1.5 Aims of Project

To identify areas or sub-sectors of the health industry where it would be reasonable to recommend up-stream integration in order to move towards some self-reliance. This involved appraisal of the existing state of the pharmaceutical industry in the Philippines, infrastructures, drug supplies and needs, population data, contributions of Government policies, economic and legal implications. The identification of possible utilization of indigenous raw materials was of high priority.

2. APPRAISAL OF THE PHARMACEUTICAL INDUSTRY AND CONDITIONS EXISTING IN THE PHILIPPINES

2.1 Status of the Philippines within the World Drug Situation

The world Pharmaceutical Industry comprises three types of industrial enterprise namely:

(1) bulk pharmaceutical chemical producers

(2) dosage form formulators (including packaging and marketing) and

3) fully integrated manufacturers (although such frequently comprise independent operating profit centres of chemical and pharmaceutical manufacture)

The reputable pharmaceutical manufacturers in the Philippines, both domestic and foreign corporations, are found to be performing exactly the same function as similar concerns in the United States, Europe or Japan but, with one exception of the semi-synthetic antibiotics bulk manufacturer, Chemfields Inc., all represent dosage form formulators.

It is estimated that throughout the world between 26-50% of total population have little or no assess to drugs (World Drug Supply, WHO 1988). While the proportion of world population in developing countries is increasing, the consumption percentage has decreased over the last 10 years. This has been due to economic recession and increased debts of developing countries.

According to UNIDO database 1988, the Philippines as at 1985 stood ninth of the top 20 developing countries in terms of consumption and was rising relatively more rapidly than other developing countries. In terms of per capita consumption the Philippines did not rate in the top 20. In terms of importation of pharmaceutical chemicals, the Philippines ranked 20, whereas for apparent production of pharmaceutical preparations was ranked 12 out of the top 20 developing countries. This indicated even in 1985 the pharmaceutical formulation and packaging industry was well established.

2.2 Domestic Situation

Domestic sales, represented by sales of drugstores, private and Government hospitals reached a level estimated at P 9,324 million in 1987 representing a 22.1 % increase over the previous year. Exports sales amounted to less than 1%. The market place is very competitive and although apparently dominated by the multi-national companies, the position of Filipino owned and managed companies has been observed and is illustrated in the 1985 IMS analysis (figure 1).

This illustrates clearly the ability of the Filipino involvement in the pharmaceutical industry and its management.

The industry comprises, in addition to manufacturing and marketing companies, the distribution and retailing functions. Distribution is 85% Filipino controlled, while current law prohibits foreigners being involved in retailing.

Of the 33 major manufacturing plants 25 % are Filipino owned and 75% transnationals. There is only one manufacturer, Chemfields (Filipino owned with 60% Government involvement) of active ingredients whose output is sold entirely in bulk.

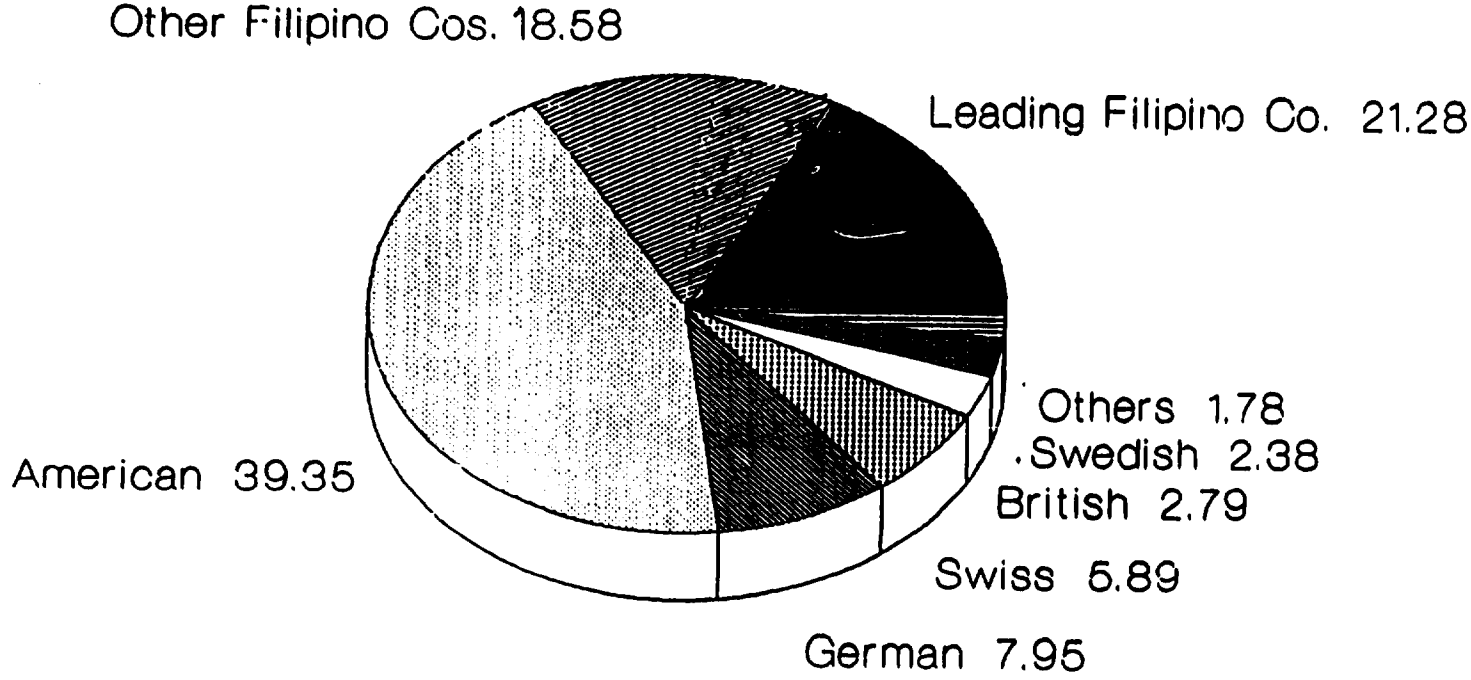
All major manufacturing units operate in the Metro Manila area.

2.3 Population

An annual population growth rate of 2.48% brought the population level to 57.4 million in 1987. The population age distribution is essentially young with 50% below the age of 14 and only 3.3% over the age 65. Sexes are well balanced at a ratio of male: female of 101:100.

FIGURE 1

DISTRIBUTION OF DRUGSTORE SALES BY THE NATIONALITY OF OWNERSHIP OF SELLERS, 1985



Source: IMS, 1985

Urban population has risen to 41% of the total by 1987 largely due to industrialization.

Projections made by PPI (1984) taking into account slow to rapid fertility decline and moderate to more favourable mortality conditions indicate a forecast population level by year 2000 of between 71.32 to 77.91 million. Rapid population growth exerts tremendous pressure on economic ability to adequately provide goods and services to meet demands. This can be traced as a major cause of the current Philippine level of 60% population existing below the poverty line.

Such a population problem will have implications in labour, health and nutritional fields. The problem of population control is being attacked by the Philippine Population Programme Medium Term Plan (1989-1992) which aims to improve the quality of human life in a just and human society.

2.4 Economic Situation

Recent recovery signs have been seen since an uncertain start in 1986 with a real rise in GNP.

Industry led in all sectors with an increase of 8% in 1987 accounted for mainly by growth in manufacturing, gas and water sub-sections.

Manufacturing grew by 7.1 % and construction by 17.1%. Agriculture lagged behind with a growth rate of only 0.4% in 1987 following adverse weather conditions.

Prospects: Growth prospects of the Philippine economy will be defined by the debt management programme. Private economists predict that if merchandise exports, which grew by 20% in the first half of 1988, can grow at a steady rate of 15.5% in the next 5 years, a downward trend in debt burden indicators may prevail. More favourable prospects will also stem from sustained implementation of structural reforms and policy measures conducive to private sector recovery. The report does suggest caution against neglect of equity considerations in pursuit of economic growth.

2.5 Social Conditions

Unemployment is seen as a problem, an increased rate of 13.4% being recorded in April 1988. Underutilisation of labour is a more serious problem and more acute in rural areas than urban.

The welfare of the employed is protected through labour and social legislations covering minimum wage rates, hours of work, social security and insurance benefits.

Systems are available for both Government employees (GSIS) and those of private companies or self-employed (SSS). Through either scheme employees and dependants can enjoy benefits under the Medicare programme.

Nevertheless the real wages, computed from the comparison of the total legislated money wage and the consumer price index deteriorate from 1980 to 1987.

There have been recent significant improvements in the number of strike cases which are attributed to generally improving labour situations among the employed in the country. Government has introduced preventive mediation facilities through the newly created National Conciliation and Mediation Board.

Distribution of Wealth: 20% of the national income is seen to be in the hands of only 3.5 % of the population.

Poverty incidence is continuing to increase and the percentage considered to be living below the poverty level now exceeds 60%, rural poverty being the most severe problem.

2.6 Health and Epidemiology

Although some improvements of health conditions can be seen, they have been slow in spite of substantial infusion of financial aid from global institutions. The health status and profile of the country has not shown major change since 1982 as can be seen in the reproduced Philippine Health Statistics reports for mortality and morbidity over the period 1982-1986 (tables 1 and 2).

Table 1

LEADING CAUSES OF MORTALITY, 1982 - 1986

	DISEASES	1982	1983	1984	1985	1986
1.	Pneumonia	45,373	45,686	45,971	52,888	50,621
2.	Diseases of the heart	36,819	28,208	31,347	36,242	39,163
3.	Tuberculosis, all forms	28,309	28,208	27,999	31,650	30,604
4.	Diseases of the vascular system	21,511	20,593	27,107	27,184	29,402
5.	Malignant neoplasm	16,832	15,703	17,700	18,143	18,395
6.	Diarrhoeal diseases	12,735	14,964	11,553	11,516	10,839
7.	Measles	7,136	6,098	7,987	8,043	6,249
8.	Nutritional deficiencies	6,068	7,463	6,825	7,114	6,145
9.	Accident	5,863	9,172	10,445	10,070	10,348
10.	Nephritis, nephrotic syndrome and nephroses	4,470	4,262	4,916	5,470	5,273

Table 2

LEADING CAUSES OF MORBIDITY, 1982 - 1986

	DISEASES	1982	1983	1984	1985	1986
1.	Bronchitis	280,431	352,447	606,880	586,427	602,851
2.	Diarrhoeal diseases	221,191	275,068	551,560	522,762	552,613
3.	Influenza	226,237	256,534	453,926	447,550	397,715
4.	Pneumonia	106,563	123,420	193,594	205,387	190,208
5.	Tuberculosis, all Forms	104,715	106,300	154,021	153,406	153,129
6.	Malaria	40,496	55,019	107,485	121,975	124,153
7.	Accidents*	-	-	84,637	96,684	105,886
8.	Diseases of the heart	-	-	70,596	70,238	78,516
9.	Measles	35,989	43,684	75,290	62,959	59,375
10.	Malignant neoplasms	26,867	23,838	24,191	24,270	26,985

* Declared notifiable diseases in 1984

The figures do not necessarily accurately reflect the actual numbers and can be expected to understate them. This is common in developing countries where statistics tend to be incomplete for often notifiable diseases are not properly diagnosed and declared or simply not registered.

CONTROL MEASURES AND GOVERNMENT CONTRIBUTION

a) Transmissible diseases: The Department of Health (DOH) have been implementing an Expanded Immunization Programme to control diseases which can be treated by vaccination. As a consequence diphtheria and poliomyelitis are declining in importance. Apart from vaccination a high standard of environmental sanitation has to be achieved and for this a good educational programme is needed together with adequate supplies of clean water.

b) Cardiovascular diseases: The Philippine Heart Center, a hospital under the supervision of the Department of Health is engaged in active research on the incidence and prevalence of cardiovascular diseases, particularly hypertension.

c) Malignant neoplasms: The Department of Health has included cancer control as one of its impact programmes in view of the rising incidednce of malignancies.

d) Nutritional problems: These problems can be attributed not only to poverty but, more particularly perhaps to lack of knowledge with respect to the correct kind and balance of food to consume. Nutritional educational and rehabilitation programmes are considered very important and work already performed by the Food and Nutritional Research Institute have already laid down the foundations for such programmes.

OTHER NATIONAL HEALTH PROGRAMMES

Several other National Health Programmes are currently being actively pursued.

a) Control of Diarrhoeal Diseases (CDD)
Involves education, application of preventative measures and application of oral rehydration therapy (ORD).

b) Schistosomiasis Control Programme: morbidity control is now possible by drug treatment and emphasis is being concentrated on transmission control.

c) Malaria Control Programme: Vector Control is being strengthened and is now a direct responsibility of the Provincial Health Office assisted by an Epidemiological Unit and supported by firm financial support as embodied in Departmental Memorandum No.2 dated 16 October 1987 which identified allocation for malaria in the budget.

d) Tuberculosis Control Programme: Indications are that very positive progress is being made both in terms of enhanced identification and of a more substantial percentage of cases completing drug treatment.

e) Acute Respiratory Infection Programme (ARI): As of May 1987 the Secretary of Health mandated that a National ARI programme be designated to deal with this most serious group of maladies which are the leading cause of morbidity and mortality to the Philippines. A programme of tentative activities has been drawn up.

f) Expanded Programme on Immunization (EPI): Launched in 1976 by the Ministry of Health with the assistance of the World Health Organization (WHO) and the United Childrens International Fund (UNICEF) to control measles, poliomyelitis, diphtheria, pertussis, tetanus and tuberculosis. Good progress in coverage is being made with the exception of tetanus.

g) Leprosy Control Programme: Good progress in treatment is expected after a promising pilot operation using multi-drug therapy (MDT) which is being extended countrywise and for which drugs to treat some 30,000 cases had been procured as at April 1988.

Programmes of physical and socio-economic rehabilitation for the cured Hansenite are also being operated.

2.7 Health Infrastructure

The Health service is supported by the Government and Private sources. From the Government side the situation has marginally worsened since 1985 in respect of servicing the population with principal health workers although plans for the coming years are aiming at substantial improvements as can be seen by the servicing ratio's illustrated in the table 3 below.

Table 3

POPULATION PER GOVERNMENT HEALTH WORKER

	1985	1987	Aim 1992
Physician	6,423	6,505	5,000
Nurse	5,245	5,405	5,000
Midwife	5,582	5,889	2,500

The rural populations are served by Rural Health Units (RHU) and Barangay Health Stations (BHS). The ratio of RHU deteriorated over the period 1980 to 1986 when not one single new unit was established. Similarly in the case of BHS no new stations were establised from 1981 to 1985. A 2% increase in 1986 was insufficient to improve the situation. Corresponding figures for the private sector are not available.

The number of hospital beds increased sharply during the period 1970 to 1980 but the increase has not been sustained. The Government provide about on-third of the capacity.

2.8 Financing of Health Activities

In the Philippines financing is dominated by the private sector. The Intercare report on Health Care Financing, 1987 covering years 1981-1985 showed a steady increase of the private contribution from 65.8 % (1981) to 73.8 % (1985). This represented a growth in real terms of 5% over this period whereas the public health care expenditure dropped by 35% over the same period.

Several agencies are involved in distribution of Government Health expenditure of which approximately 3/4 is administered by the Department of Health.

Overall curative care accounted for 57.7 % (DOH 68.7%) of annual budget over 1981/85 while 33.1% (DOH 22.3%) related to preventative care. Balances represent administration and training expenditures.

2.9 Sources of Funds

Public sector: taxes account for the bulk of the public sector financing. Development assistance in the form of foreign loans has shown an increasing trend. Largest sources of credit have originated from the United States Agency for International Development (USAID) and the International Development Assistance (IDA). These have been followed by the International Bank for Reconstruction and Development (IBRD) with a rather meagre contribution from the Asian Development Bank (ADB).

Private Sector: is supported by out-of-pocket payment by users, insurance payments, company financial health benefits, community operated resources and cash donations.

3. MARKETS AND PROJECTIONS FOR THE INDUSTRY

3.1 Drug Sales in the Philippines

Domestic sales in 1987, as represented by the sales of drugstores, private and Government hospitals, were estimated at P 9324 million which represented a 22 1% increase over the previous year. Export sales amounted to less than 1.2% of total sales.

3.2 Sales by Therapeutic Classes

The top selling drugs, in terms of major therapeutic class, in the country, can be readily identified as systemic anti-infectives which account for 24.2% of sales in 1987, followed by alimentary tract and metabolism at 16.9% and respiratory system drugs at 16.0%. Little change in emphasis has been observed over recent years.

The full picture of the 1987 distribution has been reproduced in figure 2 based on IMS sources.

Drugs may also be analysed at the second level of therapeutic class when the strong importance of antibiotics followed by cough and cold preparations, vitamins, analgesics and nutrients can be observed and again little change in emphasis has been seen over recent years. The distribution, based on IMS sources has been reproduced in figure 3, comparing 1986 and 1987 both in percentage terms and value terms for the specifically identifiable groups.

At regional level drug sales are dominated by the Greater Manila area, no doubt due to both economic and demographic reasons. Purchasing power is greater in the premier region of the Greater Manila area, there is a greater awareness of the merits of health care, the people have better access to information on drugs and finally greater access to hospitals, clinics and medical practitioners.

3.3 Factors Affecting Demand

The drug market can be classified into three markets, (1) proprietary (OTC); (2) ethical and (3) institutional and such analysis gives another insight into drug demand characteristics.

The proprietary market can be considered to be a consumer market similar to soft drinks, cosmetics and toiletries. Demand is dependant largely on the extent to which consumers suffer from headaches, indigestion, skin infections, vitamin deficiency and nasal congestion which can also be served by self medication. The consumer has an entirely free choice of medicaments and sales levels are largely controlled by the availability of disposable income.

FIGURE 2

DRUG SALES BY MAJOR THERAPEUTIC CLASS

(DRUGSTORES AND HOSPITAL SALES, 1987)

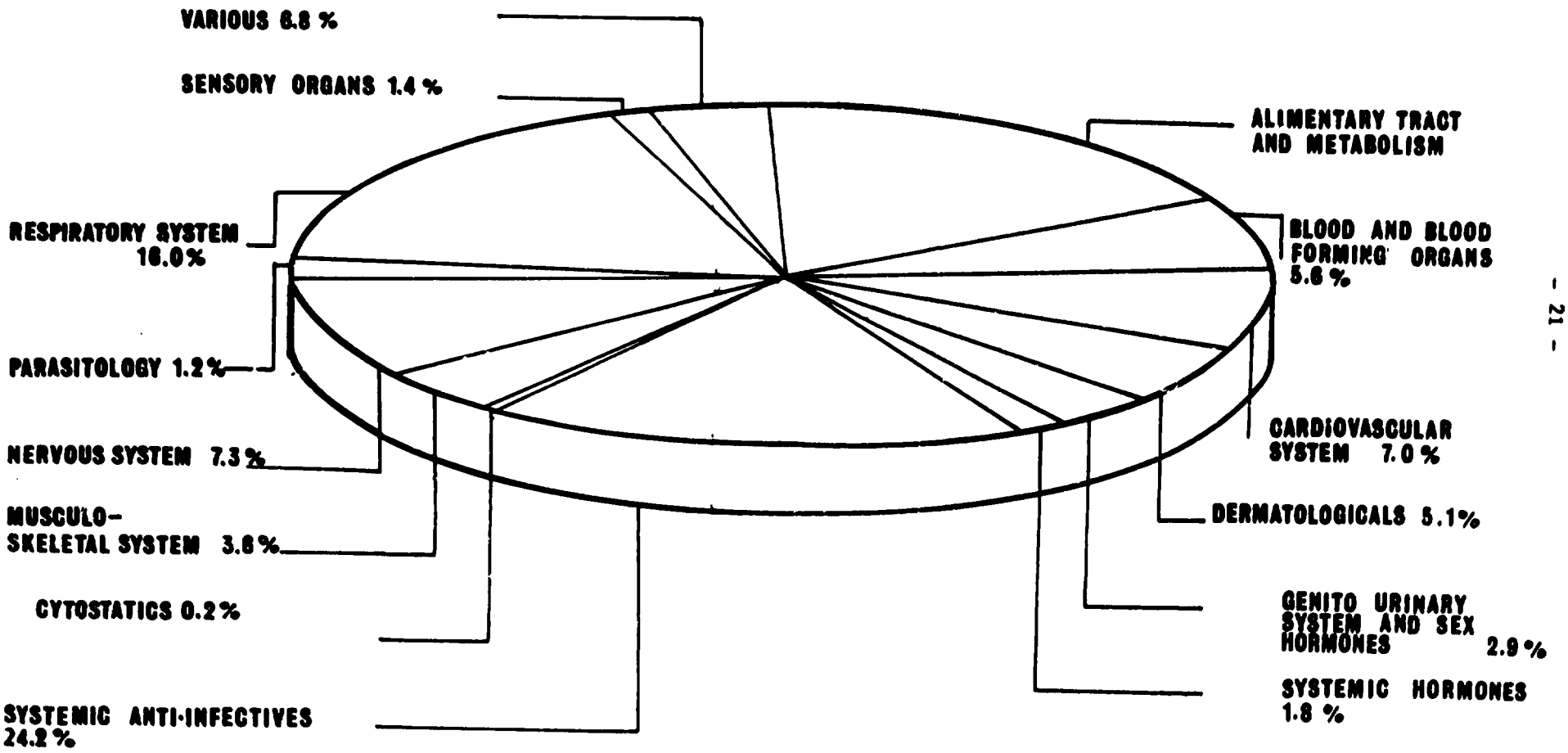
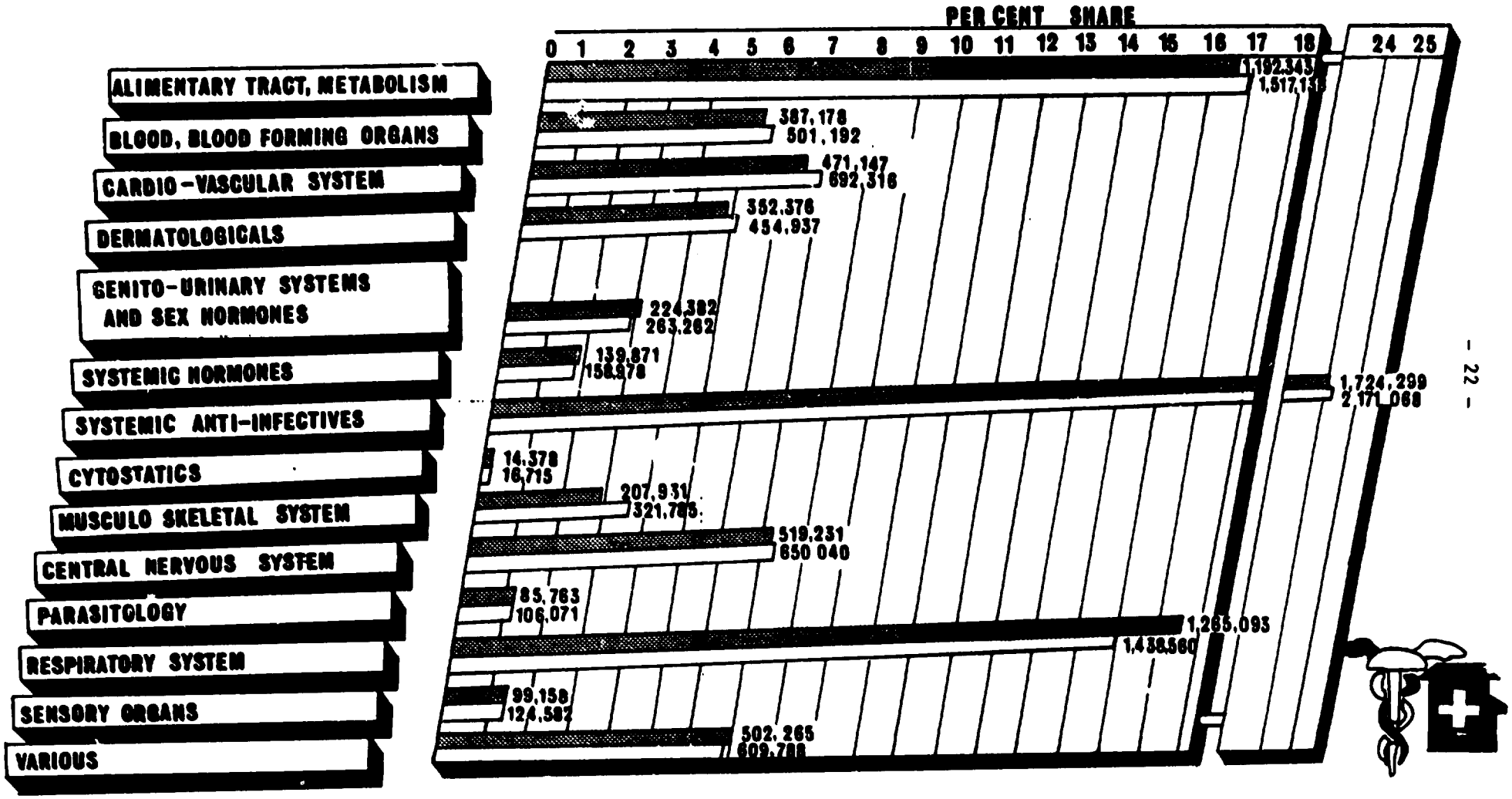


FIGURE 3

DRUGSTORES AND PRIVATE HOSPITAL SALES BY MAJOR THERAPEUTIC CLASS, 1986 AND 1987 (IN THOUSAND PESOS)



LEGEND:

TOTAL:

1986 - 7,185,360

1987 - 8,964,152

SOURCE

IMS, 1986 & 1987

The ethical market of prescription drugs differs in that the selection of drugs is controlled by the medical practitioner. Although in the past the consumer had no say in choice of supply, the situation has changed with the introduction of the Genetic Drugs Act. This area of consumption is less affected by availability of funds.

The institutional market differs again. Referring to groups such as private and public hospitals, industrial clinics and Government agencies the demand depends on factors such as hospital patient loads, number of people eligible to receive drugs through Government channels and the health budget of the Government.

From the sales market side the pharmaceutical industry performance depends on:

(1) overall performance of the economy and this is linked to the level of disposable personal income;
(2) the size of the population and level and incidence of diseases;
(3) a widening of the rural markets by means of extended medicare coverage of benefits, services and Government health programmes; and
(4) the effect of promotion strategies such as sales force expansion, drug promotion, advertising, corporate sponsored health programmes and introduction of new brands with good market potentials.

Income has a great effect on consumption. Consumers income in the country is still, on the average, low and any real increment in income opens up new opportunities for consumer goods including pharmaceuticals.

A 1985 Family Income and Expenditure Survey (FIES) clearly indicated that medical care increased not only with increasing income, but also that not only did the real expenditure increase with increase of income but also that the percentage of medicare to total expenditure also increases. From a marketing point of view this means that currently the major market lies with those of high income rather than the area of lowly paid where the need for medication is the greatest.

Medicare can be seen to be of a low priority of household expenditure. This is exemplified by the fact that all families earning less than P 100,000 per annum spend more on alcoholic beverages and tobacco than medical care.

3.4 Actual Drug Demand-Drug Requirement Gap

Drug spending falls dramatically short of requirement as determined by levels of population and disease incidence and only represents a mere 17.9% (P 9,324 million) of an estimated need for 1987 of P 51,879 million.

There are considerable differences observed in the consumption/demand ratios when analysed by therapeutic classes which could be explainable by inadequate diagnosis and/or influence of self medication. What is highlighted however, are the severe needs which are not satisfied for drugs to treat respiratory system, central nervous system, cardiovascular diseases, blood and blood forming organs, musculo-skeletal systems, systemic hormones and parasites. The picture is illustrated in figure 4.

3.5 Sourcing of Raw Materials

Almost all active substances and excipients are imported into the Philippines with the exception of those which are the output of the one chemical manufacturing unit of Chemfields who produce and supply the antibiotics ampicillin, amoxycillin and cloxacillin prepared by semi-synthesis.

Most packing materials are locally produced. Neither the country, nor any of the local drug companies have so far embarked on an effort to substitute local raw materials for imported ones and facilities do not exist for such manufacture.

Importations are in the form of chemicals (active ingredients and excipients), semi-finished products in bulk and some finished products. They originate from some 30 countries, the bulk originating from the worlds major pharmaceutical centres in the United States, Switzerland, Germany and the United Kingdom.

Importation values have averaged (from 1978 to 1987) some 1.12% of total imports.

3.6 Drug Distribution Network

Drug manufacturers, producers and importers either undertake their own distribution or through nationwide distributors. As a result of the geography of the Philippines only few manufacturers operate their own distribution network.

The regional distribution system seems to be well developed and is illustrated in figure 5.

FIGURE 4

THE PHILIPPINE DRUG SITUATION

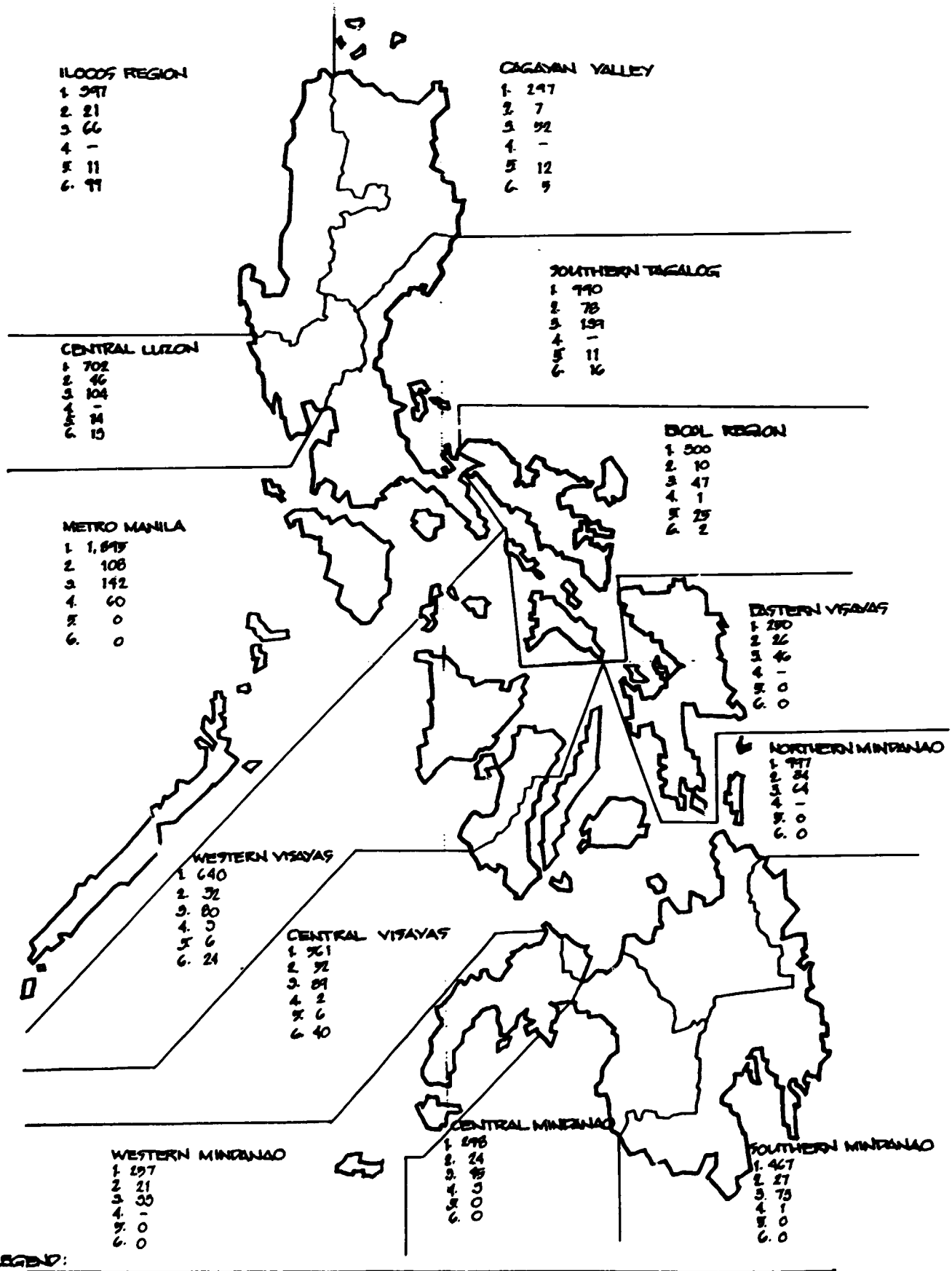
(IN MILLION PESOS)

THERAPEUTIC CLASS	CONSUMPTION	REQUIREMENT	C/R (%)	UNFILLED GAP	OVER CONSUMPTION
SYSTEMIC ANTI-INFECTIVE	2,278	2,278	100.0	–	.014
RESPIRATORY SYSTEM	1,448	2,236	64.8	787.942	–
ALIMENTARY TRACT AND METABOLISM	1,531	678	225.8	–	852.736
CENTRAL NERVOUS SYSTEM	706	5233	13.5	527.160	–
CARDIOVASCULAR SYSTEM	643	13,557	4.7	12,913.906	–
DERMATOLOGICALS	458	103	444.7	–	355.349
BLOOD, BLOOD FORMING ORGANS	605	17557	3.5	16,951.937	–
GENITO-URINARY AND SEX HORMONES	240	77	311.7	–	190.920
MUSCULO-SKELETAL SYSTEM	327	388	84.3	61.455	–
SYSTEMIC HORMONES	168	2,837	5.9	2,668.217	–
SENSORY ORGANS	125	11	1136.4	–	113.409
PARASITOLOGY	107	5,557	1.9	5,449.285	–
CYTOSTATICS	18	–	–	–	17.817
OTHERS	640	1,367	46.8	726.803	–
TOTAL	9,324	51,879	18.0	44,086.740	1,532.740

SOURCE: UNIDO RP PHARMACEUTICAL DEVELOPMENT STUDY, Q. KINTANAR

FIGURE 5

REGIONAL DISTRIBUTION OF DRUG OUTLETS



LEGEND:

1. RETAILERS	3. HOSPITAL PHARMACIES	5. HOUSEHOLD REMEDY STORES
2. GENERAL WHOLESALERS	4. CHINESE DRUGSTORES	6. BOTICA SA BARANGAY

SOURCE: BUREAU OF FOOD AND DRUGS, REGULATION DIVISION I, 06/20/86

3.7 Forecast for the Next 5 Years

Taking into account the economic scenario for the period 1988 to 1992 as forecast by NEDA (update Development Plan for GDP and inflation) and Centre for Research and Communication forecast for the Peso-dollar rates, the political environment, economic restrictions and effects of the National Drug Policy and that no dramatic changes in structure of demand both at therapeutic class and regional levels can be expected, the forecast of the drug market for the next five years is formulated in table 4 and graphically illustrated in figure 6.

These highlight the importance of antibiotic products.

4. UP-STREAM INTEGRATION OF THE PHARMACEUTICAL INDUSTRY IN THE PHILIPPINES

4.1 Present Situation - Chemfields Inc.

To date Chemfields Inc. is the only example of up-stream integration of the Pharmaceutical Industry in the Philippines.

Manufacture of semi-synthetic antibiotics commenced, and has operated, since 1981. With an initial production capacity scheduled at 25 m. tons production output has now reached a level of 75 m. tons.

The major economic contributions the project promised to deliver were:

(1) price moderation in final dosage forms through low raw material prices and their slower growth;

(2) foreign exchange savings by means of effective import substitution, and

(3) technological up-grading of the drug industry.

Some protection for the company was given in the form of import regulation of competing products in 1982 but overall the facility must be considered successful and a good indicator for the feasibility of up-stream integration in the Philippines.

The experiences of Chemfields have proved useful in assessing the status of various infrastructures in the Philippines. Such aspects were analysed in some detail being of considerable significance in proposing any further activities or implementation of up-stream activities.

4.2 Infrastructures

The principle areas covered were:

(1) energy (electrical, fuel and water)

Table 4

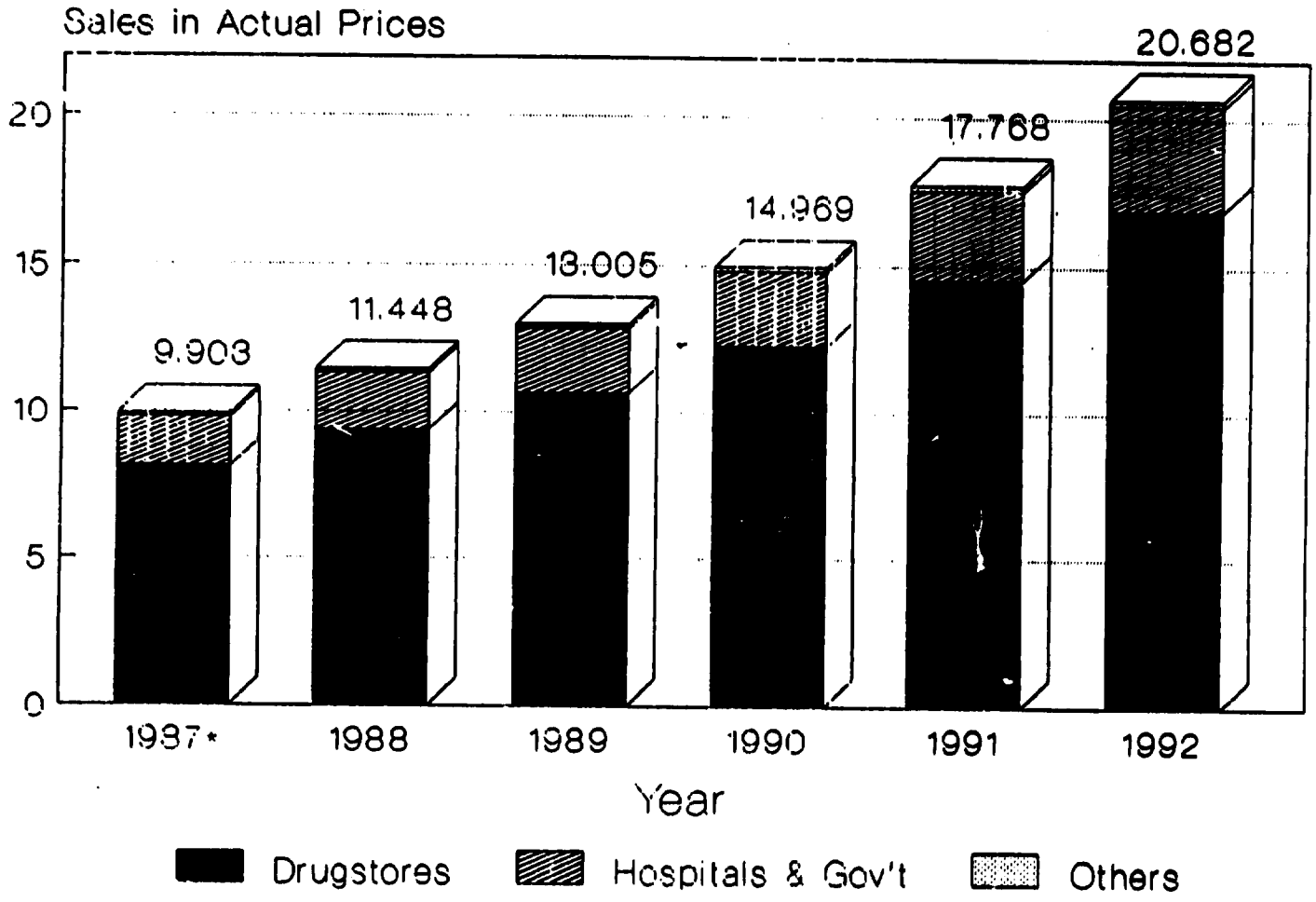
The Drug Market from 1987 - 1992

	Actual Values		Forecasted Values			
	1987	1988	1989	1990	1991	1992
Prices growth rate (percent)	8.2	6.6	6.7	8.1	11.5	9.3
Sales Volume growth rate (percent)	14.6	8.4	6.5	6.5	6.5	6.5
Sales Value growth rate (percent)	21.6	15.6	13.6	15.1	18.7	16.4
Values (Pesos Million)						
Total Sales	9903.3	11448.2	13005.2	14969.0	17768.1	20682.1
Drugstores Sales	8108.5	9376.1	10651.3	12259.6	14552.1	16938.6
Hospitals & Gov't Sales	1686.8	1946.2	2210.9	2544.7	3020.6	3516.6
Others	108.0	125.9	143.1	164.7	195.4	227.5
Drugstores & Private Hospital Sales Of:						
Antibiotics Systemic	1774.9	2051.4	2330.4	2682.3	3183.9	3706.4
Tuberculostatics Incl. Strepto	304.8	352.3	400.2	460.6	546.7	636.4

FIGURE 6

FORECASTS OF THE DRUG MARKET:1987 - 92

(By Type of Market, in Billion Pesos)



*Note. 1987 are actual figures

(2) a. plant construction and installation capabilities
    b. spare parts and maintenance
    c. plant installation
(3) civil works
(4) engineering
(5) a. communication
    b. transportation
(6) human resources and training
(7) a. state of science and technology
    b. research and development relevant to development of the pharmaceutical industry:

(1) Energy: Continuity of supply, which is of paramount importance in both the fermentation and chemical synthesis fields, cannot be relied upon in many areas. The short-coming can be overcome during design with installation of generators.

Cost of electrical energy supply is high in South East Asian terms although seem to be some 20% lower in Mindanao. Cost factor is less important in chemical synthesis than fermentation. The problem for fermentation can most likely be overcome by strategic location of the unit and utilisation of cheap waste fuel as raw material in the form of bagasse. Such fuel could be used to produce steam which in turn could be used to operate steam turbine generators to generate an electrical supply. Use of bagasse is only feasible at its source, transportation costs precluding its use at any distance. Other fuels in the form of bunker fuel or diesel are available, though expensive.

Water suppliers are variable from location to location particularly with respect to temperature. For both fermentation and chemical synthesis refrigeration systems would be essential. The quality of water suggests that in no instances should sophisticated treatment equipment be needed.

(2) Domestic capabilities in plant construction and installation exist to some extent in the Philippines in cast steel and stainless steel though it would generally be desirable for design drawings to be supplied. Now pressure vessels, tanks columns, heat exchangers are fabricated in the Philippines but importation of items requiring delicate welding such as jacketted reactors, fermentors and pressure units should be imported.

All other items of equipment including boilers, generators, compressors, refrigerators, pumps, agitators, centrifuges and driers need to be imported. Similarly importation of piping, instrumentation, control equipment and electrical systems should also be imported.

(2)b. Spare parts and maintenance: as with most developing countries, the situation is not very satisfactory and in any project a substantial inventory of spare parts must be catered for. The situation extends to analytical chemical equipment where great care in selection should be executed with special reference to after sales service and maintenance.

(2)c. Plant installation: Local companies can be expected to satisfactorily perform this function and there is already evidence that some Philippine Companies are fulfilling important contracts for plant installations worldwide, particularly in the Middle East. Low cost of local manpower can be expected to provide lower installation costs than those in Western countries.

(3) Civil works

Satisfactory capabilities exist in the Philippines in this area covering general design, engineering and building. Some outside assistance in designs with respect to special characteristics of the chemical industry might be relevant.

Construction times for engineering and construction are likely to be similar to those in Europe.

(4) Engineering: Local enterprises show the capability for performing detailed engineering of industrial plants once the basic engineering has been defined by the main contractors of a project.

(5)a. Communications: telecommunications are very difficult being frequently effected by adverse climatic conditions.

(5)b. Transportation: cost of transportation throughout the country is very high within the Philippines. It can also be severly effected during the rainy season. It could be an important factor to consider in some project evaluations.

(6) Human Resources and Training

The quality and capabilities of Filipinos in the running and management of pharmaceutical corporations in the Philippines is self-evident. The experience of Chemfields Inc., the only producer of bulk pharmaceutical chemicals in the Philippines, in setting up their facilities, training personnel and the subsequent satisfactory operation and development of the unit can be considered a positive encouraging factor.

It was a general conclusion of the international experts that there is a satisfactory pool of trained microbiologists, chemists and engineers from which staffing requirements of priority projects could be met. Some of these are currently active in university research and teaching. In most cases additional training will be needed.

When consideration of a project is active it will be of great importance that adequate attention is paid to the inclusion of training and in the longer term attention should be paid to human resources development to satisfy increasing demands.

To this end an up-grading of universities and colleges is considered to be urgently required, particularly in sciences and engineering from the point of view of training in practical aspects. Such up-grading will necessitate an investment in terms of apparatus and equipments.

(7)a. State of science and technology in the Philippines

The Department of Science and Technology (DOST) is a Government office of cabinet rank organized under Executive Order No. 129 of 20 January 1987. The organization chart is illustrated in figure 7.

The status of S & T is usually gauged by selected indicators which show the resources committed to the effort. Such are shown in table 5 and a serious problem is observed in the low R&D expenditure of only 0.09% of GNP in 1987 coupled with the dramatic staffing decreases at a rate of 12% since 1984. Strengthening should be considered a priority.

(7)b. Assessment of Research and Development in Biotechnology, Biochemistry and other sciences relevant to Development of the Pharmaceutical Industry

Ongoing local research and development in biotechnology and biochemistry cover a wide area of interests related to the development of drugs. Many initiatives are at early stages of development. There is a need for orga-

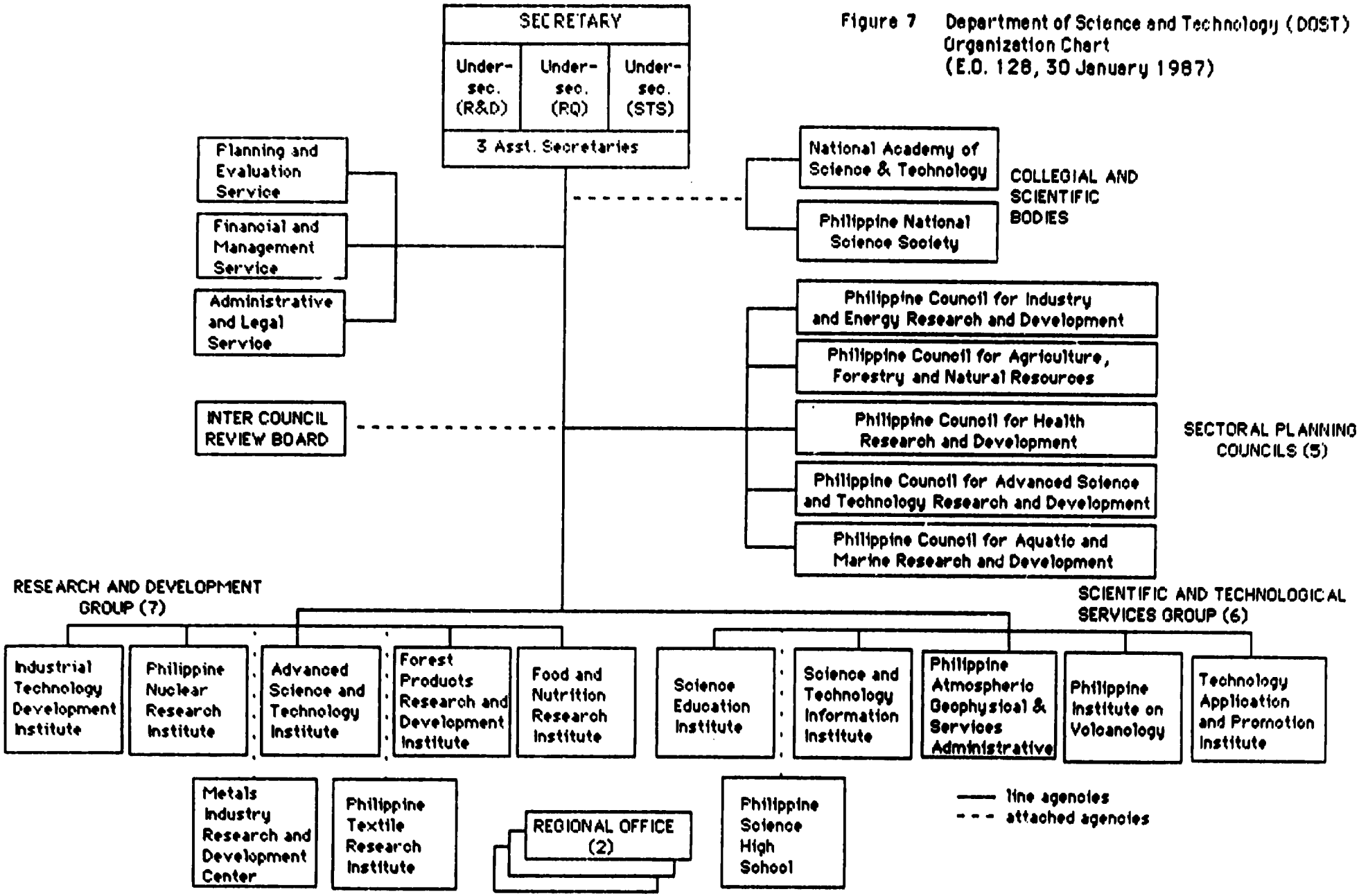


Figure 7 Department of Science and Technology (DOST) Organization Chart (E.O. 128, 30 January 1987)

Table 5
Historical data on selected S & T indicators, 1981-1987.

	1981	1982	1983	1984	1985	1986[e]	1987[e]
1. GNP (in billion P)	303.6	335.8	378.7	526.3	595.1	628.2	715.8
2. STA Expenditures (in billion P):							
2.1 Total	1.219	1.527	1.767	1.738	2.231	2.862	2.920
2.2 Gov't. share	1.097	1.374	1.590	1.564	2.008	2.576	2.628
3. R&D Expenditures as % of GNP	0.17	0.19	0.14	0.12	0.10	0.10	0.09
4. R&D Expenditures by Sector (in million P)							
- Government	332.47	418.33	338.49	419.23	422.24	440.20	458.33
- Private Industry	104.80	104.37	103.89	118.89	118.43	122.61	126.79
- Higher Education	37.86	55.24	42.11	38.07	46.20	38.95	37.70
- Non-Profit Institutions	53.21	56.52	30.10	37.22	25.66	18.23	10.78
TOTAL	528.34	634.46	514.59	613.41	606.53	620.07	633.60
5. R&D Expenditures by source of Funds (in million P)							
- Own Fund	443.74	524.64	384.70	467.76	438.24	431.65	424.66
- Government Fund	42.39	59.77	60.87	50.39	59.63	62.14	64.65
- Foreign Fund	31.80	41.44	52.92	79.74	90.30	105.83	121.36
- Other Fund	10.41	8.61	16.10	15.52	18.36	20.65	22.93
TOTAL	528.34	634.46	514.59	613.41	606.53	620.07	633.60
6. R&D Manpower by Sector							
- Government	11,048	11,631	6,449	6,678	5,885	5,180	4,565
- Private Industry	2,368	2,416	1,244	1,148	941	788	646
- Higher Education	2,733	2,829	1,568	1,618	1,414	1,234	1,079
- Non-Profit Institutions	1,034	1,116	688	741	685	632	585
TOTAL	17,183	17,992	9,949	10,185	8,925	7,834	6,875

Table 5 . (continued)

	1981	1982	1983	1984	1985	1986[e]	1987[e]
7. R&D Manpower							
by Category							
- Scientists and Engineers	7,482	7,884	4,394	4,830	4,363	3,944	3,561
- Technicians	3,306	3,500	1,867	1,855	1,599	1,379	1,188
- Support Personnel	6,395	6,608	3,688	3,500	2,963	2,511	2,126
T O T A L	17,183	17,992	9,949	10,185	8,925	7,834	6,875

Estimate

Official government figures for 1985, 1986, and 1987 are 0.22, 0.23, and 0.22, respectively.

SOURCES: NSTA Surveys on R & D Expenditures and Manpower, 1981-1982 and 1983-1984
EPRS, NEDA projections on GNP (August 1986)
National Accounting Office, DBM

NOTE: Assumption for item 2: Government Share is 90%

Prepared by STRAED, Planning and Evaluation Service
Department of Science and Technology
10 June 1988

nization and systematic monitoring.

Production of drugs by fermentation is a valid strategy for initiation of local production and will be expanded upon later.

It is suggested, and again mentioned elsewhere, that, perhaps, in the absence of a petrochemical industry efforts to employ biotechnology and sources of agricultural products as a means to develop a chemical industry should not be allowed to lapse and indeed considered in more depth.

4.3 Raw materials

No petrochemical industry exists in the Philippines and there has been no opportunity to develop a chemical industry from this source. This does not preclude consideration of up-stream integration. The Philippines nevertheless does have available raw materials which can in some instances be considered for immediate use in production of pharmacologically active chemicals or could, perhaps, be considered as a basis, using biotechnology, for the development of a more basic chemical industry. These are all of agricultural origin.

For chemical synthesis and semi-synthesis of antibiotics the most important chemicals are really solvents rather than specialised organic intermediates in which few countries are self-sufficient due to the wide range. Solvents can be produced from agricultural products using biotechnology and could conceivably be further converted using current surplus capacity of chlorine into a range of products. A study of this could be worthwhile.

The obvious raw materials of value for utilization in production development of pharmaceutical chemicals originate from the sugar industry and the cassava and corn starch industries. Corn steep liquor and raw sugar (alternatively glucose solution or molasses) are major components for the production of antibiotics by fermentation. Minor components of lard oil, soybean oil or coconut oil could also be available. An additional important item is the bagasse, availability of which may be of significant importance as an energy source for an antibiotic fermentation unit.

The availability of actual domestically produced chemicals is extremely limited comprising a few inorganic products, industrial gases and the only solvent ethanol.

Medicinal plants: This is a special area of an agricultural source of active pharmacologica' ..bstances. Many on-going research projects exist but there is a need fo. rationalisation in programmes and particularly for identification of active principles and analytical profiles before any significant contribution of these to the health of the nation can be realized.

Essential oils: These go hand-in-hand with medicinal plants and were considered in the study although direct use in the pharmaceutical industry is very negligible. It is an area worthy of investment for research into the economic viability of utilization but falls outside of this study.

Cinchona: This is a special case of a medicinal plant which warrants isolation. The Cinchona tree is available in abundance in the Philippines. It is the source of Quinine, an anti-malarial drug of great importance for utilization both in the Philippines and worldwide. Pursuit of further investigation into this raw material is one of the priority recommendation of the study.

4.4 Investment Priorities and Government Incentives Programmes

Investment: Several priority areas for investment relevant to the pharmaceutical field can be identified in "The 1988 Investment Priorities Plan" (IPP) which serves as a vehicle to direct investments into those areas where the country's needs are greatest and where there is maximum potential to create jobs, utilize locally available resources, accelerate industrializa- tion and develop competitiveness in the international market place. Anti- biotics, herbal medicines and other pharmaceuticals are included.

Incentives: Currently investors consider that the incentives offered in the Philippines are not the most attractive. Those operabl- are given in the new "Omnibus Investments Code" (EO.226).

The observations are supported by the findings of a recent survey conducted by the "SGV Group" on investment incentives offered by nine Asian Countries. The Philippines ranked eighth lowest in the region in terms of number of incentives. Those not offered by the Philippines, but offered by other Asian countries are: -

- Guarantee against losses due to nationalization
- Guarantee against losses due to damage caused by war
- Guarantee against losses due to inconvertibility of currency
- Preference in the granting of government loans
- Protection against import competition
- Protection against Government competition
- Real estate ownership by alien investors
- Exemptions from capital gains taxes
- Exemptions from taxes on royalties
- Exemptions from withholding taxes on interest on foreign loans (tax credits)
- Accelerated depreciation allowance
- Carry forward of capital allowance during the relief period
- Carry forward of loss
- Export allowances or deductions
- Deduction of organization expenses
- Deduction of pre-operating expenses
- Deduction of reinvested profits
- Investment tax credits
- Technical assistance to investors

Recommendations of some priorities for consideration of improving the situation have been made in the report.

4.5 Patent Law is highly respected in the Philippines, but the country is not a member of the International Patents and Copyright Convention.

5. RECOMMENDATIONS OF THE EXPERTS

The reports of the individual experts involved in the study have been published separately. Many recommendations, which may often be found within the general texts of the reports, bear attention.

A summary of the principal recommendations for the different disciplines can be presented best in tabular form.

		Recommendations	
	Discipline	Primary	Secondary
1.	Bioactive substances (Animal origin)	No viable areas (lack of raw material and product levels)	Use fish liver oil for vitamins

	Discipline	Primary	Secondary
2.	Blood products	Feasibility study for blood fractionation project (stage wise development employing venous and placental blood)	Production blood bags
3.	Chemical synthesis	Feasibility study for multi-purpose pilot plant for chemical synthesis	1. Feasibility study for utilization of Cinchona. 2. Possible use of glucose and fish liver oil for vitamin production. 3. Preparation of glycerine derivatives.
4.	Fermentation (Antibiotics)	1. Establishment of a multi-purpose fermentation pilot plant for antibiotics. 2. Establishment of a Penicillin and 6-Amino-penicillanic acid production plant. 3. Establishment of a Multi-purpose Fermentation plant for the manufacture of Erythromycin, Tetracyclines and Rifamycin	Monitoring domestic raw materials
5.	Genetic Engineering	Man-power training in general and short term training courses in specific techniques	Proposed wide range, essentially research projects, with special reference to development and production of diagnostics against endemic infectious diseases
6.	Industrial Biotechnology	Production of diagnostics (a) Hepatitis B (b) Blood typing reagents	1.Local production of Foetal calf serum 2. Research projects for starch and copra

7.	Industrial Economics	Recommendations relating to incentives for attracting foreign investment	
8.	Medicinal plants	1. Support for continuation NIRPROMP project 2. Consideration of setting up Philippines Centre for Medicare and Aromatic Plants Research (PCMAPR) 3. Support for essential oils development	Commercial production of agar agar
9.	Semi-synthesis of Antibiotics	1.Extension facilities for production of ampicillin, amoxycillin, cloxacillin and cephalexin 2. Production plant for Tetracycline and Oxytetracyline hydrochlorides 3. Production plant for Erythromycin derivatives and Rifampicin	
10.	Vaccines and sera	1. Upgrading of the Quality Control Laboratory for biologicals at the Biological Services, Alabang. 2. Consideration of up-grading of the Alabang Vaccine Complex with regards to "Intercare Study on the Alabang Vaccine Complex"	Revision career prospects and structure at Biological Production Sciences Unit
11.	General	Human Resource Training	

6. <u>VALIDATION MEETING OF AD HOC PANEL OF INTERNATIONAL EXPERTS</u>

Industrial profiles were prepared for priority projects chosen from the recommendations of the experts and a meeting of an independent group of experts was convened at UNIDO headquarters in Vienna on 27-28 October 1988 in order to discuss and validate these .

Present at the meeting, in addition to UNIDO staff were high level representatives of the Philippine Government and such experts as were concerned with the follow-up projects and the Chief Technical Adviser.

The ad hoc panel of international experts representing the pharmaceutical industry (both private and public) carried out an independent review of the recommendations given by the experts of the project DP/PHI/87/019. The panel validated several recommendations, reoriented and reformulated several others and suggested to withdraw a few.

The profiles and project concepts which were discussed by the panel are summarized below together with their status after the meeting in tables 6 and 7.

Table 6
PRINCIPAL PROJECT ANALYSIS

Profile No.	Recommendation	Purpose	Status after validation
1	Establishment of multipurpose fermentation pilot plant for antibiotics	1. Monitoring quality and suitability of locally available raw materials of agricultural original 2. Training of technical personnel	Recommended to be established at Biotech
2	Establishment of a production plant for Penicillin and 6APA (6-Amino-penicillanic Acid)	Production unit to produce 250 tons per annum Penicillin GK to provide 110 tons p.a. 6APA to satisfy local production of beta-lactam antibiotics, 20 tons p.a. injectable Penicillin G, 6 tons p.a. feed grade Penicillin G and 45 tons p.a. Penicillin VK	Pre-feasibility study recommended. Potential investors to be encouraged to contribute to feasibility study taking into account possible donwstream integration
3	Expansion of existing facilities for semi synthesis of Ampicillin, Amoxycillin, Cloxacillin and Cephalexin	To increase capacity of existing products and introduce the new product of Cephalexin	Pre-feasibility study recommended including considerations being given to both options of up-stream and down stream options
4	Establishment of a Tetracycline and oxytetracycline hydrochlorides production plant	Production unit for 20 tons p.a. Tetracycline hydrochloride and 15 tons p.a. Oxytetracyline hydrochloride	Recommendation now withdrawn in line with profile 6.
5	Establishment of an Erythromycin derivatives and Rifampicin production plant	Production unit for the production of 25 tons p.a. Erythromycin derivatives and 20 tons p.a. Rifampicin	Feasibility study to be carried out for Chemfields
6	Establishment of a multipurpose production plant for Erythromycin, Tetracyclines and Rifamycin	Production unit for 26 tons p.a. Erythromycin base, 35 tons p.a. Rifamycin B and 86 tons p.a. Tetracyclines	Recommendation now withdrawn on economic basis not being viable at market levels
7	Establishment of a multipurpose pilot-plant for chemical synthesis	Production of range of pharmaceutical chemicals in line with disease and market needs. Capacity for flexibility and up-stream development. Development orientated.	Pre-feasibility study to be carried out including considerations with and without inclusion of formulation packaging, reconsideration of product mix to encompass wide range of therapeutic groups, reassessment of domestic raw materials and solvent usage

Table 7

SUPPLEMENTARY PROJECT ANALYSIS

EXPERTISE	RECOMMENDATION	PURPOSE	STATUS
Chemical Synthesis (Natural Products)	Perform a pre-feasibility study on the cultivation and processing of Cinchona and utilization to produce Quinine at Mindanao.	To assess the extent of availability and continuity of supply of Cinchona and assess the economic and viability of utilizing this to set up a manufacturing unit for Quinine and its chemical conversion to Quinidine	Recommended to be carried out. Propose to utilize funds of DP/PH/87/019
Vaccines and Sera	1) Up grading of quality control facility and Biological Production Services at Alabang to WHO standards 2) Consideration by Philippine Government to present "Intercare Study on the Alabang Vaccine Complex" to UNIDO Advisory Panel on Preventive Medicine for validation		Meeting of UNIDO "Advisory Panel on Preventive Medicine recommended to be held in the Philippines to validate "Intercare Study on the Alabang Vaccine Complex"

7. FINANCIAL AND ECONOMIC ASPECTS FOR SELECTED INDUSTRIAL PROFILES

In order to ascertain preliminary commercial feasibility of the projects selected for further consideration, analyses were undertaken, using data reported by experts during field studies, by applying the UNIDO Computer Model for Feasibility Analysis and Reports (COMFAR) to produce general financial and economic indicators. The extent of the analysis can only be considered limited.

The projects considered were:

Industrial Profile (as defined at Ad hoc Vienna meeting)

No.2 Penicillin and 6-Aminopenicillanic acid production plant

No.3 Semi-synthesis of Ampicillin, Amoxycillin, Cloxacillin and Cephalexin (expansion of existing facilities)

No.5 Erythromycin derivatives and Rifampicin Production Plant

No.7 Multi-purpose pilot plant for chemical synthesis

Abbreviations:

FIRR = Financial Internal Rate of Return

EIRR = Economic Internal Rate of Return

Inputs and results of analyses are tabulated below:

Element	Industrial Profile 2	Industrial Profile 3	Industrial Profile 5	Industrial* Profile 7
Investment	US$ 30,000,000	US$ 5,900,000	US$ 1,530,000	US$ 5,265,000
Annual Output	295 tons	74 tons	45 tons	83 tons
Sales Estimates	US$ 11,630,000	US$ 7,620,000	US$ 7,788,000	US$ 2,040,000
Manufacturing Costs	US$ 6,600,000	US$ 6,461,000	US$ 6,859,000	-
Manpower	170	45	27	48
FIRR	11.28 %	12.72 %	26.16 %	-
EIRR	14.42 %	15.09 %	24.33 %	-

* Manufacturing costs not available

Summary: (as currently analysed)

Profile 2: Financially vulnerable.
Cheaper foreign capital in form of loans on joint ventures possibly necessary. Significant improvement of economic feasibility possible if use of molasses can be implemented. Downstream integration may be pursued for better commercial profitability.

Profile 3: Desirable to employ cheaper foreign sources of capital. Satisfactory employment of molasses would also benefit this project.

Profile 5: Apparently attractive project, although it is highly sensitive to output and raw materials prices due to the relatively low value added content of the activity.

8. ACTIONS INITIATED AFTER PHILIPPINE GOVERNMENT PRIORITY REVIEW AND CURRENT STATUS

1. Establishment of a multi-purpose fermentation pilot plant on the premises of Biotech at Los Baños.

Status: A Research Proposal has been prepared by Dr. William Padolina (Biotech). The project has been submitted for bilateral financing to the Government of Italy

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2. Prefeasibility studies on:
(a) establishment of an industrial scale fermentation plant for Penicillin, including enzymatic conversion of Penicillin G into 6-APA

Status: Project document prepared and submitted for IPF financing to UNDP, Manila, investigating downstream integration.

(b) establishment of an Erythromycin derivatives and Rifampicin synthetic production plant at the site of CHEMFIELDS

Status: Project document prepared and submitted to SIS financing at UNIDO, Vienna

(c)establishment of a multi-purpose pilot plant for chemical synthesis.

Special considerations recommended to be given to: -

- the economic viability of the operation should be analysed for the synthesis of pharmaceutical chemicals only and inclusive the formulation and packaging into final dosage forms;
- the product mix covering the widest range of therapeutic groups should be identified;
- the availability of domestic raw materials should be assessed;
- the optimal use and handling of solvents should be examined.

Status: Project document prepared for UNIDP financing at UNIDO, Vienna

(d) cultivation and processing of Cinchona and its utilization in the manufacture of Quinine and its derivatives

Status: The terms of reference prepared. Funding allocated under DP/PHI/87/019. The study will be launched in the first half of 1989.

3. Meeting of "UNIDO" Advisory Panel on Preventive Medicine" in the Philippines to validate "Intercare Study on the Alabang Vaccine Complex", 4-6 April 1989.

Status: Funding allocated under SI/PHI/89/801.

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4. High level advice from UNIDO has been requested for a study on hospital-based intravenous (IV) fluid production, DOH-UP

Status: Project document prepared and submitted to SIS financing at UNIDO, Vienna.

ANNEX 1

LIST OF PARTICIPANTS - PANEL MEETING, VIENNA 27-28 OCTOBER 1988

Panel Members:

Dr. Christian Noe	(Austria)
Dr. Janos Fari	(Hungary)
Dr. Ferenc Kovats	(Hungary)
Dr. Michel Philippe	(Belgium)
Mr. Luis Cuñado Rodríguez	(Spain)
Mr. Hirokazu Sato	(Japan)
Mr. Pierre Perrin	(France)
Dr. Walter Bilek	(Switzerland)

Philippine Government Representatives:

Mr. Rhais Gamboa	Undersecretary of Health
Dr. Romero Reyes	Assistant Director General, NEDA
Dr. Quintin Kintanar	Director, PCHRD, Assistant Secretary of Health
Ms. Glory Lleander-Chanco	Director, Chemical Industry, BOI
Dr. William G. Padolina	Professor of Chemistry, U.P. Los Baños, Director of Biotech
Dr. Ruperto P. Alonzo	Professor of Economics, School of Economics, U.P. Diliman