Keele University

# THE PERFORMANCE OF PUBLIC INDUSTRIAL ENTERPRISES IN ALGERIA : AN EMPIRICAL STUDY

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Cette these est dediée à tous ceux qui me sont chers

## ABSTRACT

The aim of this study is to assess the performance of the Algerian public industrial sector and identify the reasons for its inefficiency. The study is based on an empirical analysis of six public industrial enterprises: SONIC (pulp and paper), SNMC (construction materials), SNIC (light chemical), SONATRACH (hydrocarbons), SNS (iron and steel) and SONACOME (mechanical engineering). In this representative study of public industrial enterprises, 171 plants and complexes were investigated. In order to measure the efficiency of these public enterprises, input utilisation (raw materials, intermediate inputs, fixed capital and labour) is analysed. Given that Algeria is a capital-scarce economy, emphasis is placed on fixed capital utilisation via the calculations of U1 (ratio of actual over planned output), U2 (ratio of planned over technical output) and U3 (ratio of actual over technical number of shifts or time utilisation of fixed capital).

It was found that the average rate of fixed capital utilisation for the public enterprises studied was 72.81%, 76.64% and 71.27% as measured by U1, U2 and U3, respectively. With this information and according to evidence provided by the plant managers, it was concluded that the different inputs were inefficiently used in all the public enterprises studied and, by and large in the entire Algerian public industrial sector. Four causes of inefficient utilisation of inputs were identified: organisational factors, shortages of inputs, allocative inefficiencies and demand shortages. The potential for significant increases in industrial output and employment, therefore, exists.

A cross country comparison among Turkey, Egypt and Algeria

showed that several causes of inefficiency encountered in Algeria were also observed in the other, more experienced countries characterised by similar economic systems. From this study, some policy recommendations directly related to the problems encountered, emerged.

## ACKNOWLEDGEMENTS

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## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AD | = Algerian Dinar |
| A.G.I. | = Authorisation of imports |
| A.E.W. | = Assembly of public enterprise workers |
| A.P.W. | = Assembly of plant workers |
| A.S. or W.A. | = Workers assembly |
| BAD | = Algerian Development Bank |
| BCA | = Central Bank of Algeria |
| B.D. | = Board of Directors |
| BEA | = Overseas Bank of Algeria |
| BNA | = National Bank of Algeria |
| c. | = Complex/es |
| c.i.f. | = Value of imported goods that includes the purchased cost, plus the cost of transportation and insurance to the frontier of the imported country |
| CNAN | = National shipping company |
| CPA | = Popular Bank of Algeria |
| CPW | = Construction and public works |
| DNC, SONATIBA and ECOTEC | = Public enterprises for housing and community infrastructure |
| E.E.C. | = European Economic Community |
| EGA | = Electricity and gas of Algeria |
| F.A.O. | = Food and Agriculture Organisation of the U.N. |
| f.o.b. | = Value of exported goods that includes the cost of transportation and insurance to bring the goods onto the transporting vehicle at the frontier of the exporting country |
| GSE or SM | = Socialist Management |
| IBRD | = International Bank for Reconstruction and Development |
| I.L.O | = International Labour Organisation |
| I.M.F | = International Monetary Fund |
| INAPI | = National Institute of Industrial Property |
| INPED | = National Institute of Productivity & Development |
| JORA | = Official Journal of Algeria (Official Statutes) |
| LNG | = Liquefied natural gas |
| LPG | = Liquefied petroleum gas |
| MIL | = Ministry of Light Industries |
| MPAT | = Ministry of Planning |
| N.P.K. | = Mixed fertilisers |
| OCP | = Central Organisation of Planning |
| ONC or ONACO | = National office of commercialisation |
| ONCV | = National office of commercialisation of wine |
| O.P.E.C. | = Organisation of Petroleum Export Countries |
| O.P.U. | = Algerian University Press |
| p. | = Plant/s |
| P.e.b.d. | = Low density polyvinyl |
| P.N.C. | = National Price Committee |
| P.V.C. | = Polyvinyl chloride. |
| R.A. | = Refinery/ies |
| RASJEP | = Algerian Revue of Law, Economics and Politics |
| SEP | = Secretary of State for Planning |
| S.C. | = Standing Committee |
| SNED | = Public enterprise of publishing |
| SNEMA | = Public enterprise of spring water |
| SNERI | = Public enterprise of research in engineering |
| SNIC | = Public enterprise of light chemicals |
| SNLB | = Public enterprise of cork and wood |

SNMC = Public enterprise of materials construction
SNMETAL = Public enterprise of metallurgy
SNMGA = State run supermarket
SNS = Public enterprise of iron and steel
SNSEMPAC = Public grain processing enterprise
SNTA = Public enterprise of tobacco and matches
SNTR = Public enterprise of transport
SOGEDIA = Public enterprise of canned food
SONAC = Previous name of SONITEX
SONACOME = Public enterprise of mechanical engineering
SONAGHTER = Public enterprise of water work
SONAREM = Public enterprise of quarrying and mining
SONATRACH = Public enterprise of production, transport, and commercialisation of hydrocarbons
SONATRO = Public enterprise of road work
SONELEC = Public enterprise of electrical engineering
SONELGAZ = Public enterprise of electricity and gas
SONIC = Public enterprise of pulp and paper
SONIPEC = Public enterprise of skins and hides
SONITEX = Public enterprise of textiles
SORECO and SORECAL = Regional public enterprise for construction and civil engineering
T.S.P. = Triple superphosphate fertiliser
U.G.T.A. = Algerian Labour Organisation
U.N. = United Nations
U.S.A. = United States of America
US $ = United States Dollar
U.S.S.R. = Union of the Soviet Socialist Republics
VA = Value added
W.A. = Workers assembly

## INTRODUCTION

The central purpose of this study is to assess the performance of the public industrial sector in Algeria and to identify the causes of inefficiency. The choice is governed by the important role played by this sector in the industrialisation process of Algeria (in 1980 this sector contributed to more than 45% of the Algerian value added). This study is based on an empirical and an aggregative analysis of six public enterprises. The capacity utilisation measurement is chosen to assess the efficiency of these public enterprises. The main causes of underutilisation are identified. In order to analyse these different aspects, it is necessary to draw a general picture of conditions prevailing in the Algerian public industrial sector.

This study is divided into three parts :
the first part provides background information related to the Algerian economy which constitutes the environment in which the public enterprises operate. As previously mentioned, this thesis is only concerned with the industrial sector. Therefore the agricultural sector is not described and discussed in detail although some information is given in various sections. The First Chapter is devoted to the characteristics of the Algerian economy. These are the Algerian development strategy, the role of the government and state control of the economy, human and natural resources, development planning, Algerian gross domestic product, financing of public investment and balance of payments and public debt. In Chapter Two the Algerian industrial sector at the time of independence (1962) and its evolution up to 1980 are discussed. The most important branches of the industrial sector are analysed. In

Chapter Three the government policies that influence public enterprise performance are examined. Investment, financing, labour, foreign trade and price policies are described.

In the second part of this work an analysis of the performance of the Algerian industrial public sector using empirical evidence from six public enterprises is presented. Capacity utilisation (raw materials and intermediate inputs, capital and labour) is calculated and the main causes of inefficiency are identified for each public enterprise studied. Chapter Four is divided into three parts. In the first part some background information concerning Algerian public enterprises is given (organisational structure, the decision making and control). Some theoretical background used in the analysis of the data is presented in the second part. This part is divided into the methodology , the survey and sample, and the questionnaire. This is followed by the discussion of the main causes of inefficiency which constitute the last part. In Chapters Five to Ten the general profile, capacity utilisation and the analysis of the main causes of inefficiency are presented for the public enterprises SONIC, SNMC, SNIC, SONATRACH, SNS and SONACOME, respectively.

Finally part three consists of two chapters : Chapter Eleven is devoted to a comparative study of Algeria, Turkey and Egypt. The objective is to compare their economic performance and draw out similarities or differences between the different systems. Lastly, Chapter Twelve gathers all the findings and the main conclusions that have emerged. In this concluding chapter some specific recommendations to improve the level of capacity utilisation in the Algerian public industrial enterprises are suggested. Some proposals for further work are also presented.

# PART ONE

# CHAPTER ONE: THE CHARACTERISTICS OF THE ALGERIAN ECONOMY

Algeria gained its independence in July 1962 after a seven year war of liberation. At that time the Algerian economy, massively disrupted by the war, relied essentially on the agricultural sector. It should be noted however that the economy as a whole was in a better state than that of many other newly independent nations. Oil and natural gas, which are some of Algeria's resources, helped to transform Algeria from a relatively poor agricultural country to one with a growing and diversified industrial economy. Despite the existence of some private firms, the Algerian economy is largely dominated by the public sector. This sector has encountered numerous problems which will constitute the core of our next discussion. In this chapter the characteristic features of the Algerian economy are presented and the level of Algeria's economic development is assessed.

## 1.1. The Algerian development strategy

The present socio-economic and political system and hence, development strategy, are the result of different ideological tendencies that prevailed during the post-independence period (1). Algeria's main objective has remained economic development based on a socialist system (2). The socialist ideas germinated during the war of liberation and were influenced by Nasser's ideology. The initial policies were dominated for a short period by self-management before a radical switch to state capitalism in 1966 (3). Since then the state took over all the main activities through the nationalisation of the existing industries and the creation of public enterprises. Algeria systematically followed the route towards an economic independence based on a strong industrial sector and on state control of the production apparatus. Although the industrialisation process is comparable to that of any developing country, Algeria's development strategy can be distinguished by the emphasis on heavy industries.

In July 1962, the Tripoli programme was the first and only document which gave some indication of the ideological orientation and the model of development that were to be adopted in the post-independence period. The Tripoli programme advocated socialist principles and elaborated some of the bases for socialist options. The means to reach the objectives were not precisely defined. It should be noted that the formulation of industrialisation policies was made difficult by the lack of industrial experience. In the Tripoli programme the need for economic change and diversification prompted by the decline and change of Algerian economic relations with France regarding primary exports and by political reasons are implied. For instance, the birth of nationalism involved a rejection of the colonial past in all its aspects and the rising unemployment brought additional pressure for a change in the classical colonial pattern of production.

The objectives defined in the Tripoli programme started to be implemented only in 1965 after president Boumediene came to power. Government policies emphasized industrial development controlled by the state instead of an unorganised laissez-faire. The elements of this doctrine are found only in the speeches of president Houari Boumediene. There is no doubt that the shortage of fertile land (4) and the abundance of local natural resources led to a development strategy based on a strong industrial sector which was thought to be the key to economic expansion. Algerian economic development is defined as "based upon the industrialisation of the country"(5). The industrialisation objectives are "the increase of the national revenues, the improvement of the technical level of the workers, the increase of employment and the widening of markets, i.e., less dependency on the foreign markets"(6). In addition, industrialisation is believed to "realize a symbiosis between the industrial and agricultural sectors and achieve a real complement within ...(the ) national economy"(7).

The development of heavy industry is essential in order to produce and to provide the "most essential tools, raw materials, combustibles and economic plants which are necessary for the development" of the national economy (8). The establishment of a heavy industry means that solid foundations are set up for economic and political independence (9). Furthermore, the building of a heavy industry is thought necessary" to safeguard the independence and the sovereignty" (10). Consequently in order to satisfy the total national demand, the construction of an independent and integrated economy was necessary at that stage of development.

The basic objectives that Algeria intended to pursue were defined in the 1966 Algiers Charter (11) and reaffirmed in the National Charter adopted after a nationwide referendum in June 1976. These objectives are (a) the expansion and organisation of the productive base of the national economy in order to reach the stage of self-sustaining growth and full employment as quickly as possible; (b) the attainment of economic independence, which implies that Algeria must rely primarily on its own resources while broadening and diversifying its international economic relations; (c) the improvement of income distribution, especially between regions. Reflecting upon these objectives and taking into consideration Algeria's basic socio-economic characteristics, the long-term development strategy focuses on a number of key issues: development of a diversified and highly integrated industrial base, strengthening of new economic management structures at all levels and in all sectors, regional decentralisation within a planned framework, speeding up of education and training and austerity in consumption. The Algerian strategy of development reflects the nationalism springing from the liberation war characterised by socialism and the perception of the state as an agent of change through integrated planning and state enterprises.

1.1.1. The "industrialising industries" strategy

The accelerated industrialisation undertaken in Algeria through the "industrialising industries" concept was initiated by the French economist G. Destanne De Bernis. Accordingly, the underdeveloped countries avoid the impasse of both the conventional import substitution industries and the merely export-oriented industries. This strategy is to some extent similar to economic development theories developed by Feldman, Domar and Mahalanobis as well as to the theory of equilibrium of Rosenstein-Rodan, the growth pole of Perroux (12) and the unbalanced growth of Hirschman (13).

The cornerstone of the "industrialising industries" strategy is the leading industry--"industrie motrice"--which (when chosen and launched) generates around it a multiplier effect--"effect d'entrainement". The "industrialising industries" are characterised by important forward and backward linkages with other sectors, and therefore a quasi-automatic process of industrialisation. This model of development advocates a concentration of investment in heavy industry as opposed to light industry, e.g. capital intensive as opposed to labour intensive industries. Agricultural development is also predicted to be an outcome of the industrialisation process since the two sectors use each other's output. Most of the new outputs are destined for the domestic market. Furthermore, the main features of the industrialising industries are their large scale which necessitates important outlets, a very high capital concentration and a very high rate of investment together with the manufacturing of capital goods (not consumer products)(14). Currently most Western economists do not advocate a development strategy based on these four elements. De Bernis, on the other hand, uses them as a basis for his development model (15).

In Algeria De Bernis identifies the capital goods industries and the oil industries as being the industrialising industries that have the highest multiplier effect. These industries are mainly iron and steel, chemicals, petrochemical, natural gas liquefaction and refining industries. These industries supply intermediate inputs to other sectors; for instance, to the automobile, farm machinery, electrical goods and plastic industries. In 1962 the only industries which had a strong industrialising impact were the metallurgy (and its derivatives), the mechanical and the energy industries. Other modern industries such as chemical industries and particularly fertiliser and plastic industries, which were considered important in modernising the agricultural sector, had to be developed.

### 1.1.2. Analysis of the industrialising industry strategy

Since 1967, following the De Bernis development strategy, Algeria has invested the bulk of its capital in siderurgy, metallurgy, petrochemistry and other basic industries. Consequently, social needs (such as housing and water supply) and the development of the consumer goods industries were neglected. Similarly, agriculture and infrastructure lacked investments. The foundation of this strategy was only partially adapted to the local conditions. This resulted in the occurrence of several problems which will be reviewed in detail later. The reasons for these problems are manifold. Firstly, as argued by Andreff and Hayad (16), the iron and steel industry which was chosen and developed was not an industrialising industry. De Bernis' recommendations therefore may enhance the probability of failure of such a strategy. Secondly, the strategy advocated the installation of the most sophisticated capital intensive technology. This involved enormous investments in the industrial sector which absorbed almost all the resources. Consequently, the other sectors did not benefit from sufficient investments (such as social, infrastructure and agriculture) which resulted in an imbalanced development between the different sectors. Thirdly, the capital intensive technology required skilled workers which formed only a small minority of the Algerian work force. This led to problems encountered at all levels. Fourthly, the creation of many job opportunities (a basic objective of development) is, at least in the short term, inconsistent with the choice of capital intensive industries since it is well known that the latter do not create enormous employment opportunities. Fifthly, while large investments were allocated to education, training was in fact only available to a small minority of the labour force. This problem was aggravated by inadequacies in the system of training. Lastly, the protection of heavy industries brought about a lack of competition and hence an almost complete monopoly of the local market by the public enterprise.

The problems encountered in Algeria cannot only be attributed to the adoption of this strategy. The causes of these problems arose from the application and implementation of the strategy. The realisation of the projects took longer than planned. The plants were built by a product-in-hand contract or by a turnkey contract both of which are expensive contracts and lead to a lot of problems as discussed in more detail in Appendix C.1. The planning process seems to be inefficient. The decision-making process is too centralised. This situation derives from the intervention of the state in the management of public enterprises. This leads to an increase in heavy procedures. The system is also to blame since for example, a more adequate and adapted educational system should have been emphasized. All these points will be developed in more detail later.

After having presented briefly the different criticisms of the "industrialising industries" strategy, the next step brings us to the explanation of possible solutions. The government seems to have been aware of these problems and started to pay more attention to social objectives as it appears from the 1980-84 five year development plan (31% of the total investments were allocated to this sector). For instance, changes in government policies such as foreign trade policy would overcome many of the inefficiencies. Some positive suggestions are outlined in the concluding chapter of this thesis.

## 1.2. Role of the government

The role of the state, which has become important since 1965, has as its objectives the liberation of the economy from all foreign dependence and the build up of a genuine national economy. Behind these objectives lies the basic desire to reduce the existing disparities in income distribution not only between upper and lower individual incomes but also between economic sectors (e.g., modern and traditional agriculture) and between the coastal and inland regions. The National Charter adopted in 1976 supports state control over the economy. Later the New Constitution of 1976 allows the existence of a private sector only if it contributes to the development of the country and is socially useful.

The emergence of the government as the major force in the economy did not result solely from the underlying strategy but it also reflected a combination of circumstances that accompanied independence. These forced the government into an extremely activist position. It was believed that development as foreseen by the state could not be accomplished by private investment. No private Algerian enterprises after independence had the necessary size to support the development of capital intensive industries. Skilled workers and entrepreneurial abilities were lacking. Again, foreign investment was discouraged by the government for the very reason that it would be directed towards highly profitable short term ventures. This was supported by the fact that there was no model allowing dynamic industrial growth under the dominance of a private sector without the creation of a powerful dominant class and its enrichment. Thus the state had to play a major role in the process of industrialisation.

In order to apply the adopted strategy of accelerated industrialisation, Algeria needed most of its resources. The nationalisation process (with compensation) was therefore inevitable since it is a normal procedure to ensure control of resources by the state. The assumption that the oil reserves would not last long (17) reinforced the nationalisation of hydrocarbons. The recovery of national resources started after independence but the most important occurred in 1971, when the government nationalised the oil companies and concessions at 51% and the natural gas resources and concessions as well as the gas and oil transport facilities totally.

In order to realise these objectives and build up a strong national economy, the government promoted the public sector setting up modern industries under the exclusive control of the state. This development strategy requires large investments. Since 1967 several plans have been undertaken and a large number of projects have been implemented under the control of the state. This underlines the role of the government in the Algerian economy.

### 1.3. State control of the economy

On the eve of independence the economy was largely dominated by privately owned enterprises except for the public utilities and the sizeable government investment in the petroleum sector. After independence the state authority expanded to cover almost all aspects of the national economy through nationalisation and investment planning so as to implement its political programme. To start with, only the modern agricultural sector and a few industrial plants were under state control (those abandoned by the French settlers who fled to France after independence). These were first under the control of former workers who instituted self-management in the agricultural and industrial sectors. The foreign-owned mining sector was nationalised in 1966. This was followed in 1968 by the nationalisation of the major foreign-owned manufacturing companies. By 1971 all the petroleum operating companies and concessions were under state control (at least 51%) and all the natural gas concessions and operations as well as the gas and oil transport facilities were recovered by the government (18). This larger state control of the economy included also the self-managed industrial enterprises which were all absorbed by 1974 (19). The takeover of the self-management sector by the public enterprises which held a quasi-monopoly of the whole national economy was not officially explained. It is believed that this was achieved in order to speed up the production which had remained constant and relatively low since 1962. At the end of 1971, the government initiated a land reform by nationalising some large Algerian owners, the land of absentee-owners and communal land. This reform advocated the reorganisation of the land distribution. Some Algerian privately owned manufacturing companies were also nationalised. Meanwhile, public finance was reorganised through the development of state control of the banking system, the insurance companies and the administrative network. In addition, the foreign trade system was also restructured (20).

Management of nationalised interests was assigned to government owned or controlled state enterprises or national companies. Each state enterprise had control over a subsector of the economy. In some cases the state enterprise accounted for the entire subsector (e.g., Mining and hydrocarbons), in some other subsectors private enterprise was permitted. By the mid 1970s more than 500 establishments belonged to the state public sector, hundreds more were owned by local government. These public enterprises have carried out investment projects financed by capital provided by the state or the banking system. In addition, regarding the management of the state agricultural land, the modern agricultural sector and the agrarian reform land were under the self-management system organised in cooperatives. These cooperatives also receive financial, physical and educational inputs to modernise their production methods in order to increase output.

Table 1.1: The share of the public sector in VA by different sectors in percent (current prices)

| Sectors/Years | 1969 | 1973 | 1974 | 1977 | 1978 |
|---|---|---|---|---|---|
| Agriculture | 24 | 19 | 23 | 26 | 27 |
| Industry | | | | | |
| -Hydrocarbons | 19 | 86 | 82 | 83 | 83 |
| -Mines and energy | 97 | 95 | 97 | 98 | 98 |
| -Manufactur. ind. | 48 | 49 | 61 | 74 | 73 |
| -Construction & public works | 37 | 47 | 70 | 79 | 73 |
| Transport & communication | 76 | 88 | 89 | 91 | 91 |
| Services | 18 | 19 | 19 | 22 | 25 |
| VA without hydrocarbons | 37 | 46 | 48 | 55 | 58 |
| Total VA | 34 | 55 | 62 | 65 | 66 |

Source : MPAT: La Synthese du Bilan Economique et Social de La Decennie 1967-78, Algiers, May 1980, p 53.

The extent of government financial participation in industrial projects for the different plans is not known in exact terms. According to some available figures public participation was higher than that of the private sector (21). In the early post-independence period, a number of foreign companies (mainly French) financed part of the investment directly (hydrocarbons). Since the nationalisation process however, no foreign capital has been invested except in joint participation with the state. In fact the investment code specified that the state should take a leading role in investment in all vital sectors but when financial resources are limited mixed enterprise (state and foreign private with 51% owned by the state) may be created. In effect the public sector accounts for the bulk of the new investments. Industrial investment has become almost exclusively a government activity undertaken by the various organisations of the public sector.

This is confirmed by Figure 1.1 which shows that from 1970 to 1978, the contribution of the public sector VA to the total VA was higher than that of the private sector. As indicated in Table 1.1, in 1978 the former generated more than two thirds of the VA. The public sector contributed almost three fourths of the manufacturing industries' VA and more than fourth fifths of the hydrocarbons' VA. The services and agricultural sectors' value added are still dominated by the private sector. The public sector value added rose parallel to the growing public industrial sector value added, whose importance increased as a result of the hydrocarbon sector growth and the creation of new manufacturing enterprises. State control of the economy, although very important in the industrial sector, is still dominated by the private sector in agriculture and services. By 1980, the only parts of the economy that remained under private control were the traditional agricultural sector (59% of the cultivable land, fruit trees and vineyards), some small consumer manufactures and small-scale retail trade. The government dominated all other sectors of the economy--all foreign trade, most

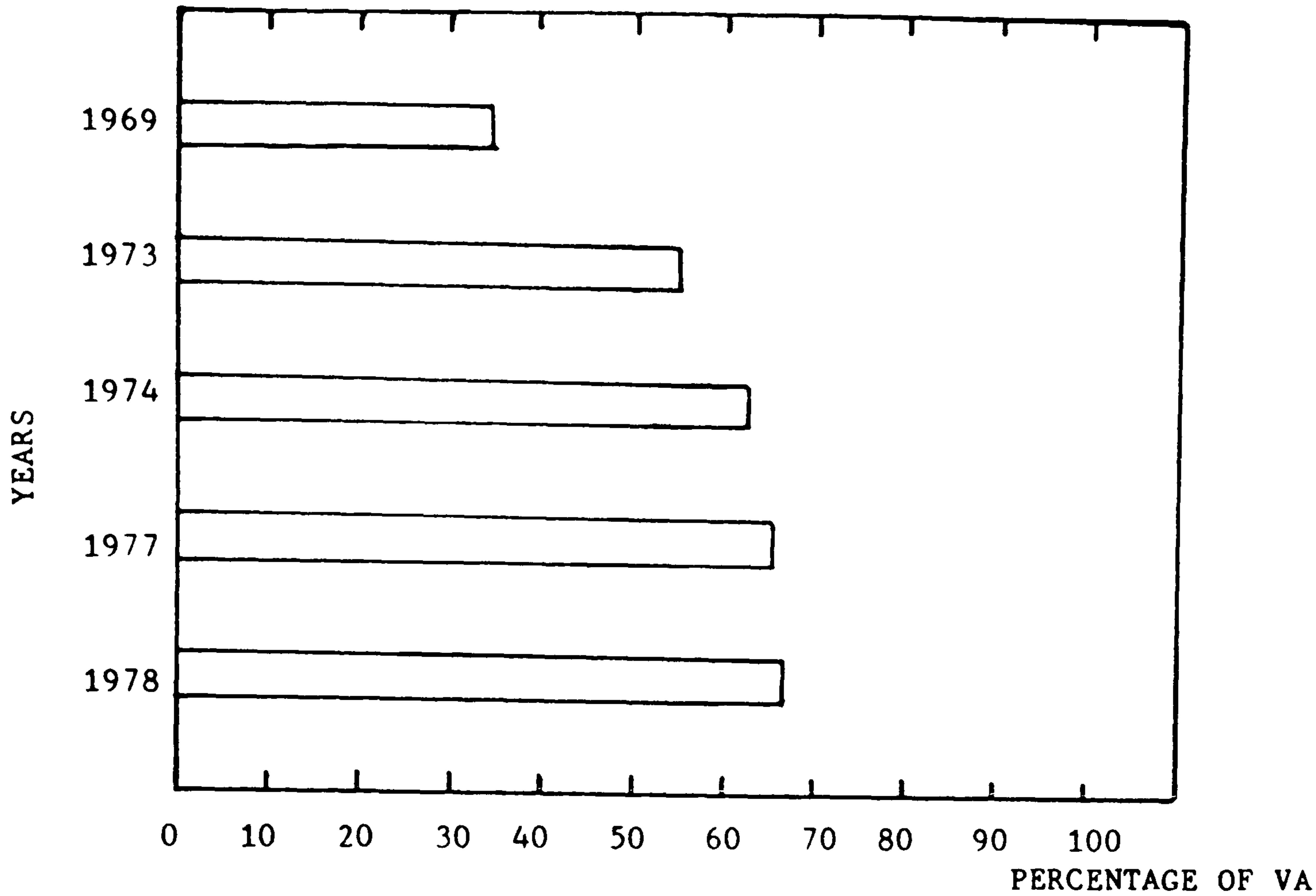



Figure 1.1 : The share of the public sector in value added.

Source : La Synthese du Bilan Economique et Social de la Decennie 1967-78. MPAT, May 1980, Algiers, p 53.

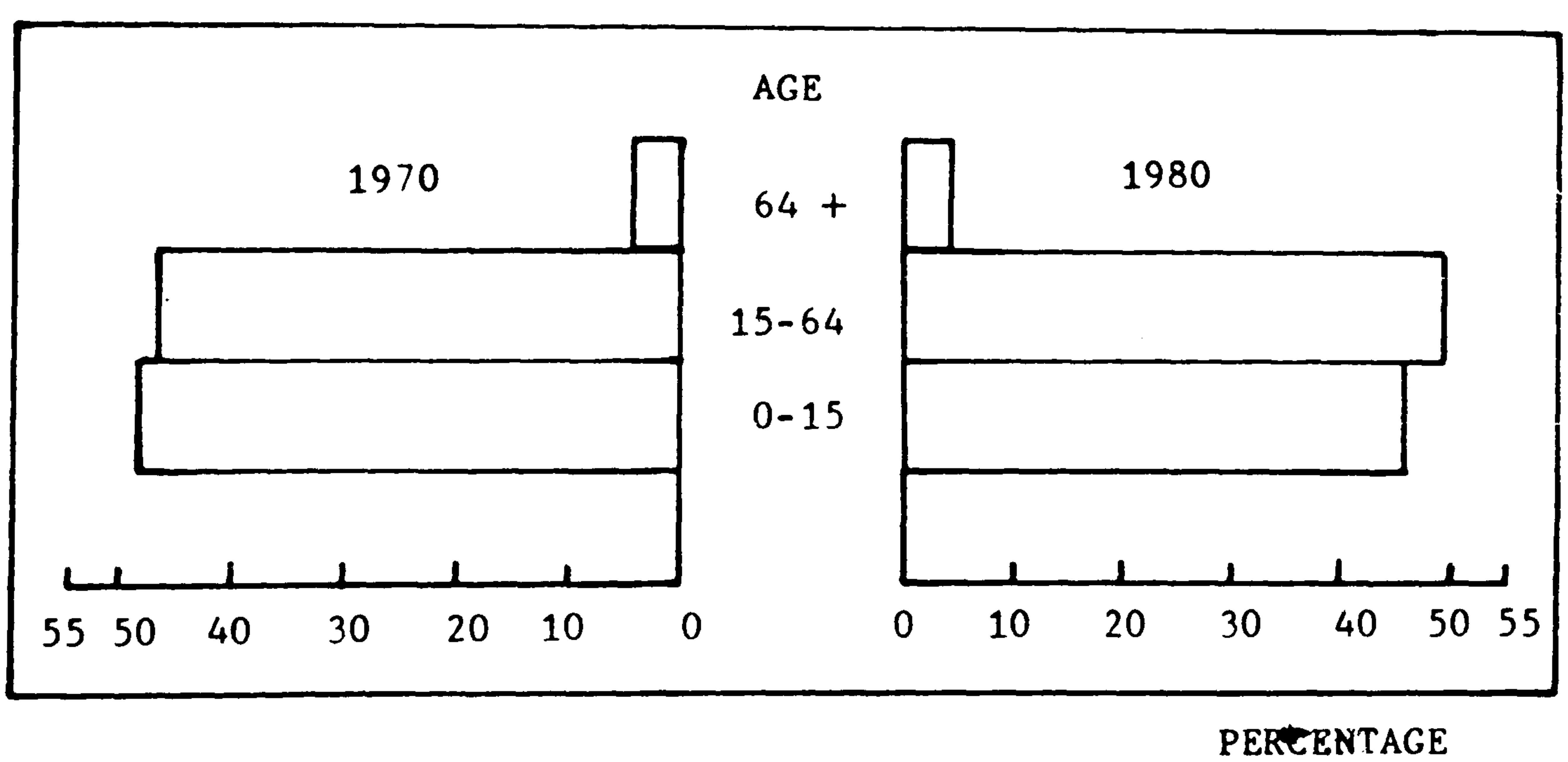



Figure 1.2 : Age distribution of the Algerian population.

Source : Ibid Figure 1.1. p 134.

industries, much of the wholesale and retail trade, all utilities, transportation and the banking system.

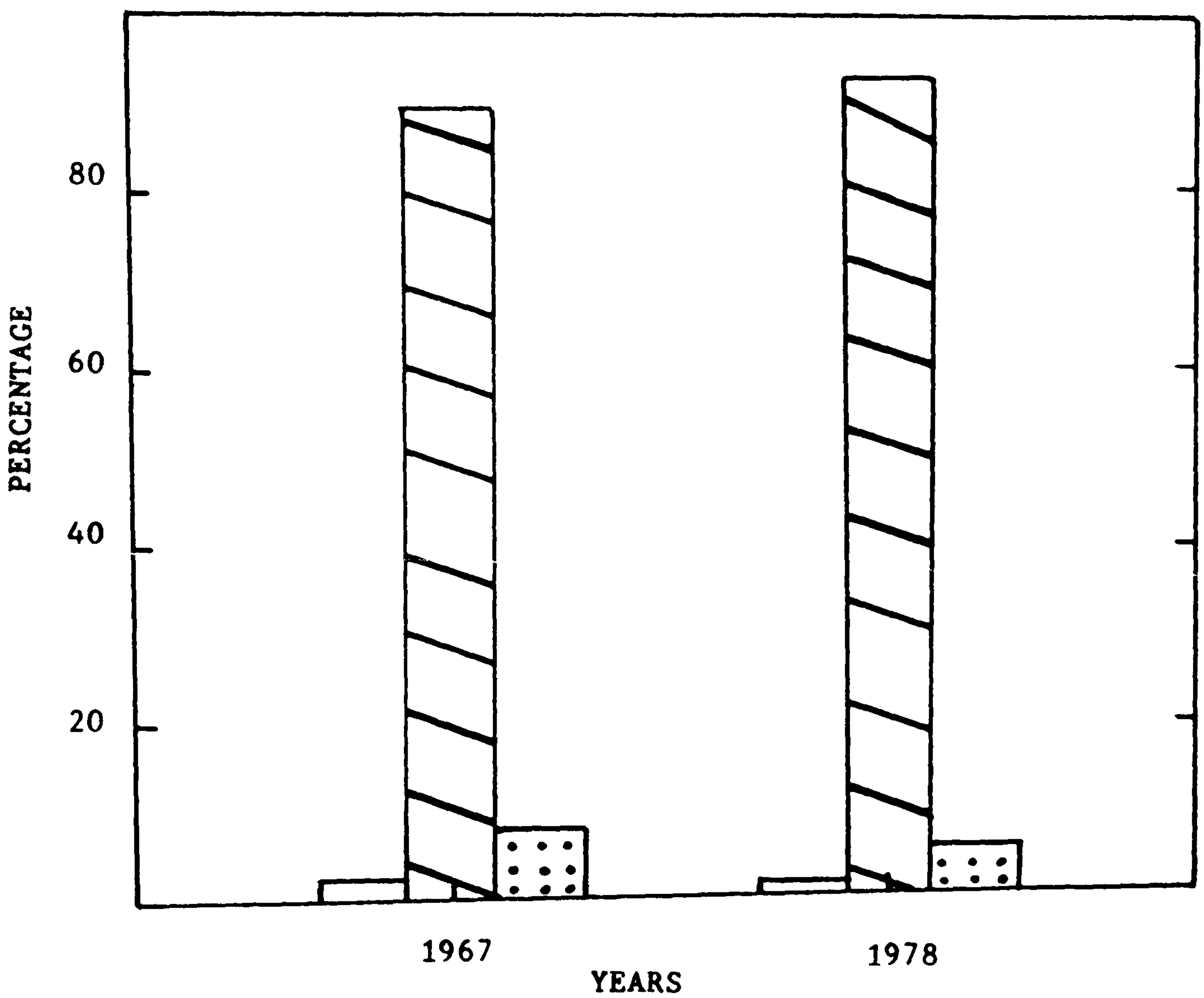
1.4. Human and natural resources

Algeria, which is the second largest African country, is situated between Morocco and Tunisia with a Mediterranean coastline of nearly 1,000 km and a total area of 2,361,741 sq km. The climate of the Northern regions, the Tell, is of Mediterranean type with warm wet winters and hot summers. The high plateaux region is characterised by a semi-arid or steppe climate and the Algerian Sahara by large temperature variations, wind and an arid climate. Barely 3% (22) of the total land area of Algeria is agricultural land. The rest is desert, mountains, high plateaux and steppes. The soil and vegetation of Algeria reflect the climatic contrast between the humid Tell, the semi-arid lands further South and the dry Sahara. Cereals, grapes, olives and fruit constitute the main vegetation in the fertile plains and valleys of the coastal regions while only dates are grown in the oases which depend on permanent supplies of underground water.

As a result of the rapid population growth favoured until recently by government policies (23), the Algerian resident population grew from 12.1 million in mid 1965 to 19.6 million in mid 1981 (24) at an average annual rate of 3.3% (25), one of the highest in the world. The population of Algeria is characterised by large family cells, 6.7 persons (26), a very young population (in 1980 about half the population was under 15 years old (27)(Figure 1.2) and a high level of illiteracy (in 1977 65% of the adult population was illiterate) (28). One should add that the sustained investment made in the educational system resulted not only in a large increase of enrolled students at all levels (e.g., from 1966 to 1978 the number of students doubled in primary schools (29), increased by a factor of 5 in secondary and high schools (30) and rose by a factor of 15 in universities (31)) but also in a considerable decrease in the proportion of illiterate. Furthermore, having the same proportion of males and females, the Algerian population which is concentrated in the Northern part of the country is mainly centered in the urban areas (43.5%(32)).

In 1980 the size of the labour force (33) was estimated at 3.86 million (34) and was characterised by an annual rate of growth higher than 4%. This rate, which is larger than that of the population growth, reflects the progressive entry of Algerians born during the period of rapid natural increase (1950's) into the labour force. The ratio of the labour force to total labour resident population, 20%, remained constant between 1967 and 1980. The age distribution of the labour force is illustrated in Figure 1.3. Despite the fact that half of the population are female, their participation in the labour force is very low (6.7% of the total labour force in 1978 (35)). The level of education among the employed population is very low: among the employed labour force in 1977, 85% of the males and 54% of the females were without formal qualifications and only 1.45% of males and 4.79 % of the females were managers, technicians and supervisors (36). This, despite the large effort invested in the educational system, does not meet the present needs of the expanding economy due to the lack of emphasis on technical, scientific and vocational training.

The high rate of growth of the labour force has consequently meant a massive demand for employment. As Table 1.2 and Figure 1.4 indicate, the contraction of the agricultural




KEYS: 15-17 year old

18-59 year old

Over 60 year old

Figure 1.3 : Age distribution of the labour force in Algeria as percentage of the total labour force for the specified years.

Source : La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 134.

labour force was exceptionally rapid dropping from 51.8% of the total employment in 1966 to 25.3% in 1980 (37). This rapid drift from the countryside may be the result of the competition between the different sectors of the economy. In addition, since 1969 remarkable progress has been made regarding the creation of non-agricultural employment (8.6% per annum during the 1970-81 period). The ratio of industrial to total labour force increased sharply from 6.9% in 1966 to 24.35% in 1980. Similarly, the ratio of service to total labour force rose from 27.75% in 1966 to 33% in 1980. The proportion of employment within the industrial and service sectors remained almost the same. The most rapid growth was recorded in the industrial sector (particularly construction). The high rate of growth in construction is the result of the large number of industrial project construction. As a result, the rate of non-agricultural unemployment was reduced by almost half during the 1970s. This was achieved mainly by the creation of new jobs in the public sector (84%) (38). It should be stressed that the creation of jobs did not match the increase in the labour force. In 1980 11% were unemployed and another 10% held part time jobs (39). This unemployment is particularly felt by the young population with half of the unemployed between the ages of 18 and 25 (40).

The most important resources of Algeria are hydrocarbons. They include crude oil, natural gas, liquefied petroleum gas (LPG) and condensates (41). Major oil and natural gas fields were discovered in the North central, Southeast and South central regions of the Algerian Sahara. The main producing areas are Hassi-Messaoud, Hassi-R'mel in the North central region of Algeria and Chanet in the Illiz Bassin near the

Table 1.2: Labour Force and Employment (1)
(in thousands)

| | 1966 | 1969 | 1973 | 1977 | 1978 | 1979 | 1980 | 1981 | Annual growth rates, in % 1970-1973 | 1974-1977 | 1978-1979 | 1980-1981 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total labour force | 2450 | 2640* | 2977* | 3425 | 3566 | 3710 | 3860 | 4015 | 3.0 | 3.5 | 4.0 | 4.0 |
| Agricultural labour force | 1270 | 1212* | 1130* | 1040 | 1020 | 1000 | 980 | 950 | -1.7 | -2.1 | -2.0 | -3.1 |
| -Full-time employment | 450 | ... | ... | 570 | 585 | 590 | 595 | ... | ... | ... | 1.7 | ... |
| -Self-managed sector | ... | ... | ... | 190 | 195 | 195 | 195 | ... | ... | ... | 1.3 | ... |
| -Cooperative sector | ... | ... | ... | 100 | 110 | 115 | 120 | ... | ... | ... | 7.0 | ... |
| -Private sector | ... | ... | ... | 280 | 280 | 280 | 280 | ... | ... | ... | 0.0 | ... |
| -Part time employment | 820 | ... | ... | 470 | 435 | 410 | 385 | ... | ... | ... | -6.8 | ... |
| (as percent of total agricultural labour force) | (64.6) | (...) | (...) | (45.2) | (42.6) | (41.0) | (39.3) | (...) | | | | |
| Non-agricultural labour force | 1180 | 1430* | 1847* | 2385 | 2546 | 2710 | 2880 | 3065 | 6.4 | 6.4 | 6.4 | 6.4 |
| -Non-agricultural employment | 850 | 944 | 1380 | 1963 | 2111 | 2282 | 2448 | 2634 | 9.5 | 8.8 | 7.2 | 7.6 |
| -Industry | 100 | 140 | 229 | 343 | 373 | 410 | 505 | 539 | 12.3 | 13.8 | 9.1 | 6.7 |
| -Handicrafts | | | | 55 | 51 | 65 | | | | | | |
| -Construction | 70 | 82 | 190 | 364 | 399 | 402 | 435 | 480 | 21.0 | 16.3 | 4.4 | 10.3 |
| -Transportation | 50 | 63 | 88 | 109 | 118 | 135 | 148 | 160 | 8.4 | 5.4 | 12.0 | 8.1 |
| -Trade & services | 330 | 345 | 369 | 542 | 590 | 650 | 700 | 750 | 1.7 | 9.6 | 8.9 | 7.1 |
| -Government | | | | 390 | 415 | 430 | | | | | | |
| -Other services | 300 | 314 | 504 | 160 | 165 | 190 | 660 | 705 | 11.8 | 2.3 | 6.7 | 6.8 |
| -Non-agricultural unemployment | 330 | 486* | 467* | 422 | 435 | 428 | 420 | 431 | -0.1 | -2.5 | 0.7 | -0.2 |
| (as percent of total non-agricultural labour force) | (28.0) | (34.0)* | (25.3)* | (17.7) | (17.1) | (15.8) | (15.0) | (14.0) | | | | |

Source: Ministry of Planning.

1 Resident Algerian only.
... Not available.
* Estimates by the MPAT.

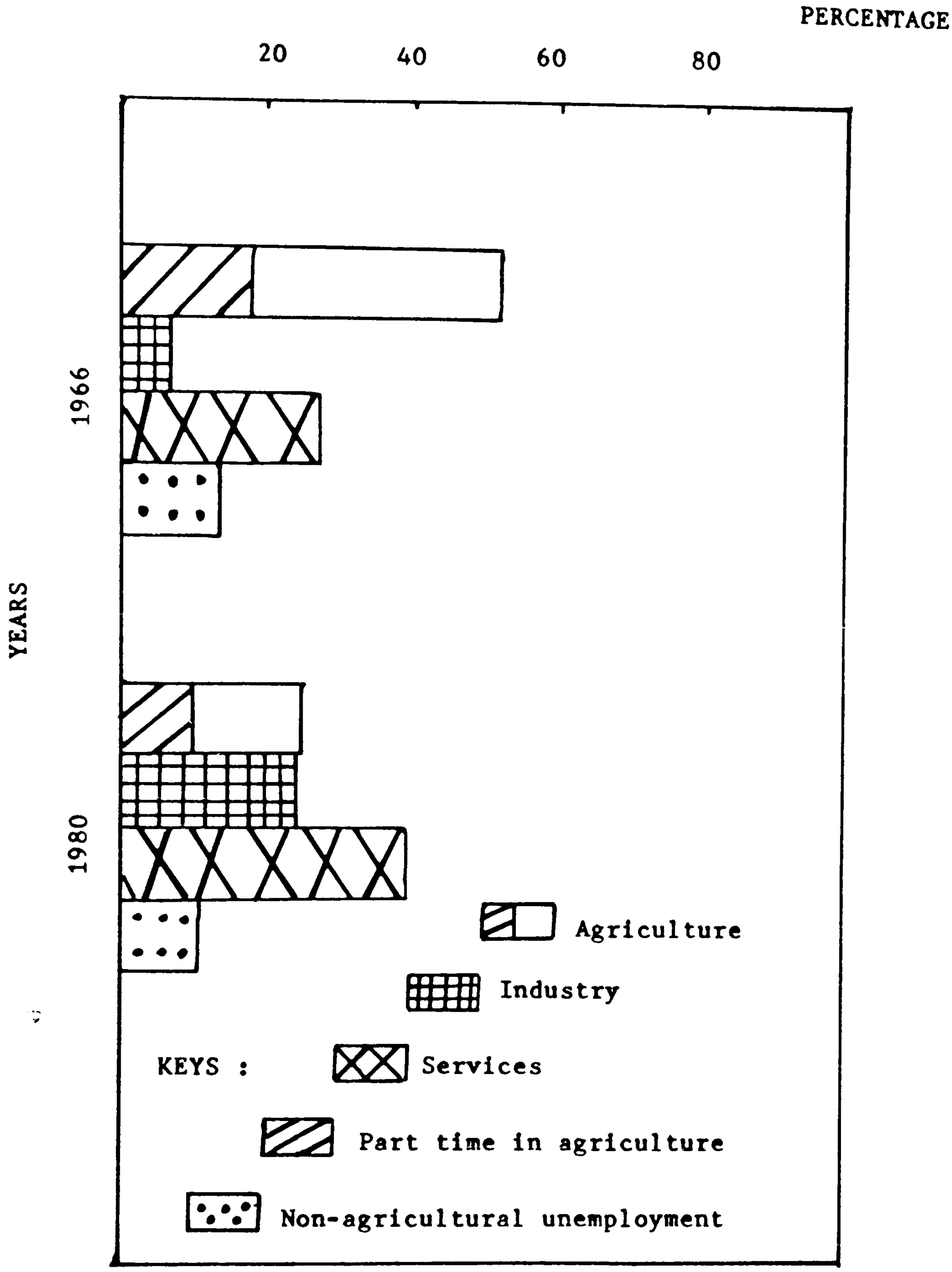



Figure 1.4 : Labour force in the different sectors of activities.

Source : Table 1.2.

Libyan border. Algerian crude oil is a light oil with a low sulphur content (42). The proven reserves of crude oil are limited. They were estimated at 8,080 million barrels in 1981 (43). They should last for about 20 years at the 1978 production rate. In addition, the natural gas proven reserves are estimated at about 4,300 billion cubic metres representing 5% of world reserves (44). In 1980 Algeria ranked 4th in the world among natural gas producers (45) and 15th in the world in crude oil production (46).

Algeria is also rich in mineral resources discovered before the petroleum era and after independence. The main ones are iron ore, phosphates, lead, zinc, antimony, wolfram, uranium and gold. Most of the iron ore is found in the Northern regions (Bouari in Batna), near the Eastern border at Ouenza (47) and Boukara and near the Western border at Gara Djibilet (48) and Kenadra. In 1978 the Gara Djebilet reserves alone were estimated at 3,000 million tons of medium grade ore (49) and the deposit at Ouenza represented 75% of the national production. Zinc and lead are mostly found on the Algerian-Moroccan frontier at El Abed-Oued Zuonder. They are also found at Kherzet-Youcef in the Willaya (county) of Setif. The phosphate is found at Djebel Onk near the Eastern frontier and in the Northeast of the Algerian Sahara. Gold, uranium, wolfram and tin were discovered more recently in the Southeast region of the Sahara (El-Hoggar). This region is said to be particularly rich in other minerals too. In 1980, the reserves of uranium oxide were estimated at 50,000 metric tons, mostly in the Tingaouine area (50). Mercury is found in the Kabilia region (near Algiers). In 1980 Algeria ranked 3rd in the world in mercury production (51). Other minerals such as antimony, tungsten, manganese, copper and salt are also found in the Northern part of Algeria, but are only processed on a small scale.

### 1.5. Development planning

The strategic development adopted in 1966, emphasized the necessity to orient state intervention toward the building of a strong economy, granting priorities to development problems. This strong will brought about the establishment of an essential instrument of the organisation of development: planning. By planning the planners expected to develop backward and forward linkage effects throughout the economy and most of all set up a basis for an industrialising economy. Algerian planning is based on aggregative (or interrelated) sectoral models of planning. The plans are also capital centered being basically of the Harrod-Domar type in which the rate of growth of GDP is seen to depend on the rate of saving and the incremental capital/output ratio. The main condition to reach a certain rate of growth is an adequate level of investment which explains the high investment in Algeria. Planning is strictly controlled by the state.

This centralised planning is very much like that encountered in the Eastern European countries, in Egypt (at the time of Nasser) and in India (from the second development plan). It was late in the 1960's that the Algerian government started investing directly in industry. Just after independence, planning had a limited form as it was restricted to the elaboration of only the annual equipment budget.

The first significant act for centralised planning was the creation of the "State Secretary of Planning" (SEP) in 1971 which became the Ministry of Planning in 1977. Before that planning was under the responsibility of the Ministry of

Finance. After 1965, a long term plan (15 years) was elaborated with the help of the IBRD and the Russian GOSPLAN (52). Government orientation of economic development started to emerge based on the "industrialising industries" strategy. Thus from a combination of branch studies analysis, the adopted strategy and the prospects for the 1980-82 horizon, the different plans were formulated. The Council of the Revolution fixes the accumulation rate to be reached during the coming years. The different plans are foreseen taking into account the 7% planned rate of growth of the GDP (53). Until 1970 the plan was indicative but with the launching of the 1970-73 four year plan, the plan has become imperative and highly centralised (54).

Organised development planning started with the 1967-69 three year plan which represented the first phase of an extended long range development programme. The 1967-69 plan was followed by the 1970-73 four year plan and the 1974-77 four year plan. Previous to these, three plans had been launched in 1947, 1953 and 1959 (Constantine plan). The period extending from 1962 to 1966 saw only the continuation of some projects that were launched as part of the Constantine plan (55). 1978 and 1979 are characterised by a transitional period in anticipation of the 1980-84 five year plan. Although the development plans form the core of the development effort, 13 special programmes (56) were launched outside the framework of the plans to alleviate economic and social needs in low income areas, notably employment and education.

Since 1967 fixed capital formation has shown a rapid evolution. From the early 1970's more than 40% of GNP has been used for the growth of national fixed capital. During the 1967-79 period, the investment ratio exceeded 39% of GDP.

It rose to 58% in 1977 before declining slightly to 44% in 1979. This ratio, which is exceptionally high, is similar to that encountered in such countries as the USSR and Japan.

The 1967-84 period can be divided into two distinct stages. The first aimed at setting up the structural reform, at introducing central planning and at preparing and starting large industrial projects. The objective was to create the technical and institutional supports to form a basis for a long term development strategy. Investment during that period was directed towards the development of the hydrocarbon sub-sector which would finance future development and would result in the creation of substitution industries leading to a lowe-ring of consumer goods imports, especially textiles, leather and shoes. This period was characterised by a massive increa-se in oil prices in 1973 which marked the end of the first stage. During the second period, the country has experienced a rapid expansion of investment in industry and in hydrocar-bons in particular. This period is characterised as well by the development of intersectoral imbalances which led to marked social tensions and to underdevelopment of social services e.g. housing, health, training and urban transit. The 1978-79 interplans aimed at narrowing the widening gap between industry, particularly the hydrocarbon sub-sector and the rest of the economy before launching the 1980-84 plan. The 1980-84 plan shows different objectives when compared to the first three. These objectives do not favour costly capital investment but aim at correcting imbalances that appeared in Algerian economic development. This is expected to be achieved by reducing industrial investment in favour of other sectors such as agriculture, water, housing and public works. The emphasis has shifted towards the satisfaction of basic needs. In addition, preferential attention is given to local investment and inland regions. Furthermore, another objective is the completion of ongoing projects. These accounted for half the financing of the 1980-84 plan (57). Investment in this plan is supposed to provide links with the existing industries and to realise the constraints placed upon existing capacities.

### 1.5.1.The 1967-69 three year development plan

This plan was the first development plan launched by the government after independence. Realised investment at current prices amounted to 9.164 billion AD. More than half of this went to the industrial sector as shown in Table 1.3 and Figure 1.5. The agricultural and the social sectors were allocated less than 20%, respectively. The actual cost was 2.15 times the planned cost, while the rate of investment realisation amounted to only 49.5% of planned investment. The rate of investment realisation was particularly low in the industrial sector (58) as illustrated in Table 1.4. This may be attributed to the fact that the investment cost was subject not only to international and domestic inflation but to the underestimation of the investment cost at the planning level. Carry-over to the 1970-73 plan was therefore very important.

### 1.5.2.The 1970-73 four year development plan

The objectives of this plan were more ambitious than those of the previous plan. Actual investment was almost 4 times that of the previous one. Government determination to invest in projects is confirmed by these Figures. The industrial sector again received the largest share of investment, which in relative terms is even larger than that of the previous plan (see Table 1.3). The social sector continued to receive

Table 1.3: Structure of planned and actual investment since 1967 (a) in percent.

| Sectors | 1967-69 plan | 1970-73 plan | 1974-77 plan | 1978-79 interplans(b) | 1980- plan |
|---|---|---|---|---|---|
| Agriculture | 13.9(15.2) | 10.5(8.1) | 10.9(4.8) | 3.3(7.9)(d) | 6(e) |
| Industry | 59.6(53.5) | 44.8(57.2) | 43.6(61.2) | 42 (61.7) | 38.6 |
| Social sectors(c) | 13.7(19) | 26.7(18.5) | 25.9(17.5) | 25(20.2) | 31.1 |

a The figures in brackets show actual investment.
b No investment was planned during this period, the figures concerned budgeted investment. The figures in brackets relate to 1978 only.
c Housing, education, training and other community facilities.
d The 1978 planned figure contains fisheries.
e The planned figure contains fisheries.

Sources : Tables A.1 and A.2 in the Appendix A.

Table 1.4: Rate of realisation of investment since 1967 in billions of AD

| Sectors | 1967-69 | | 1970-73 | | 1974-77 | |
|---|---|---|---|---|---|---|
| | prog. cost | rate real. | prog. cost | rate real. | prog. cost | rate real. |
| Agriculture Hydra & fisheries | 1.9 | 100 | 9.5 | 46 | 31.6 | 28 |
| Industry | 14 | 35 | 36 | 57 | 166.7 | 44 |
| Social sector | 2.3 | 75 | 15.2 | 44 | 75 | 28 |

Source : Ibid Table 1.3.

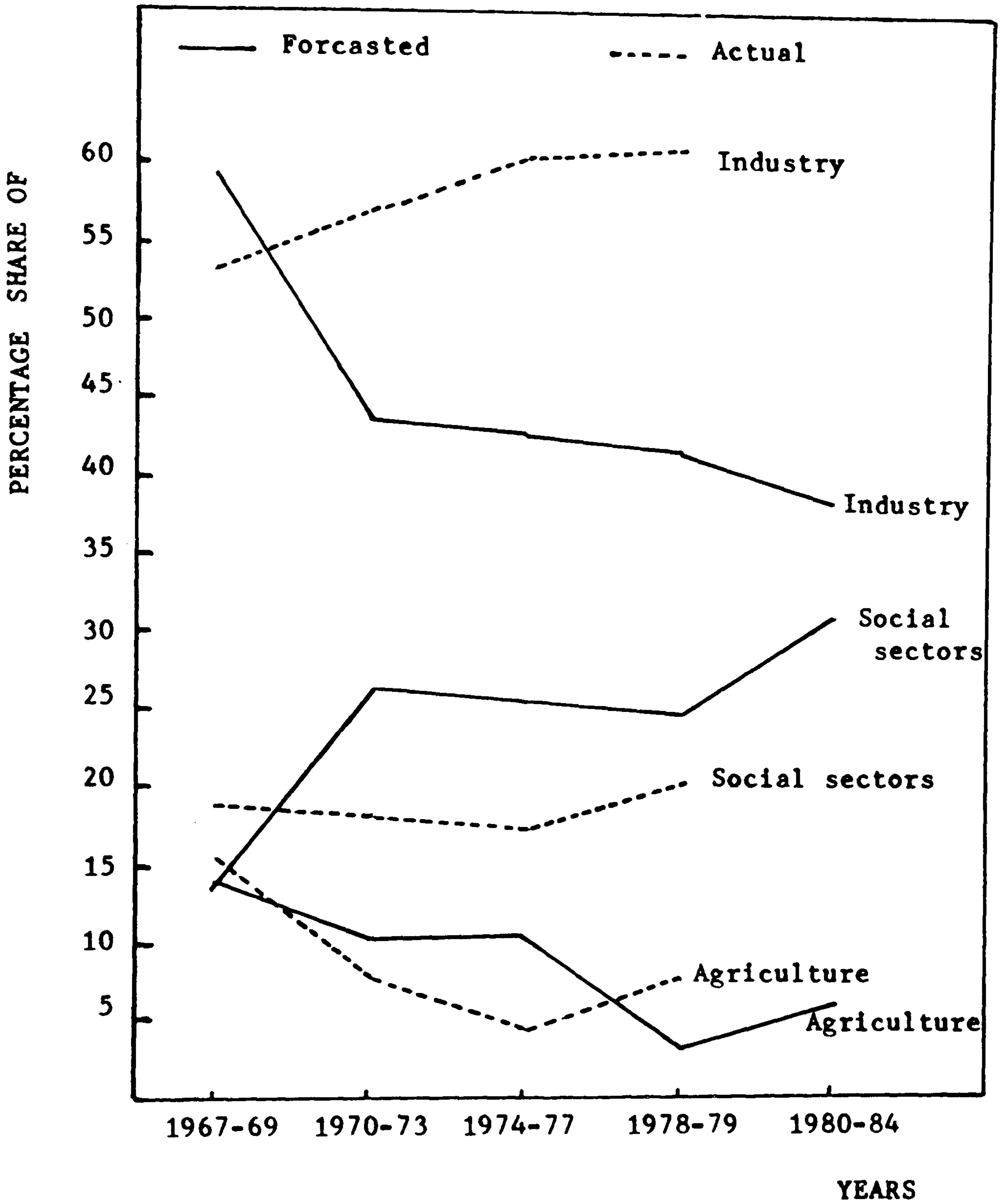



**Figure 1.5 : Stucture of planned and actual investment in percentages.**

Source : Table 1. 3

the same proportion. On the other hand, the agricultural sector received an even lower proportion. In addition, the actual cost was 2.46 times larger than the planned cost despite a realisation ratio of only 53% (see Table 1.4). This may be attributed to identical reasons discussed in part 1.5.1. The rate of realisation of the agricultural sector was lower than in the previous plan. Again the carry-over to the following plan was very high.

### 1.5.3.The 1974-77 four year development plan

Actual investment during this plan amounted to more than 3 times those of the previous plan. The large increase in oil prices in 1973 reinforced the government willingness to pursue a policy of even larger investments. The industrial sector was again allocated the largest share (see Table 1.3 and Figure 1.5), this time more than three fifths of the total investment. The relative share attributed to the agricultural sector is less important than that of the previous plan. The social sector received a similar proportion in relative terms. The actual cost was again 2.85 times larger than the planned cost for similar reasons (outlined in part 1.5.1.). The rate of realisation, 39 %, was lower than that for the previous plans. The agricultural and social sectors experienced the lowest rate of realisation ever compared to the previous plans. One should mentione that the rate of realisation in the industrial sector does not exceed 45% (see Table 1.4). The number of unrealised projects at the end of this plan was so high that the government decided not to launch a new development plan for the two following years.

1.5.4. The 1978-79 interplans

Although no plan was launched during this period, large investments were realised. The amount allocated was comparable to that of the previous plan, amounting to more than 100,000 billion AD. The industrial sector received more than half of the investments and the agricultural and social sectors were allocated almost the same proportion in relative terms as in the 1974-77 plan. Despite these efforts the carry-over to the 1980-84 plan was still very high (49% of the total investments of the new plan: 196.7 billion AD) (59). The carry-over was particularly high in the hydrocarbon sub-sector and social sector as they represented 40% and 38% of the investments allocated to these sectors, respectively (60).

1.5.5. The 1980-84 five year development plan

This plan is the first five year plan undertaken in Algeria since independence. Planned investment amounts to 400 billion AD. This is almost one and one half times the total realised investment for the 1967-79 period. About half the total investment is used for financing ongoing projects. As opposed to the previous plans only 38% of the total investment is allocated to the industrial sector (see Table 1.3 and Figure 1.5). In addition, most of the investment allocated to the industrial sector is targeted at fostering light industries which are expected to meet consumer demand. The social sector planned investment increased to almost one third of the total investment while the planned investment in the agricultural sector in relative terms was comparable to that of the previous plans. The rest is devoted to water, transportation and economic infrastructure.

During the 1967-79 period, investment rose sharply at an average rate of 36% particularly after the revision of petroleum prices in 1973. These investment efforts mainly benefited the industrial sector which occupied a key role in Algerian development strategy until the 1980-84 plan. The share of investment in the agricultural sector fell steadily while the share of investment in the social sector remained constant until the 1980-84 plan. One should add that the share of investment allocated to the industrial sector is higher than the planned figure. Consequently, investment with regard to planned goals in the agricultural and social sectors has been falling steadily. This is illustrated in Figure 1.5. The real resources of the economy were essentially concentrated in the industrial sector. The high carry-over to successive plans refleted the low realisation ratio which averages 48% for the 1967-79 period. In industry, for instance, ongoing works to be completed during the 1980-84 plan consist of 248 out of 490 large and medium-sized projects and 28 out of 93 expansions launched since 1967. These figures do not include the 587 small projects which were planned but not carried out (61). These ongoing projects were estimated at 80 billion AD, nearly half of the total amount allocated to the industrial sector.

The slow growth of investment reflects the difficulties and delays in implemention. The reasons for the low rate of investment realisation are manifold. Firstly, problems are generated by the lack of care in preparation of studies, by extremely cumbersome administrative procedures, by inadequate coordination of the establishment of surrounding infrastructure and by the form of contracts and difficulties during contract negotiations. Secondly, there is the inadequacy of Algerian infrastructure and execution capacities, the complexity of the projects characterised by their large size, the possibility of the wrong choice of constructor or location, an inappropriately high level of technology and high degree of required integration of production lines. Thirdly, the need to train management and manual workers parallel to the construction of projects creates difficulties because of the significant lack of skilled workers. Finally, project implementation is burdened by cumbersome government procedures required to obtain financing and to import capital goods and other products required for the projects. Other causes include difficulties due to the planning itself. These causes will be seen in more detail in the investment policy (see part 3.1). All these difficulties have led to substantial delays which have themselves generated considerable incremental costs.

### 1.6. Algerian gross domestic product

The Algerian gross domestic product (62) at current price rose from 21 billion AD in 1969 to 154.76 billion AD in 1980 (63), at an average annual rate of 20%. This increase of 700% is the result of large investments made in the public sector. It should be noted that the sharp increase in GDP for the period starting in 1974 coincides with the worldwide oil price increase. As shown by Figure 1.6, as one would expect from the investment figures, the highest average annual rate of growth was reached by the industrial sector, 26.25%. The agricultural and the service sectors grew at a similar annual rate of 15% although the growth of the agricultural sector was irregular as opposed to that of the service sector. By and large the annual rate of growth of Algerian GDP and of the various sectors was irregular over the years as seen in Figure 1.6. These figures are not representative of the average annual

Table 1.5: Average annual rate

of growth of GDP (1969-80)

| Years | 1969-80 | 1967-78 | 1967-69 | 1970-73 |
|---|---|---|---|---|
| Current prices | 20% | | | 12.7% |
| 1978 prices | | 7.2% | 11% | 6.6%(9) |

| Years | 1974-77 | 1977-78 | 1978-80 |
|---|---|---|---|
| Current prices | 16.2% | 23.5% | 23.75% |
| 1978 prices | 6.6%(9) | 6.6%(11) | 8% |

( )The figures in brackets are the planned average annual rates of growth.

Sources : La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. pp 49, 51, 59 and Table A.4 in the Appendix A.

Table 1.6: Percent of GDP in Algeria, Mexico and Brazil

at current prices.

| | Algeria 1980 | Mexico 1981 | Brazil 1980 |
|---|---|---|---|
| Agriculture | 6 | 8 | 13 |
| Industry | 55 | 37 | 34 |
| -Manufacturing (1) | 11 | 23.80 | 23 |
| Services | 39 | 55 | 53 |

1 Manufacturing sub-sector is part of the industrial sector but its share of GDP is shown because it typically is the most dynamic part of the industrial sector.

Source : 1983 World Development Report, World Bank Publication (Oxford University Press) p 153.

rate of growth of GDP (total and sectoral) which, as indicated in Figure 1.6, fluctuate greatly. These large variations may be attributed to domestic and international inflation. This high average annual growth of GDP (at current prices) is also reflected by a high average annual rate of growth of GDP in real terms (at 1978 prices) which amounted to 7.2% during the 1967-78 period (Table 1.5). The real rates of growth of GDP were lower than the planned figures as seen in Table 1.5. These rates reflect relatively good economic performance.

As illustrated in Figure 1.7, the most important changes that have occurred in the sectoral composition of GDP have been the steady decline of agriculture and the growth of industry, particularly hydrocarbons. Agriculture's contribution to GDP which, in absolute terms increased from 2.216 billion AD in 1969 to 9.845 billion AD in 1980 (64), declined almost annually in relative terms from 10.53% to 6.3%, respectively. On the contrary, industry's contribution grew from about 38.6% in 1969 to as much as 57.1% in 1980. This happened despite the decrease in the contribution of GDP from the manufacturing sub-sector which dropped from 13.2% to 11.1%, respectively. Meanwhile the contribution to GDP from services declined from 32.7% to 21.7%, respectively.

The sectoral composition of the GDP of the Algerian economy differs from that of other middle-income countries like Mexico or Brazil for instance. This is illustrated in Table 1.6. The main contribution to GDP is due to services in the case of both Brazil and Mexico while it comes from the industrial sector in the case of Algeria. The industrial sector is dominated by the manufacturing sub-sector in the former and by the hydrocarbon sub-sector in the latter. The manufacturing

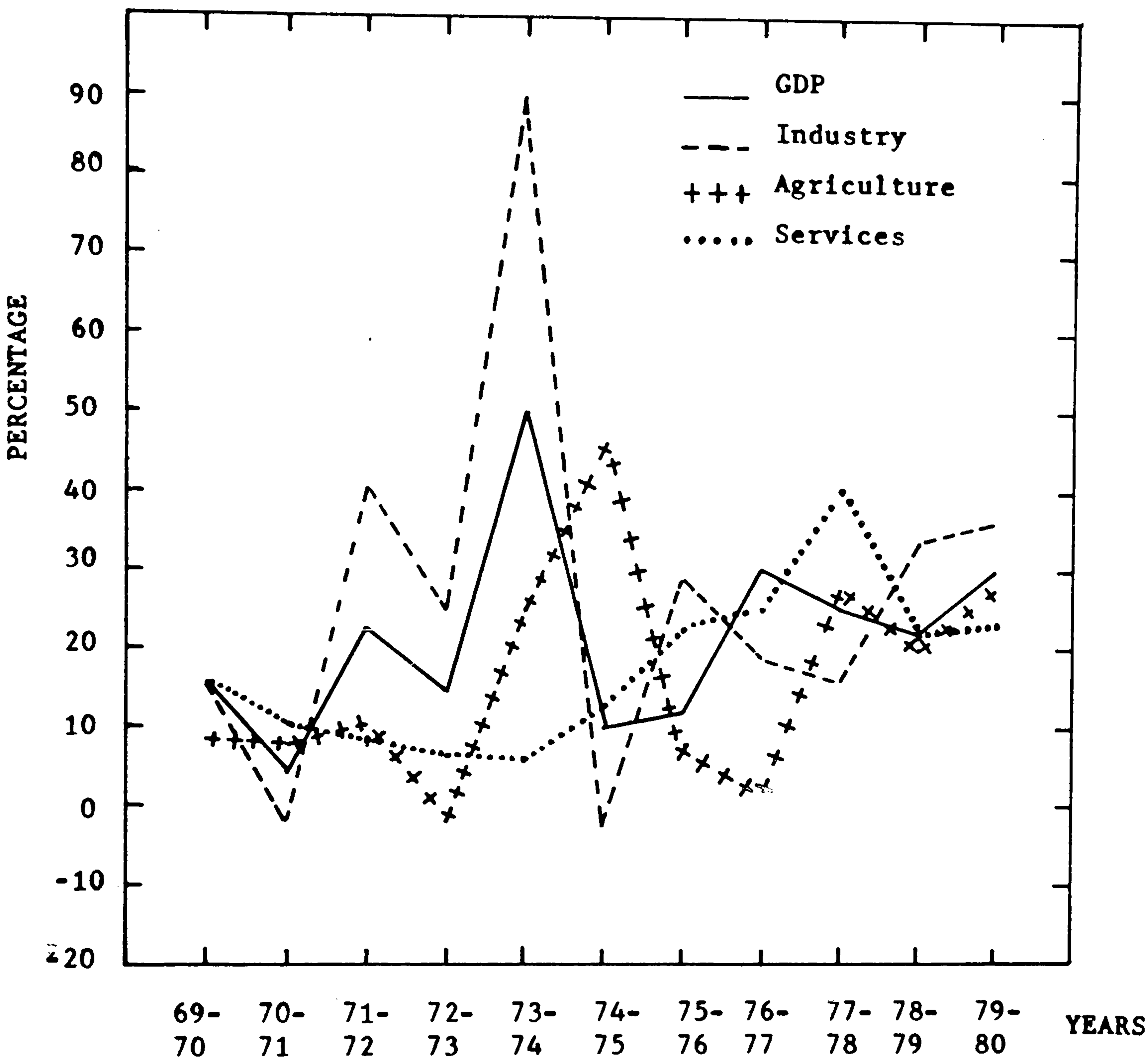



Figure 1.6 : Annual rate of growth of GDP at current prices in percentages. The full curve represents the total rate of growth of GDP while the discontinuous curves are the rate of growth of GDP for different sectors.

Source : Table A.4 in the Appendix A.

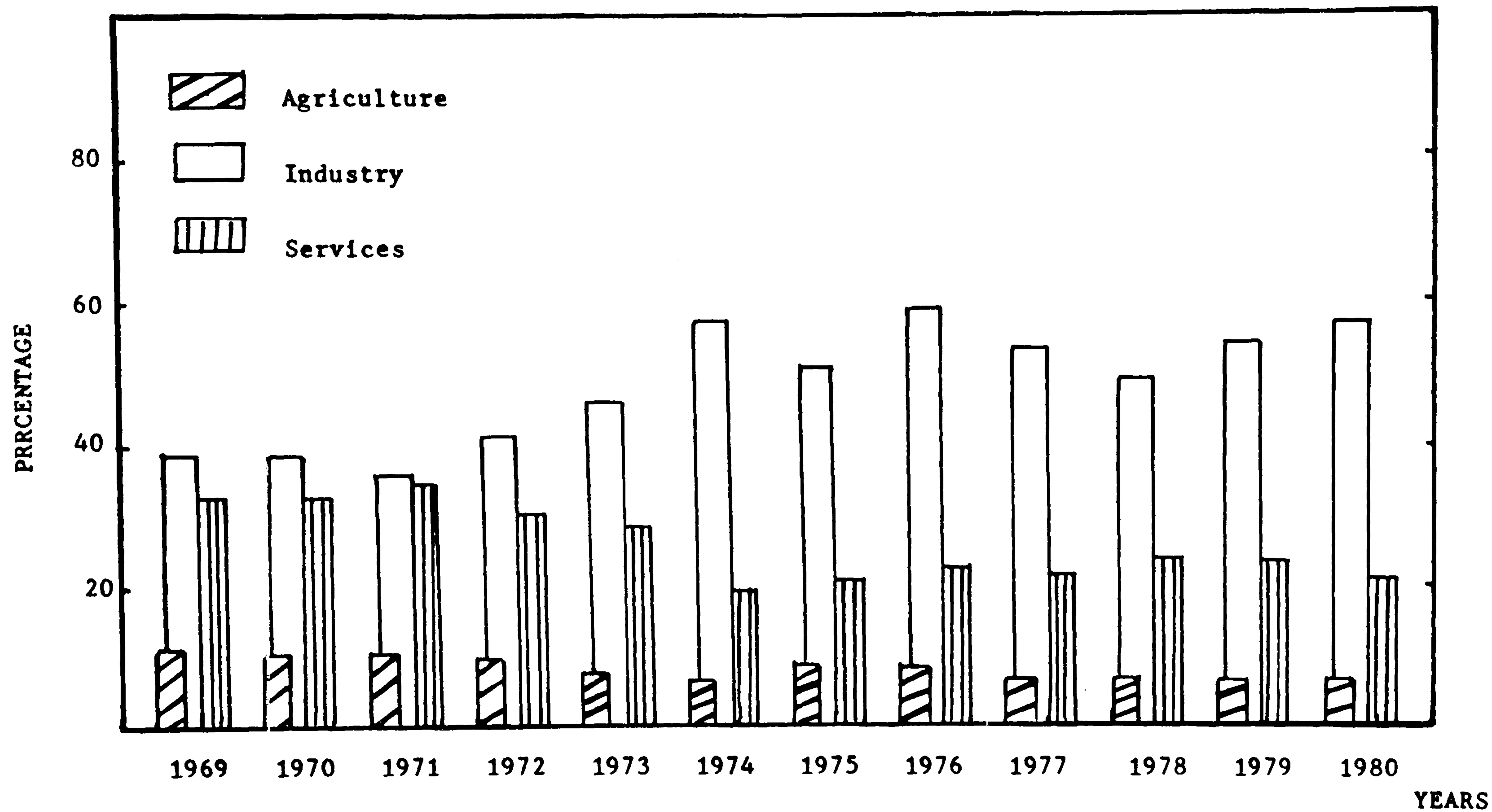



Figure 1.7 : Distribution of GDP by sector (in percentages).

Source : Table A.5 in the Appendix A.

sub-sector contribution to GDP in Algeria is almost half of that of Brazil or Mexico. The agricultural sector contribution to GDP is insignificant in the three countries although it is higher in Brazil than Algeria and Mexico. The GDP in Algeria is based on the production of one group of products (hydrocarbons), while the GDP in Brazil and Mexico is more diversified. This situation has prevailed in Algeria since the pre-independence period. Thus Algeria is characterised by a weak manufacturing sub-sector and agricultural sector, a situation which is alleviated by the existence of a strong hydrocarbon sub-sector.

Reflecting the high level of investment which corresponded to an increase in GDP, income per capita rose from 1,547 AD in 1970 to 8,199 AD (US $2000) in 1980 (65) (at current prices) at an average annual rate of 16.4%. The fact that this increase does not reflect the high rate of growth of GDP for the same period may be attributed to the high rate of growth of the Algerian population. The average annual rate of growth of per capita income in real terms (at 1978 prices) is 4% for the 1969-78 period (66). This rate is higher than in the neighbouring countries of Morocco and Tunisia though lower than in other oil-producing countries.

As indicated in Table 1.7 (at 1974 prices), output (67) per worker for the period 1969-80 increased at an average annual rate of growth of 2.22%. This figure, which is smaller than that for output (6.48%), reflects the large increase in employment. It should be noted, though, that the increase in overall labour productivity is solely due to the growth in productivity in the agricultural sector resulting from a decline of the labour force. In the industrial sector government policies regarding the adoption of advanced technology

Table 1.7: Levels and rates of growth of real outputs (1), employment and productivity by sector
Actual 1969-80
(Output figures in millions of 1974 AD, employment figures in thousands
and productivity thousands AD per employee).

| | Levels | | | | | | Annual rates of growth (in percent) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1969 | 1973 | 1977 | 1978 | 1979 | 1980 | 1969-1973 | 1973-1977 | 1977-1978 | 1978-1979 | 1979-1980 | 1969-1980 |
| Agriculture | | | | | | | | | | | | |
| Outputs(1) | 2,986.7 | 3,108.4 | 3,600.2 | 4,046.6 | 4,130.7 | 4,425.8 | 1.00 | 1.67 | 11.69 | 2.06 | 6.90 | 3.58 |
| Employment(2) | 1,210 | 1,130 | 1,040 | 1,020 | 1,000 | 980 | -1.71 | 2.07 | -1.94 | -1.98 | -2.02 | -1.92 |
| Productivity | 2.468 | 2.751 | 3.462 | 3.967 | 4.131 | 4.516 | 2.71 | 5.74 | 13.63 | 4.04 | 8.92 | 5.50 |
| Hydrocarbons | | | | | ) | | | | | ) | | |
| Outputs(1) | 14,921.2 | 19,318.0 | 19,638.3 | 21,187.9 | 21,658.1) | | 6.46 | 0.41 | 7.59 | 2.19 ) | | |
| Employment(3) | 10 | 32 | 74 | 82 | 86 ) | | 29.08 | 20.96 | 10.27 | 4.76 ) | | |
| Productivity | 1492.1 | 603.68 | 265.38 | 258.38 | 251.84 ) | 32,163 | -22.62 | -20.55 | -2.68 | -2.57 ) | -4.34 | 4.95 |
| Other industries | | | | | ) | 515 | | | | ) | 8.09 | 11.84 |
| Outputs(4) | 3,741.0 | 5,818.7 | 8,329.3 | 9,471.3 | 11,931.6) | | 11.04 | 8.97 | 12.85 | 23.09 ) | | |
| Employment(5) | 130 | 197 | 324 | 342 | 389 ) | 62.45 | 10.39 | 12.44 | 7.44 | 10.21 ) | -12.43 | -6.89 |
| Productivity | 28.77 | 29.53 | 25.70 | 27.69 | 30.67 ) | | 0.65 | -3.47 | 7.44 | 10.21 ) | | |
| Construction | | | | | | | | | | | | |
| Outputs(1) | 2,357.6 | 4,129.1 | 8,420.0 | 9,998.8 | 11,544.5 | 12,388.0 | 13.82 | 17.81 | 17.19 | 14.37 | 7.05 | 15.01 |
| Employment(2) | 82 | 190 | 364 | 399 | 402 | 430 | 21.01 | 16.25 | 9.18 | 0.75 | 6.73 | 15.06 |
| Productivity | 28.97 | 21.73 | 23.13 | 25.06 | 28.71 | 28.80 | -7.19 | 1.56 | 8.01 | 13.62 | 0.22 | -0.05 |
| Industrial sector | | | | | | | | | | | | |
| Outputs(6) | 21,019.6 | 25,140.8 | 36,387.6 | 40,658.8 | 45,434.2 | 44,550.9 | | | 11.08 | 11.05 | -5.66 | |
| Employment(7) | 222 | 419 | 762 | 823 | 877 | 945 | | | 7.7 | 6.35 | 7.46 | |
| Productivity | 94.68 | 60.00 | 47.75 | 49.40 | 51.80 | 47.14 | | | 3.1 | 4.74 | -9.42 | |
| Services | | | | | | | | | | | | |
| Output(8) | 12,386.3 | 15,507.9 | 19,016.4 | 21,073.8 | 22,869.8 | 25,311.3 | 5.62 | 5.10 | 10.27 | 8.18 | 10.14 | 6.50 |
| Employment(2) | 722 | 961 | 1,201 | 1,288 | 1,405 | 1,515 | 7.15 | 5.57 | 6.99 | 8.69 | 7.54 | 6.74 |
| Productivity | 17.15 | 16.13 | 15.83 | 16.36 | 16.27 | 16.70 | -1.53 | -0.47 | 3.28 | 0.51 | 2.60 | 0.24 |
| Total | | | | | | | | | | | | |
| Output(9) | 36,410.8 | 47,882.0 | 59,004.1 | 65,778.7 | 72,134.7 | 74,288.0 | 6.85 | 5.22 | 10.87 | 9.22 | 2.86 | 6.48 |
| Employment(2) | 2,154 | 2,510 | 3,003 | 3,131 | 3,282 | 3,440 | 3.82 | 4.48 | 4.17 | 4.71 | 4.70 | 4.26 |
| Productivity | 16.904 | 19.076 | 19.648 | 21.009 | 21.979 | 21.595 | 3.03 | 0.74 | 6.70 | 4.51 | -1.84 | 2.22 |

Sources:
1 At 1974 constant prices, MPAT.
2 Table 1.2.
3 From statistics 1967-78 and MPAT: Salaried employment only.
4 Mining and quarrying, electricity, gas and water and manufacturing at 1974 constant prices, identical to source of item 1.
5 Total industrial employment (industry and handicraft Table 1.2) minus hydrocarbons employment item 3.
6 Total hydrocarbons, other industries and construction output.
7 Total of hydrocarbons, other industries and construction employment.
8 Services plus government services at 1974 constant prices, identical to source of item 1.
9 Sum from above. Also equals GDP less import duties at 1974 constant prices, identical to source of item 1.

partially failed in the sense that the expected long term improvement in labour productivity did not materialise. The massive growth of employment in this sector led to low or negative rates of growth of labour productivity. Output per worker in services and construction remained essentially constant over this period. In spite of these increases, the level of agricultural productivity remains by far the lowest of any sector and the industrial sector, or more particularly the hydrocarbon sub-sector, by far the highest of any sub-sector or sector.

The VA rose from 17.23 billion AD in 1969 to 131.772 billion AD in 1980 at current prices. The VA rose more rapidly in the industrial sector than in the agricultural or service sectors. This is clearly illustrated by Table 1.8 which shows the contributions to VA from the different sectors. The industrial sector contribution to VA increased while that from services decreased by nearly a factor of two. In addition, the share of the manufacturing sub-sector decreased. This is because the VA rose more quickly in some sectors than in others. In real terms the VA rose from 38.55 billion AD in 1967 to 81.20 billion AD in 1978 (at 1978 prices). The contribution by the different sectors is as shown in Table 1.9. The contribution from the industrial sector increased until 1973 and then remained essentially constant for the 1973-78 period. At the same time, the agricultural sector contribution dropped steadily over the years while the service sector contribution increased, though only slightly.

1.7. Financing of public investment

Since independence the financing structure of public investment evolved continually. Prior to 1971, the investments of public enterprises were financed by non-reimbursable

Table 1.8: The contribution to VA from various sectors in 1969 and 1980 (percentages).

| Sectors | 1969 | 1980 |
|---|---|---|
| Industrial sector | 47.2 | 67 |
| -Hydrocarbons | 17.2 | 38.3 |
| -Mines and energy | 2.2 | 1.7 |
| -Manufacturing | 16.1 | 13 |
| -Construction and public works | 11.7 | 14 |
| Agriculture | 12.8 | 7.4 |
| Services | 40 | 25.5 |
| VA without government services | 100 | 100 |

Source : Table A.3 in the Appendix A.

Table 1.9: The VA contribution by sector in real percentage terms (at 1978 prices).

| Sectors | 1967 | 1973 | 1977 | 1978 |
|---|---|---|---|---|
| Industrial sector | 60.3 | 62.6 | 62 | 61.5 |
| -Hydrocarbons | 37 | 36 | 31 | 30 |
| -Mines & energy | 1.2 | 1.6 | 2 | 2 |
| -Manufacturing | 10.2 | 13 | 13 | 13 |
| -Construction and public works | 12 | 12 | 16 | 6.5 |
| Agriculture | 13.4 | 9.5 | 8.6 | 8.2 |
| Services | 26.3 | 27.7 | 30 | 30 |

source: Table A.6 in the Appendix A.

grants from the Treasury, foreign aid and to a small extent by the public enterprises' own financial assets. From 1971, the investments of public enterprises have been financed by reimbursable long term loans from the Treasury supplemented by external borrowing and medium term loans from the Primary Banks. The financing of public investments by public enterprises was introduced to deal with the rapid growth of planned public investments. These long term loans are channelled through specialised financial agencies such as the Algerian Development Bank (BAD) which lends directly to public enterprises according to the terms set up by the Treasury. All the investments are subject to approval by the government within the context of the central planning procedures (see part 3.1). Since 1971, the aim of government financing policies has been to give the banking system control over public enterprise investments. This restructuring has made the banking system responsible for project financing. Selected projects, therefore, are required to guarantee their financial feasibility and proper execution. In addition, for public enterprises, this is expected to stimulate a choice of project which shows an adequate financial rate of return, i.e., generates the necessary funds, for new capital goods and for repayment and debt servicing. Thus, since 1971, the financing of public enterprise investments is the responsibility of the Treasury and the banking system. This part proposes to assess in general terms the share of government and public enterprise investments. The magnitude of internal and foreign resources required by the different development plans and the share of gross public and private savings in total national savings are revealed.

1.7.1.The different sources of public investment financing

The rapid growth of public investment during the 1967-80 period needed the mobilisation of large financial resources. Since 1967 public investments have been financed by the government through the Treasury and by public enterprises (68). As Table 1.10 and Figure 1.8 indicate, the reorganisation of public investment financing that occurred in 1971 resulted in a sharp increase in public enterprise financing and consequently in a sharp decline of direct government financing of public investment. The former increased from 2% to 71% while the latter declined from 79% to 29% for the 1967-73 period. This rapid increase in the share of public enterprise investment in the total amount of public investment corresponds to a rapid growth in public investment for the same period. The large share of public enterprise financing attained in the 1970-73 period continued over the 1974-79 period. The financing system introduced in 1971 resulted in the replacement of non-reimbursable Treasury grants by long term loans and the introduction of medium term bank lending as a source of investment financing.

The dynamic growth of public investment by public enterprises did not outstrip the growth in gross domestic savings capacity since generated saving increased in terms of the percentage share of total public investment from 68% during the 1967-73 period to 80% during the 1974-77 period (as indicated in Table 1.11). The share of gross foreign financial sources declined in relative terms from 32% during the 1967-69 period to 20% during the 1974-77 period while in absolute terms it rose by a factor of eight between the two periods concerned. Thus although the ratio of foreign financing to total public investment decreased, foreign financing increased

Table 1.10: Financing of public investment
(in percentages)

| Investments | 1967-1969 | 1970 | 1971 | 1972 | 1973 | 1970-1973 | 1974 | 1975 | 1976 | 1977 | 1974-1977 | 1978 | 1979 | 1978-1979 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government inv. | 79 | 80 | 27 | 28 | 31 | 29 | 25 | 22 | 20 | 22 | 22 | 24 | 26 | 25 |
| Public enterprise investment | 21 | 20 | 73 | 72 | 69 | 71 | 75 | 78 | 80 | 78 | 78 | 76 | 74 | 75 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Computed from Table A.1 and A.2 in the Appendix A;
La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 8;
several Annuaires Statistiques de l'Algerie (MPAT, Algiers);
and the paper by Palloix C.: Industrialisation et Financement lors des Deux Plans Quadrienaux, Revue Tiers Monde, Tome XXI, Vol. 83, 1980, PUF, France p 554.

Table 1.11: Sources of finance of
public investment in percentages

Realised figures

| Financial sources/Plan | 1967-69 | 1970-73 | 1974-77 |
|---|---|---|---|
| Gross domestic fina. sources | 68* | 72* | 80* (1) |
| Gross foreign fina. sources | 32 | 38* | 20* (2) |
| Total financ. sources millions AD | 10,971 | 33,700 | 126,971 |

Source: MPAT 1978 quoted in Attal A.A. Ph.D thesis, Financing Economic Development in Algeria 1967-77, unpublished Ph.D thesis, Keele University (GB), 1983, p 156.

1 Gross domestic savings consists of household savings, business and commercial private savings, public savings and transfer from Algerian living abroad.

2 Gross foreign borrowing includes both budgetary government savings, i.e. aid and foreign borrowings(short and long term loans from foreign financial institutions) and non-tax government revenues.

* refers to the percentage of each source as a fraction of total investment.

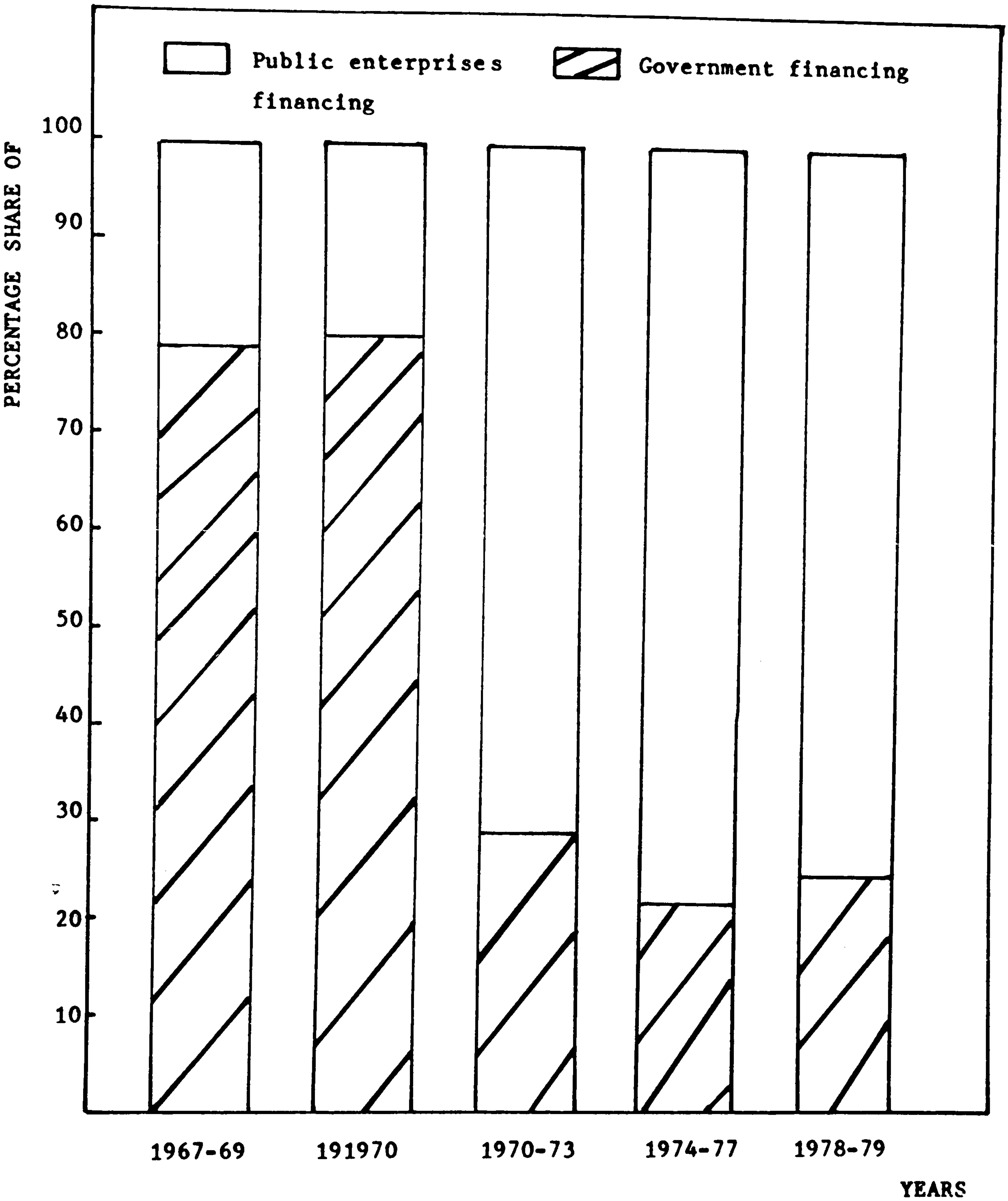



Figure 1.8 : Share of government and public enterprises financing of public investment for some selected years.

Source : Table 1.10.

in absolute terms. Algeria had to turn to Euro-market and international banks which were more than willing to grant loans to a country with exportable reserves of oil and gas. This insurance reinforced the government's willingness to pursue productive investments at a high rate (50% of GDP)(69). The increase in the capacity of gross domestic financial sources follows the large increase in oil exports after 1970. Public enterprises were thus mainly financed by gross domestic financial sources in relative terms which, as indicated in Figure 1.9, have been dominated by public savings since 1973 .

1.7.1.1.Government financing

The government financing of public investment takes the form of non-reimbursable loans which are part of capital budget expenditures. Capital budget expenditures consist of public investments made mainly in agriculture, education, irrigation, infrastructure, social services and in some public enterprises and agencies (non-productive investments). These investments are financed by government revenues and foreign borrowing. The most important source of government current revenues comes from the taxation of petroleum products which includes royalty payments and an income tax payment as shown in Table 1.12 and Figure 1.10. In 1980, the ratio of petroleum revenues to total revenues reached 61%. The successive rise in oil prices led to important financial resources despite the stagnation of the volume of crude oil and condensate exports. The continued rise in petroleum resources corresponds also to an increase in refined products exports, liquefied petroleum gas (which tripled from 1973 to 1978) and liquefied natural gas (which more than tripled from 1969 to 1978)(70).

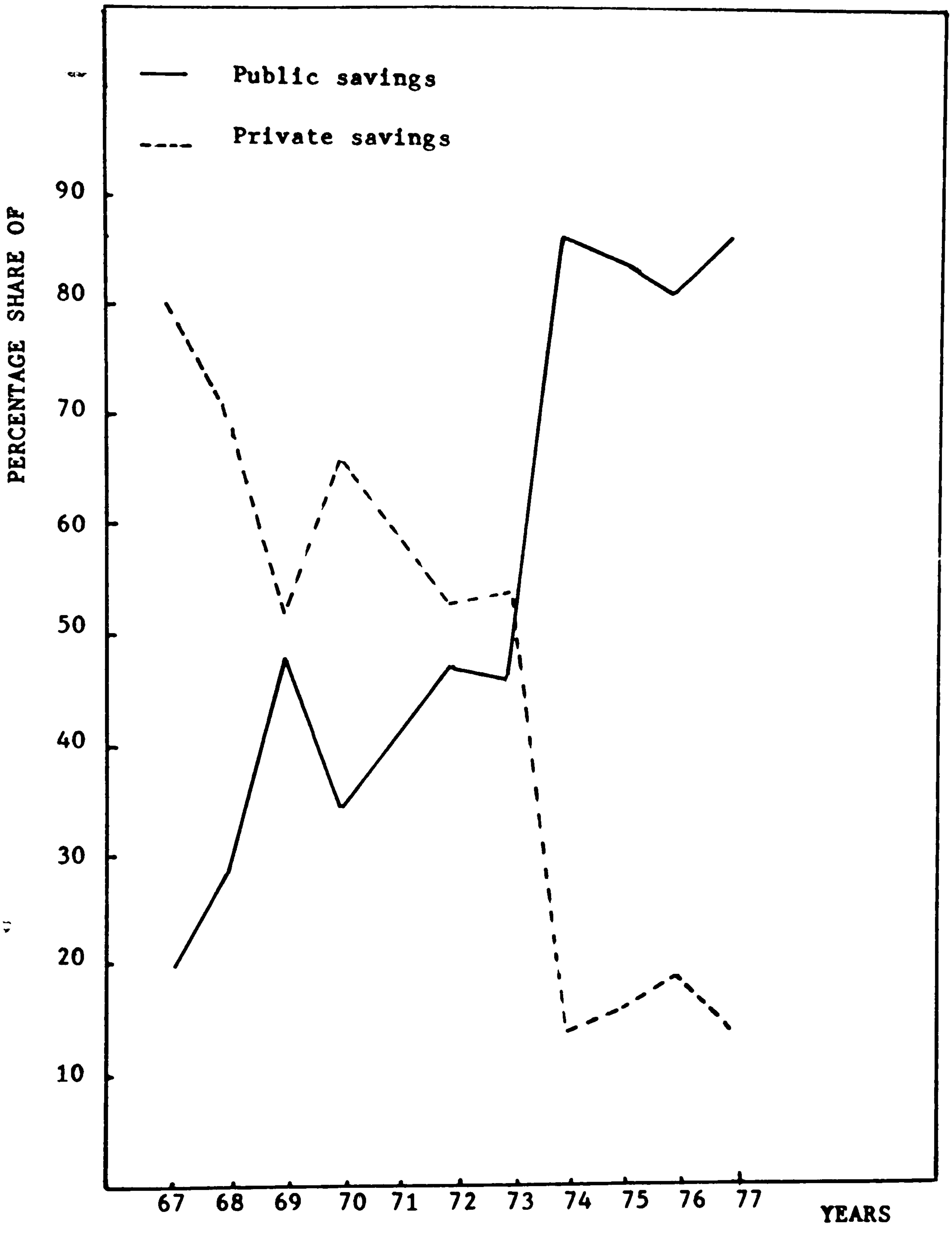



**Figure 1.9 : Percentage share of gross private savings, gross public savings in gross national savings - 1967 to 1977.**

**Source : Attal A. A. : Financing Economic Development in Algeria 1967-77. Ph.D Thesis op cit. p 162.**

Table 1.12: Summary of government current revenues (in millions of AD)

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax revenues | 3,377 | 3,953 | 4,156 | 5,456 | 5,982 | 8,434 | 9,955 | 21,399 | 23,194 | 24,976 | 31,279 | 35,379 | 45,729 | 59,168 |
| Petroleum revenues | 880 | 1,134 | 1,320 | 1,350 | 1,648 | 3,278 | 4,114 | 13,399 | 13,462 | 14,237 | 18,019 | 17,365 | 26,516 | 37,658 |
| Petroleum revenues as % of total revenues | 21.8 | 24.8 | 23.4 | 21.4 | 23.8 | 53 | 37 | 57 | 53.6 | 54.3 | 53.8 | 47.2 | 55.4 | 61.4 |
| Total revenues | 4,025 | 4,567 | 5,689 | 6,309 | 6,919 | 9,178 | 11,067 | 23,438 | 25,093 | 26,215 | 33,479 | 36,782 | 47,780 | 61,262 |
| petroleum revenues/ total real. public inv. | 46 | 37.7 | 31 | 21.6 | 20 | 32.5 | 35 | 84 | 55.8 | 41.08 | 38 | 33 | 49.4 | .... |

Sources: Ministry of Finance;
Several Annuaires Statistiques de l'Algerie;
La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 8 & 256;
Surveys of African Economics, IMF, Vol. VII, USA, 1977 p 62
and 1982 International Financial Statistics Yearbook, IMF, p 89.

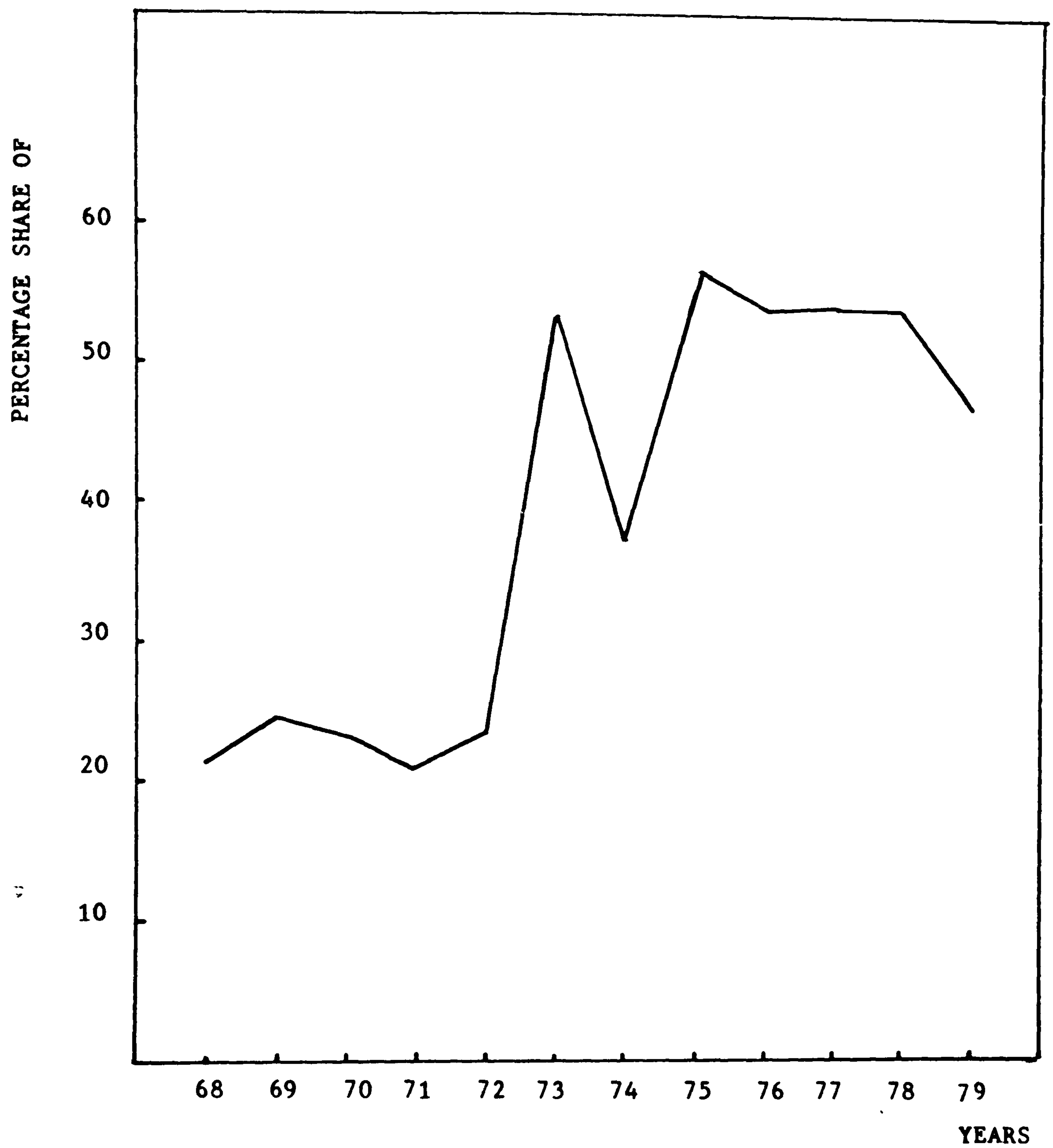



Figure 1.10 : Percentage share of petroleum revenue in total revenues - 1968-79.

Source : Table A.7 in the Appendix A.

### 1.7.1.2. Public enterprise financing

The different sources of public enterprise financing expressed as a fraction of total investments are shown in Table 1.13. Reimbursable Treasury loans for public enterprises investments increased from 46.3% for the 1970-73 period to 60% for the 1978-79 period. These investments are financed by long term loans from the Treasury through specialised financial agencies such as the BAD. They are financed by the overall budget surplus resulting from government current revenues and expenditures and capital budget expenditures. Primary Bank loans decreased from 28.2% for the 1970-73 period to only 4.4% for the 1978-79 period. These loans are medium term loans granted by the Primary Banks to the economy. On the other hand, foreign sources of public enterprise financing increased from 25.5% for the 1970-73 period to 35.6% for the 1978-79 period. This shows that the financing structure introduced in 1971 was inadequate to satisfactorily handle the sharp increase in investment. In addition, the bulk of foreign financing went to a few public enterprises, mainly SONATRACH, SONELEC, SONACOME, SNS, SONITEX and SONIPEC. The other sectors did not benefit at all from this type of financing (Table 1.14). The light industries benefited from foreign financing only from 1980.

By and large public enterprise financing has increased since 1971. This means that public enterprises are merely financed by reimbursable loans. The Treasury continues to provide the greatest share of the funding required to finance the different plans through non-reimbursable or reimbursable loans. In addition, these investments are mainly financed by gross domestic financial sources, despite the fact that the share of gross foreign financial sources has, in absolute

Table 1.13: Different sources of financing of public investment by public enterprises.

| | 1970 | 1971 | 1972 | 1973 | 1970-73 | 1974 | 1975 | 1976 | 1977* | 1974-77 | 1978 | 1979 | 1979-79 | 1980** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percentage Treasury (long term) | 55.2 | 48.8 | 36.3 | 46.9 | 46.3 | 43.5 | 49.2 | 51.5 | 56.9 | 52.2 | 59 | 60.8 | 60 | 67 |
| Banking System (medium t.) | 15.1 | 24.4 | 37.8 | 30.7 | 28.2 | 13.1 | 17.1 | 14.55 | 14.3 | 14.8 | 6 | 2.9 | 4.4 | 3.55 |
| Foreign financing | 29.7 | 26.8 | 25.3 | 22.4 | 25.5 | 43.4 | 33.6 | 33.9 | 28.7 | 33 | 35 | 36.2 | 35.6 | 29.5 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

* The 1977 resources are estimated.
** Budget figures.
Sources : Palloix C.: L'industrialisation et Financement lors des Deux Plans Quadrienaux, op cit. pp 546-547;
Ministry of Finance;
Survey of African Economics, op cit. p 60
and Several Annuaires Statistiques de l'Algerie, op cit.

Table 1.14: Foreign financing of public interprises in percentages

| Public enterprises | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|
| SONATRACH | 74.7 | 54.2 | 40.9 | 68.2 | 57.1 | 34.8 |
| Heavy industries | 14.6 | 18.8 | 16 | 18.2 | 16.6 | 23 |
| -SNS | 7.5 | 6.2 | 6 | 7.8 | 7.7 | 9.5 |
| -SONACOME & SONELEC | 4.7 | 4.9 | 3.7 | 6 | 7.7 | 11 |
| Light industries | 17.2 | 10.9 | 24.3 | 17.1 | 21.1 | 28.4 |
| -SONIPEC & SONITEX | 1 | 2 | 6.7 | 8.3 | 7.7 | 10.8 |
| -SNIC | 3.9 | 5.2 | 6.8 | 6 | 6.2 | 7 |
| Total inv. in public enterprises AD | 5,642 | 7,868 | 9,127 | 14,215 | 14,552 | 11,229 |

Source: Ministry of Finance.

terms, increased over the years. Public investments are mainly financed by public savings. The government's efforts to mobilise savings has therefore improved over the years. Furthermore, despite the introduction of the new financing system, the contribution from the banking system has not improved. This can be seen from the fact that the medium term loans have declined sharply during the development plans. The fact that public enterprise investment is more dependent on foreign sources may be attributed to the difficulties encountered by public enterprises to generate their own financing. Important efforts, however, have been made to mobilise domestic and foreign sources of financing for the current development strategy.

### 1.8. Balance of payments and public debt

Algeria's balance of payments was strongly influenced by the investment strategy pursued, but one should add that external factors had almost as great an impact. Surpluses were recorded from 1971 to 1974, in 1976 and between 1978 and 1980 as indicated in Table 1.15. The largest surpluses were recorded in 1974 and 1980 mainly because of higher oil revenues. Hydrocarbons played a fundamental role in maintaining a high rate of growth in export earnings. The substantial deficit of over 1.1 billion AD and 1.4 billion AD recorded in 1975 and 1977, respectively, reflects the decline in hydrocarbon exports coupled with a rise in imports of capital goods in 1975 and an increase in imports of capital and consumer goods in 1977. The balance of payments was heavily influenced by non-factor services, especially transport and insurance of goods, technical cooperation (payment to foreign contractors and consultants) and public works and services (of which the interest paid on the private debt is

Table 1.15: Balance of payments (millions of AD).

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Merchandise | -320 | -849 | -433 | -1,225 | 3,909 | -3,992 | 1,912 | -1,132 | -3,760 | 6,470 | 15,563 |
| credit | 5,004 | 4,047 | 5,413 | 7,249 | 19,236 | 17,540 | 21,499 | 24,579 | 25,164 | 36,544 | 52,388 |
| debit | 5,324 | 4,896 | 5,846 | 8,474 | 15,327 | 21,532 | 19,587 | 25,711 | 28,924 | 30,074 | 36,825 |
| 2.Non-factor services | -732 | -640 | -962 | -1,171 | -1,993 | -2,840 | -5,511 | -7,761 | -8,745 | -9,458 | -10,960 |
| 2.1.Transport and insurance | -526 | -424 | -550 | -800 | -1,498 | -1,696 | -1,782 | -2,317 | -2,685 | -3,097 | -3,945 |
| 2.2.Technical cooperation(1) | -260 | -396 | -462 | -551 | -738 | -1,032 | -2,214 | -2,319 | -3,109 | -3,714 | -3,342 |
| 2.3.Public works | -152 | -138 | -171 | -192 | -227 | -466 | -1,720 | -2,937 | -2,673 | -2,371 | -2,572 |
| 3.Factor services | 160 | 499 | 676 | 440 | 355 | 147 | -442 | -853 | -1,702 | -3,490 | -3,949 |
| 3.1.Interest on private debt(2) | -7 | -93 | -173 | -291 | -853 | -830 | -1,466 | -1,763 | -2,237 | -4,257 | -5,548 |
| 4.Current transfers | 271 | 686 | 169 | 198 | 1,603 | 127 | 169 | 115 | 164 | 160 | 283 |
| 5.Total current account balance | -621 | -304 | -547 | -1,758 | 668 | -6,558 | -3,872 | -9,631 | -14,043 | -6,318 | 928 |
| 6.Medium and long-term capital | 310 | 508 | 904 | 4,012 | 2,193 | 5,414 | 7,579 | 7,867 | 14,477 | 9,366 | 3,449 |
| Overall balance | -430 | 152 | 585 | 2,055 | 3,349 | -1,134 | 3,148 | -1,404 | 1,522 | 1,851 | 4,542 |

Source: Algerian Central Bank.

1 Payment to foreign contractors and consultants.
2 Interest and transactions on medium and long term loans contracted by Algeria with private external sources i.e., suppliers and banks.

the most important). The private debt consists of medium and long term loans contracted by the Algerian public organisations (banks and public enterprises) with private foreign suppliers and banks. Since 1979, the interest on the private debt, transport and insurance and technical cooperation were the largest source of the deficit in the balance of payments. This is because public enterprises have become more dependent on private commercial sources for loans and technical cooperation. Serving to mitigate the impact of freight, technical cooperation and interest, are the large influx of medium and long term capital in the form of loans and investment, private transfer payments (which consist of gifts and remittances of income sent home by Algerians working abroad) and, only more recently, the trade balance. These have contributed to the overall balance of payments surplus and to the increase in international reserves.

In 1981, the total mobilised debt was estimated to be US$ 14.3 billion which is equivalent to about 55.4 billion AD (including disbursed loans only)(see Table 1.16). The contracted debt has always been important (this is for both surplus or deficit periods of the balance of payments). From 1970 to 1978 there was a sharp increase in borrowing. In effect, between 1972 and 1978, the debt increased at an average annual rate of 36%. From 1979 onward a slight decline in borrowing has been recorded. The country's contracted debt has been growing mainly because hydrocarbon revenues have not allowed the government to sustain imports of capital, semi-finished and consumer goods and services. Loans from the international markets have been contracted to strengthen the deficit of foreign currencies and maintain the realisation of

Table 1.16: External public debt and service payment on external public debt.

| | External public debt | | US $ Million | | | Service payment on external public debt. | | | |
|---|---|---|---|---|---|---|---|---|---|
| Years | Disbursed only | Growth rate in percent | Total | Growth rate in percent | Ratio mobilised debt / GDP | % of export of Goods and services | Growth rate in percent | % of GDP | Growth rate in percent |
| 1969 | | | | | | 2.9 | 4.5 | 0.76 | 31 |
| 1970 | 937 | | | | 19.3 * | 3.2 | 10 | 0.82* | 7.8 |
| 1971 | | | | | | 5.8 | 81 | 1.2 | 46 |
| 1972 | 1,625 | | 2,827 | | 27.5 | 11.8 | 103 | 2.6 | 116 |
| 1973 | 3,109 | 91.3 | 4,788 | 69.1 | 40 | 12.2 | 3.4 | 3.4 | 30 |
| 1974 | 3,324 | 6.9 | 6,039 | 26.1 | 29.4 | 13.5 | 10 | 6.2 | 82 |
| 1975 | 4,526 | 36.2 | 9,003 | 49 | 35.7 | 8.7 | -35 | 3.4 | -45 |
| 1976 | 5,853 | 29.3 | 11,340 | 25.9 | 40.1 | 13 | 49 | 4.9 | 44 |
| 1977 | 8,164 | 39.5 | 13,785 | 21.5 | 42.5* | 15.4 | 19 | 5.3* | 8 |
| 1978 | 13,167 | 61.2 | 20,093 | 45.75 | 52.6* | 20.4 | 31 | 5.9* | 11.3 |
| 1979 | 15,330 | 16.4 | 23,376 | 16.4 | 49.1* | 25.6 | 25.5 | 8.6* | 45 |
| 1980 | 15,073 | -1.6 | | | 38.7* | 24.9 | -2.7 | 9.5* | 10.5 |
| 1981 | 14,392 | -4.5 | | | 35.2* | 24.9 | 0 | 9.5* | 0 |
| | | 30.55(1) | | 36.3(2) | | | | | |

* Ratio mobilised debt/GNP
(1) Average figure 1973-1981.
(2) Average figure 1973-1979.

Sources: 1972 to 1983 World Bank Development Reports, op cit.;
1981 Balance of Payments Statistics Yearbook, Vol 32, IMF;
1982 International Financial Statistics Yearbook, IMF, p 89
and Annuaires Statistiques de l'Algerie, op cit.

the development plans. For instance, from 1967 to 1977 more than 20% of public investment was financed by foreign sources (71). The largest borrowers among the public enterprises were SONATRACH, CNAN, SNS, SONACOME and SNMC (72).

In addition, the mobilised debt to GNP ratio jumped from 19% in 1970 to 52% in 1978. From 1979, however, it decreased steadily to reach 35.2% in 1981 (see Table 1.16). This means that in 1981 more than 35% of GNP was mobilised in the form of foreign loans. Consequently, a large fraction of the sources of financing for productive investment had to be sought outside the national economy.

With the launching of big industrial projects the solvency of Algeria has improved and recourse to foreign loans from financial institutions has increased greatly. The foreign financial sources come essentially from financial institutions which are mainly private banks, credit suppliers in charge of the realisation of projects that are specific to public enterprises, bilateral official loans made by governments and finally, multilateral loans (see Table 1.17). Government bilateral loans were granted (in order of importance ) by USA, Japan, West Germany, USSR, Canada, France, East Germany and Spain. The financial institutions come mainly from multiple lenders as well as French, American, Belgiam and West German financial institutions. Loans (73) have been subscribed with European, Japanese and American bank consortium (74), for example.

In order to get a better insight into the Algerian situation, the external outstanding debt during the covered period is compared to that of other developing countries. In 1979, Algeria was among the most indebted countries in the world, ranking third below Brazil and Mexico (as shown in

Table 1.17: External public debt structure.

| Years | Total Million US $ | % bila-teral | % multi-lateral | % suppli-ers | % finan. institut. | % others |
|---|---|---|---|---|---|---|
| **Undisbursed debt** | | | | | | |
| 1972 | 2,827 | 43.5 | 0.6 | 40 | 13 | 2 |
| 1973 | 4,788 | 30 | 0.8 | 28 | 37 | 3.6 |
| 1974 | 6,789 | 29 | 3.1 | 31 | 34 | 2.5 |
| 1975 | 9,003 | 19.7 | 2.5 | 37.5 | 38.6 | 1.4 |
| 1976 | 11,340 | 17.5 | 3.3 | 35 | 42 | 1.6 |
| 1977 | 13,785 | 15.6 | 4 | 35 | 43.5 | 1.4 |
| 1978 | 20,093 | 14.6 | 3.5 | 26 | 52 | 1 |
| 1979 | 23,376 | 15.4 | 4 | 23 | 56 | 1.4 |
| Average figures | | 23 | 3 | 32 | 40 | 1.4 |
| **Disbursed debt** | | | | | | |
| 1979 | 15,330 | 12.5 | 1.6 | 25.2 | 58.5 | 2.2 |
| AD | | (1,912) | (245) | (3,865) | (8,965) | (343) |

Source: Ibid source Table 1.16.

Table 1.18: External public debt of Third World Countries higher than ten billion US$ on 31th December 1979

| Countries | Total debt Million US$ | Debt per capita US$ | Service payment % exports |
|---|---|---|---|
| Brazil | 47,521 | 407 | 34.6 |
| Mexico | 36,015 | 549 | 64.1* |
| Algeria | 23,376 | 1,283 | 25.6 |
| India | 21,287 | 32 | 9.5 |
| Indonesia | 20,840 | 145 | 13.4* |
| Korea repub. | 20,036 | 529 | 13.5 |
| Egypt Arab r. | 16,037 | 412 | 15.8 |
| Turkey | 14,652 | 331 | 12.9 |
| Spain | 11,442 | 307 | 5.6 |
| Israel | 10,673 | 2,816 | 10.3 |
| Pakistan | 10,599 | 132 | 12 |
| Venezuela | 10,238 | 757 | 9.4 |
| Sudan | | | 33 |
| Mauritania | | | 32.4 |

* Service payment reflects prepayments.

Source: 1981 World Bank Annual Report, op cit.

Table, 1.18). These three countries accumulated more than 25% of the total world debt. Regarding contracted debt per capita, Algeria ranked first (with the exception of Israel) in the world. The difference, however, between contracted debt and mobilised debt is large. In fact, Algeria has never been in financial difficulty despite the fact that credits granted have more than doubled between 1976 and 1979.

The service of the debt increased from 8 million AD in 1968 to almost 10 billion AD in 1980 (see Table 1.16). Most of the loans contracted were long term loans and for a certain period repayment was less than 12% of annual export earnings, a fairly reasonable debt burden according to some scholars (75). Between 1979-81 the service of the debt accounted for about 25% of the exports of goods and services.

From 1968 to 1979 the service payment increased by more than a hundred times. The highest increase was obtained in 1972, but from 1973 onward the increase in the volume of hydrocarbon exports alleviated this situation. This proportion (i.e., 25% of total export earnings) is considered by international financial experts to be the highest ratio affordable by a country. This is slightly higher than the Algerian blueprints of financing of the plan which state that the debt service ratio should not exceed 20% of total exports (76). Compared to other countries, Algeria is in a better position in terms of the ratio of service payments to exports of goods and services since, in 1979, Algeria ranked ninth after Mexico (64%), Brazil (34.6%), Sudan (33%) and Mauritania (32.4%).

In addition, the debt service as a fraction of GNP rose tremendously from 1970 to 1980 (77)(see Table 1.16). This ratio goes through a peak in 1972 and from then on tends to decrease. It remained constant between 1980 and 1981. In 1980 this service payment was as high as the contribution of the agricultural sector VA and that of the manufacturing industries (10%). The relative repercussion of the service of the debt on the Algerian economy is therefore quite significant.

Algeria managed to maintain a surplus in the balance of payments except in 1975 and 1977 where a deficit was recorded. In addition, the Algerian debt burden remained within the limits of the country's capacity. The external financial situation has been improved over the past years. Despite a further increase in absolute terms, the ratio of mobilised debt to GNP declined tremendously from 52.6% in 1978 to 35.2% in 1981 and the ratio of debt service to exports dropped slightly from 25.6% in 1979 to 24.9% in 1981. The most important sources of foreign borrowings were banks, suppliers and bilateral official loans. When Algerian contracted foreign debt and debt service is compared to that of other countries, Algeria is among the most indebted country in the world (debt per capita is the highest and the ratio of debt service to exports is among the highest in the world). The Algerian situation, however, can be said to be much better than that of the countries with which it is compared.

## References


1 For more details on the different ideological tendencies see Bennamane, A.: The Algerian Development Strategy and Employment Policy (Centre for development studies, University College of Swansea, University of Wales, 1980) Chapter One and Two.

2 Refer to Charte Nationale du Peuple Algerien en Algerie, Naissance d'une Societe Nouvelle, by Lambotte, R. (Edition Sociale, Paris, 1976) p 87.

3 Raffinot and Jaquemot believed that Algeria started with state socialism and now is under state capitalism. Raffinot, M. and Jaquemot, P.: Le Capitalisme d'Etat Algerien (Maspero, Paris, 1977).

4 Only 7% of the total land is cultivable. 1980 Production Yearbook, FAO, Vol. 34, U.N.

5 Speech delivered by President H. Boumediene.

6 Ibid.

7 Ibid.

8 A statement by Kim II Sung, President of the Korea People's Republic quoted in Temmar, H.: Structure et Modele de Developpement de L'Algerie (SNED, Algiers, 1974), pp 206-207.

9 See Temmar, H.: Structure et Modele de Developpement de L'Algerie, op cit.

10 Ibid.

11 The Algerian strategy and objectives were more or less identified and defined in the Tripoli Programme.

12 Refer to Perroux, F.: Multinational Investment and the Analysis of Development and Integration in Poles, Cahiers de L'ISEA, no. 24, France, 1973.

13 See Osterkamp, R.: L'Algerie Entre le Plan et le Marche, Canadian Journal of African Studies, Vol. 16, no. 1, 1982, p 34.

14 Bennamane, A.: The Algerian Development Strategy and Employment Policy, op cit. p 71.

15 Ibid.

16 Refer to Andreff, W.and Hayab, A.: Les Priorities Industrial de la Planification Algerienne sont-elles vraiment Industrialisantes ? Revue Tiers Monde, Vol. 76 Oct-Dec. 1978, IEDES, PUF, France, pp 867-892 .

17 Regarding known reserves, oil is expected to last for about 25 years. This does not take into account natural gas.

18 The government started by nationalising British and German firms and ended with the French in 1971 at only 51% most of the time.

19 An incomplete list of nationalisations can be seen in Benhouria, T.: L'Economie de l'Algerie (Maspero, Paris, 1978) pp 258-268.

20 More details will be given later.

21 Private sector and foreign investments combined still remain inferior to the state's contribution. Refer for more detail to Said Amer, T.: Le Developpement Industrial de L'Algerie: Bilan de L'industrialisation (Edition Anthropos, Paris, 1981) p 35.

22 Refer to Le Monde Diplomatique, June 1978, Paris, p 27.

23 Since president Boumediene's death the government's attitude in favour of family planning became official. In fact one of the 1980-84 Plan's aims is to reduce population growth.

24 See 1983 World Development Report, World Bank publication (Oxford Uni. Press) p 149.

25 Ibid p 185.

26 Ibid.

27 Refer to La Synthese du Bilan Economique et Social de la Decenie 1967-78, op cit. p 126.

28 1982 World Development Report, op cit. p 155.

29 La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 150.

30 Ibid.

31 Ibid p 154.

32 Ibid pp 127-139.

33 Labour force: Persons seeking a job or employment.

34 See Table 1.2.

35 Refer to La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 131.

36 MPAT: 1977 Census of Population and Housing (MPAT, Algiers, 1977).

37 Table 1.2.

38 La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 139.

39 Table 1.2.

40 La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 141.

41 A condensate is a high quality petroleum in association with natural gas.

42 See, for more details, Chevalier, J.M. in : "Petrole et Gas Algeriens: De L'Affrontement a la Cooperation", Defence Nationale: Problems Economique Scientifique Militaires, Paris, Aug-Sep. 1982, p 58.

43 Petrole et Gas Arabe 16-01-82 quoted in Petrole et Gas Algeriens, op cit. p 56.

44 Refer to SONATRACH Study by Golyer and Mac Naughton (Dec. 1974) quoted in Monde Diplomatique, op cit. p 28.

45 1980 Yearbook of World Energy Statictics, U.N.

46 Ibid.

47 This mine is estimated to have 3 million of tons of iron ore of high quality. See for more details Chauleur, P.: L'Afrique Industrielle (Mainsonneuve et Larose, Paris, 1979) p 189.

48 The Gara Djebilet reserve is the largest in Algeria.

49 See Chauleur, P.: L'Afrique Industrielle, op cit.

50 Refer to Middle East and North Africa, 1980 (edited by Europa Publications Limited, London) pp 234 & 235.

51 Schnetzler, J.: Le Developpement Algerien (Masson, France, 1981) p 66.

52 Benissad, M.E.: L'Economie Algerienne Contemporaine (PUF, Paris, 1980) p 15.

53 Ibid.

54 Refer to Bouzidi, A.: la Planification des Investissements en Algerie, RASJEP, special 20eme anniversaire, Algiers, 1982, p 251.

55 Constantine Plan 1959-61. See Benamane, A.: The Algerian Development Strategy and Employment Policy, op cit. for more details.

56 See La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. pp 365-368.

57 As Table A.2 in the Appendix A indicates.

58 As defined by Algerian statistical breakdowns, the industrial sector includes the production, transportation and transformation of hydrocarbons (petroleum and natural gas), the production of non-hydrocarbon materials, the production of energy (electricity and industrial and

household use of natural gas), manufacturing and coonstruction and public works. This definition of the industrial sector will be adopted in this thesis.

59 See Table A.2 in the Appendix A.

60 Ibid.

61 Data collected during the interviews in the MPAT.

62 For a number of reasons it is difficult to precisely evaluate economic growth at current and constant prices. Statistical data and the conclusions drawn from them should be taken as indicative rather than as precise measures of changes occurring over any period. This caution should be kept in mind for almost all the figures which are given in this thesis.

63 Refer to Table A.3 in the Appendix A.

64 As Tables A.3 and A.5 in the Appendix A indicate.

65 At an official rate of 3.972 AD to US$.

66 La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 55.

67 Output equals VA minus government services.

68 All the following figures should not be regarded as exact figures, but only as estimates, since various published reports show different results and figures in the composition of the sources of finance in the various plans.

69 Frieden, J.: Third World Indebted Industrialisation: International Finance and State Capitalism in Mexico, Brasil, Algeria and South Korea, International Organisation, Vol. 81, Summer 1981, pp 423- 425.

70 Refer to La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 284.

71 As Table 1.11 indicates.

72 Refer to Freiden, J.: Third World Indebted Industrialisation: International Finance and State Capitalism in Mexico, Brasil, Algeria and South Korea, op cit. p 424 and Table 1.14.

73 In October, 1975, Algeria contracted from a 46 bank consortium (American, Europeans, Japanese and Arabian) one of the most important loans of US$ 400 million. This figure was quoted in Raffinot, M. and Jaquemot, P.: Le Capitalisme Algerien, op cit. p 163.

74 An incomplete list of borrowed capital can be found in Attal, A.A.: Financing Economic Development in Algeria 1967-77, op cit. and in Benhouria T.: L'Economie de L'Algerie, op cit. pp 307-310 which illustrate the different sources of the external public foreign debt.

75 See Said Amer, T.: Le Developpement Industriel de L'Algerie: Bilan de L'Industrialisation, op cit. pp 67-74.

76 Attal, A.A.: Financing Economic Development in Algeria 1967-77, op cit. pp 333 & 349.

77 1983 World Development Report, World Bank, op cit.

# CHAPTER TWO : THE ALGERIAN INDUSTRIAL SECTOR

In this chapter we intend to assess the stage of development reached by the Algerian industrial sector. This is not meant to be an exhaustive balance sheet of the performance of the industrial sector. It is only proposed to show the main orientation of the Algerian development effort. We will first deal with the industrial sector at the eve of independence, as we want to estimate its contribution to the Algerian economy at that time and to assess the transformation and development accomplished since then. The analysis of the most important branches of industry, based on the international standard industrial classification of 1968, will follow the discussion of the Algerian industrial sector in the late 1970's.

## 2.1. The industrial sector in 1962

The colonial Algerian economy was based on the agricultural sector and exports because Algeria was considered to have an agricultural calling. In the Algerian economy, wine and citrus products played a similar role to cotton in the Egyptian economy. Consequently the industrial sector was very limited. The few firms that existed in 1962 had been built only because of the seclusion of Algeria from France during World War II. These industrial settings (1) consisted of a few import substitution industries and public utilities (electricity, gas and railway industries). The main industrial equipment at that time belonged to the colonial public sector. Most of the import substitution industries were of modest size and specialised in the final transformation of products. These were tied to the mining industry, construction materials (steel and cement works, plaster, tiles and brick work), light chemicals, electrical and vehicle assembling and food firms (i.e., wines, alcohol and beer plants, fish, fruit and vegetable canning firms and flour and semolina pasta mills) (2). Some plants were still under construction as part of the Constantine plan (3). Algeria also inherited two oil pipelines, a substantial road network and airport, port and housing infrastructure.

As indicated in Table 2.1, the contribution of the Algerian industrial sector to GDP was small. At the time of independence the Algerian economy was dominated by the agricultural sector and services. In 1962, the industrial sector contribution to GDP increased slightly with the exploitation of hydrocarbons. In 1962 the hydrocarbon sub-sector contribution to GDP and to the industrial sector VA was higher than in 1959. The hydrocarbon industries constituted half of total export earnings (4) and accounted for 15.8% of GDP (5). The manufacturing sub-sector contribution to industrial sector VA and to GDP was also small (see Table 2.2). Almost one third of the manufacturing sub-sector contribution to VA came from craftwork and small manufacturing (see Table 2.2).

The branches that contributed the most to the manufacturing sub-sector VA were the agricultural and food industries, the electrical and mechanical engineering industries and the textile and leather industries (see Table 2.2). In the mechanical and electrical industries and in the agricultural and food industries the craftwork contribution was especially high. The steel, petrochemical, fertiliser and instrument industries were not at all developed.

A comparison of the contribution of each industrial branch to the industrial VA between Algeria and developed countries (6) confirms the above conclusions. The different figures given in Table 2.3 show clearly that, in the case of Algeria,

Table 2.1: The contribution of different sectors to GDP

(millions of AD at current prices)

| Sectors | 1959 | per cent | 1962 | per cent |
|---|---|---|---|---|
| Agriculture | 2,685 | 24 | 2,314 | 23.3 |
| Industry | 3,060 | 27.5 | 3,903 | 39.5 |
| -Hydrocarbons | 220 | 1.98 | 1,560 | 15.7 |
| -Manufacturing ind. | 1,520 | 13.7 | 1,332 | 13.4 |
| Services | 5,355 | 48.2 | 3,665 | 37 |
| Total GDP | 11,100 | 100 | 9,903 | 100 |

Source: Amin S. : L'Economie du Maghreb (Les Editions de Minuit Paris, 1966) p 266.

Table 2.2: The contribution of different industrial branches

to industrial sector VA (millions of AD at current prices).

| Branches of industry | 1959 | per cent | (1) | (2) | 1962 | per cent | (1) | (2) |
|---|---|---|---|---|---|---|---|---|
| Mining | 121 | 3.9 | | | 121 | 3.1 | | |
| Energy | 200 | 6.5 | | | 218 | 5.5 | | |
| Petroleum | 220 | 7.1 | | | 5,560 | 40 | | |
| Manufacturing industries | 1,520 | 49.7 | 72 | 28 | 1,332 | 34 | 72 | 28 |
| -Mechanical & electrical | 386 | | 52 | 48 | 357 | | 53 | 47 |
| -Construction materials | 156 | | 83 | 17 | 135 | | 85 | 15 |
| -Chemical & rubber | 92 | | 87 | 13 | 106 | | 90 | 10 |
| -Agricultural & food | 541 | | 83 | 17 | 477 | | 82 | 18 |
| -Textile & leather | 152 | | 33 | 67 | 161 | | 56 | 44 |
| Construction and public works | 999 | 32.6 | | | 672 | 17.2 | | |
| Total industrial sector | 3,060 | 100 | | | 3,903 | 100 | | |

Source : Ibid Table 2.1, pp 262 & 266.
1 Large and medium manufacturing as a percentage of the industrial branch contribution to VA.
2 Small manufacturing and craftwork as a percentage of the industrial branch contribution to VA.

the craftwork and small manufacturing industries' contribution was high while that of the large manufacturing industries was lower than those in developed countries. It should be noted that, with the increase in oil production, the contribution of petroleum production to the industrial sector VA increased tremendously. This is in contrast to the non-existent petroleum contribution in the developed countries .

The weakness of the industrial sector reflected the lack of investment by indigenous and European populations in this sector. Up to 1955 only 11.9% (7) of GDP was invested, with only 36% of this investment going to investment going to the manufacturing sub-sector (8). In 1961 investment increased to 38% of GDP. Despite this large increase, most of the investments were allocated to the hydrocarbons, housing, agricultural and infrastructure sectors.

At independence, Algeria inherited a small and weak industrial sector which was further weakened by the sudden and massive departure of the European colony.

### 2.2.The industrial sector in the late 1970's

Since independence the government has paid particular attention to the industrialisation of the country following the "industrialising industry" strategy (see part 1.1). The main objectives have been to establish certain basic industries, such as steel and chemical industries, which take advantage of Algerian natural resources. Sizable investments have been made and a thousand plants organised into public enterprises have been built (9). A large effort has been made in the steel, electricity, construction materials, petrochemical, gas and petroleum branches. The processed food sub-sector has benefited from this effort too, but to a much

Table 2.3: The contribution of each industrial branch to industrial VA in percentages

| | Algeria 1959 | Algeria 1962 | Developed countries |
|---|---|---|---|
| Mining | 3.9% | 3.1% | 5 to 10% |
| Energy | 6.5% | 5.5% | 2 to 4% |
| Petroleum | 7 % | 39.9% | |
| Craftwork and small manufact. | 14.7% | 16 % | 5 to 10% |
| Large manufacturing | 38.8% | 40.8% | 67 to 75% |
| Construction and pub. works | 32 % | 17.2% | 12 to 15% |

Sources: Table 2.1 and Temmar, H.: Structure et Modele de Developpement de L'Algerie, op cit.

Table 2.4: Public enterprises under ministry responsibility

| Ministry of Energy and Hydrocarbons | Ministry of Heavy Industries | Ministry of Light Industries |
|---|---|---|
| SONATRACH and its subsidiaries.<br><br>SONELGAZ: Electricity and gas. | SONAREM and Alrem :mining.<br>SNS, Genisider, Sidal, Realsider: iron and steel.<br>SONACOME and Almo: mechanical engineering.<br>SONELEC: electric and electronic engineering.<br><br>In project: CEMAL, SONARIA (engineering design & implementation). | SOGEDIA:Sugar,fats oil,conserves,juices.<br>SNEMA:Mineral water carbonat drinks.<br>SN SEMPAC:Processing of cereals.<br>SNTA:Tobacco & matches<br>SNLB: Wood furniture<br>SONITEX:Textiles.<br>SONIPEC:Tanneries & shoes.<br>SNIC:Light chemicals.<br>SONIC:Pulp & paper.<br>SNAT:Handicrafts.<br>SNMC:Construction materials.<br>INPED & SNERI: Consulting, training and design. |

Source: Survey data.

lesser extent. Apart from hydrocarbon products, no other exports have received immediate emphasis. Output is directed towards the satisfaction of domestic demand.

The Algerian industrial sector is characterised by a large hydrocarbon sub-sector. Accordingly, the Algerian industrial sector can be divided into two distinct sub-sectors: the hydrocarbon sub-sector which is mainly export oriented and the rest, which is composed of import substitution industries.

### 2.2.1.General analysis of the industrial sector

#### 2.2.1.1.Industrial organisation

Three ministries are in charge of the industrial public sector. These are the Ministry of Energy and Hydrocarbons, the Ministry of Heavy Industries and the Ministry of Light Industries. Each ministry supervises and often directly intervenes in the management of individual public enterprises belonging to its corresponding sector. The ministries themselves are supervised by higher authorities. Each ministry is divided into a number of departments which may be specialised according to a particular branch of industry (e.g., textiles within the Ministry of Light Industries). Public enterprises are, as a rule, subordinated to a branch of the supervising ministry.

The activities of the Ministry of Energy and Hydrocarbons extend to exploration and drilling, the production and transport of raw materials (hydrocarbons), liquefaction and refining, the production of fertiliser and petrochemical products (heavy chemicals) and the production of electricity. In addition, it is involved in international marketing of hydrocarbons and their derivatives as well as domestic marketing of electricity, gas and petroleum derivatives. Services, research and work associated with the above mentioned spheres of action are also part of its activities.

The involvement of the Ministry of Heavy Industries can be divided into four main activities: the research and exploitation of mining resources except hydrocarbons; first stage processing of ferrous and non ferrous compounds such as metallic construction, mechanical, electrical and electronic engineering; the design and production of industrial equipment and finally services, research and work associated with the above mentioned spheres of action.

The activities of the Ministry of Light Industries cover large fields extending from food and agro-industry, tobacco and matches, textiles and ready to wear, leather and shoes to light chemical industry, wood, cork, paper and cardboard, traditional crafts and construction materials. Finally, it is also involved in services, research and work associated with its activities.

In 1980, the main public enterprises were arranged under the responsibility of the three mentioned ministries as shown in Table 2.4. All public enterprises and plants are totally owned by the state except for a few exploration, consulting and processing plants (e.g., Alrem, Genisider, Realsider, Sidal, Cosider and Almo) which are at least 51% state-owned.

In 1980 plans were made to restructure all public enterprises. The restructuring process should be accomplished by 1988 and public enterprises divided as shown in Appendix B.2. This restructuring affects the various public enterprises in different ways. For instance, SNS, SNMETAL and SONATRACH were divided according to the types of activities which develop quasi-contractual relationships among themselves. On the other hand, SONACOME was restructured into largely autonomous divisions based on families of products.

2.2.1.2.The industrial gross domestic product

From 1969 to 1980, GDP at current prices generated by the industrial sector grew from 8.12 billion AD to 88.38 billion AD (see Table 2.5). For the whole period the average annual rate of growth amounted to 26.25%, a higher rate than that of GDP, 20%. The rate of growth of the industrial sector was 21.3% during the 1970-73 plan, 13.8% during the 1974-77 plan and 33% during the 1978-80 period.

The relative importance of the GDP generated by the industrial sector compared to that of other sectors has increased (10). One may add that within the industrial sector, the contribution to GDP from various sub-sectors of industry changed. This is clearly illustrated by Table 2.6.

The importance of hydrocarbons increased sharply, while that of the manufacturing industry and construction and public works declined slightly. Meanwhile, the industrial sector played an important role in the growth of GDP.

2.2.1.3.Industrial investment

The key role assigned to industry by the Algerian development strategy is confirmed by the investment goals of the various plans as indicated in Table 1.3. The industry share reached more than 43 per cent of total planned investment in the various plans. This emphasis is in fact apparent from the structure of actual investment in industry during the same periods (more than 53% of total investment). As indicated in Figure 2.1, this investment was unequally distributed among the various branches of industry. The largest share went to the hydrocarbon sub-sector and to the mechanical and electrical engineering industries. The number of plants achieved in each plan by branch of industry is as

Table 2.5: GDP, industrial GDP and the annual rate of growth of GDP and industrial GDP (AD at current prices)

| | 1969 | 1980 | 1969-80 |
|---|---|---|---|
| GDP | 21.05 bil. | 154.8 bil. | |
| Rate of growth of GDP | | | 20% |
| -Industrial sector GDP | 8.12 bil. | 88.38 bil. | |
| -Rate of growth indus.sec. | | | 26.25% |

Sources: Tables A.3 and A.4 in the Appendix A.

(bil. is for billion)

Table 2.6: The contribution to GDP at current prices (in percentages)

| Sector and sub-sectors | 1969 | 1980 |
|---|---|---|
| GDP industrial sector | 38% | 57% |
| -Hydrocarbons | 14% | 32% |
| -Manufacturing | 13% | 11% |
| -Construction | 9% | 12% |

Source: Table A.5 in the Appendix A.

Table 2.8: Industrial value added in billions of AD

| Sectors and sub-sectors | VA 1967 | VA 1979 |
|---|---|---|
| Current prices: | | |
| Industrial sector | 6.36 | 66.15 |
| -Hydrocarbons | 2.58 | 33.7 |
| -Manufacturing industries | 2.05 | 14.28 |
| 1978 prices: | | |
| Industrial sector | 23.11 | 55.83 |
| -Hydrocarbons | 14.18 | 25.02 |
| -Manufacturing industries | 3.93 | 13.43 |

Sources: Tables A.3 and A.6 in the Appendix A.

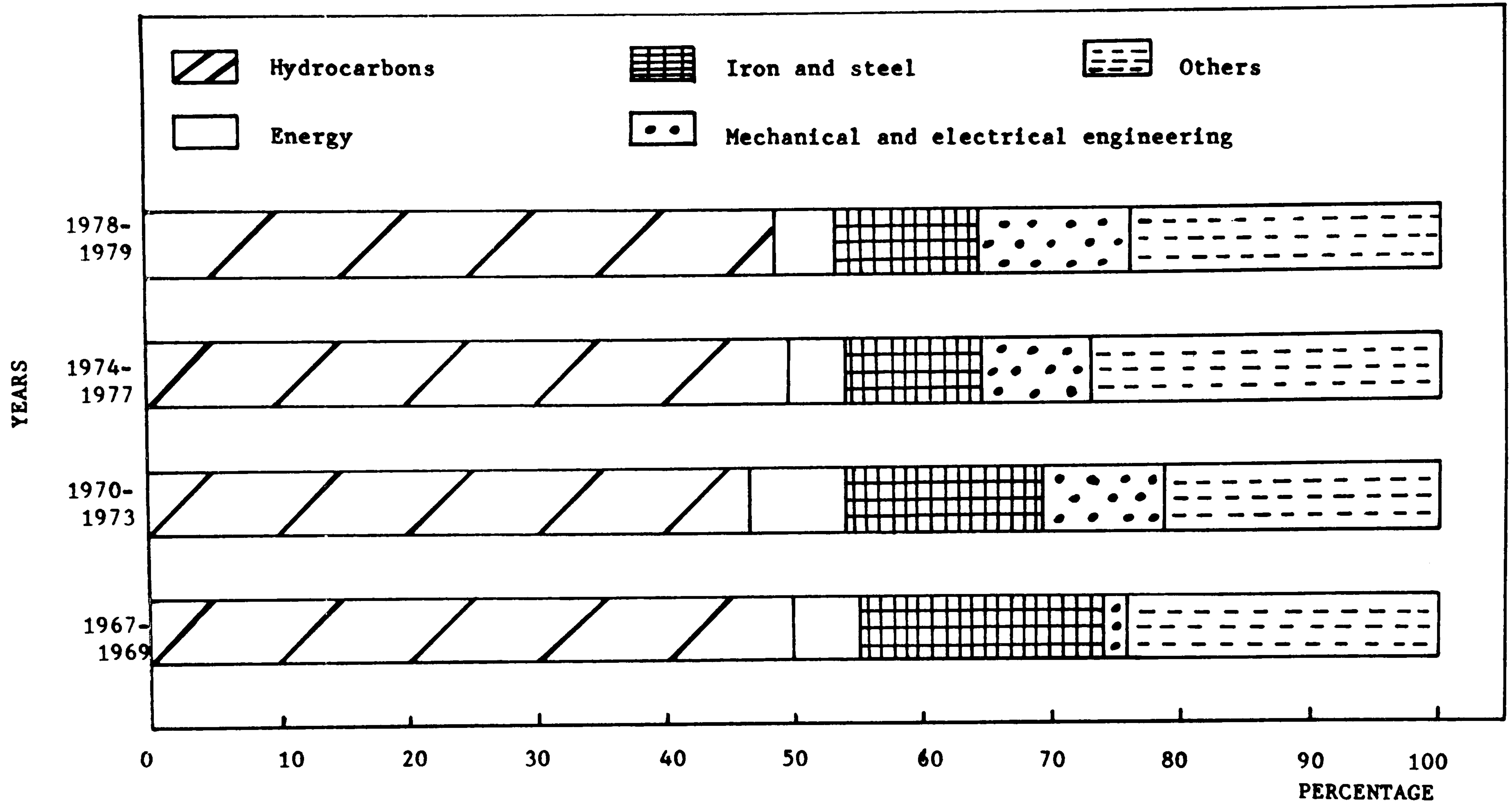



Figure 2.1 : Evolution in percentage terms of major industrial investment 1967-79.

Source : Table B.1 in the Appendix B.

illustrated in Table 2.7.

2.2.1.4. Industrial production

In spite of the substantial investment allocated to the industrial sector, the evolution of industrial VA has been relatively slow. VA for the industrial sector and main sub-sectors are given in Table 2.8. For the 1967-79 period the hydrocarbon sub-sector VA in real terms (at 1978 prices) increased by a factor of 1.76, at an average annual rate of 9.32%, and the manufacturing sub-sector VA rose by a factor of 3.4, at an average annual rate of 11%. It can be seen from Table 2.9 that the average annual rate of growth of VA for both the hydrocarbon and manufacturing sub-sectors passed through a minimum for the 1974-77 period. Up to 1977 the rate of growth of manufacturing sub-sector VA was consistently lower than that for the industrial sector. Since 1978 it has risen more rapidly. Value added has risen more rapidly in certain branches of the industrial sector: construction materials (average rate of growth over the period was 18.57% a year), the metal industry (18.32%) and energy (18%). The lowest average rate of growth was recorded for the agricultural and food industries (8.22%). Between 1970 and 1979 the VA for some branches of industry increased steadily while that of most of the others decreased. For example, the VA for the metal and construction materials industries rose steadily while the VA for the chemical, wood and paper industries and agricultural and food industries declined constantly. During the 1978-79 period this increase was more rapid in the key industries: construction materials, textiles and leather, iron and steel and mechanical and electrical engineering industries.

Table 2.7: Industrial projects realised

from 1967 to 1979 and to be realised at the end of 1979

| Industrial branches | 3-year plan 1967-69 | | | 4-year plan 1970-73 | | | 4-year plan 1974-77 and interplan 1978-79 | | | Projects being realised at the end 1979 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Projects larg.& med. | Exten-sion | Small projects | Projects larg.& med. | Exten-sion | Small projects | Projects larg.& med. | Exten-sion | Small projects | Projects larg.& med. | Exten-sion | Small projec. |
| Hydrocarbons | - | - | - | 15 | - | - | 25 | 4 | 1 | 28 | 5 | 1 |
| Electricity | - | - | - | 8 | - | 1 | 20 | - | - | 9 | - | - |
| Mining | - | 1 | - | 7 | - | - | 3 | 1 | - | 6 | 1 | 3 |
| Iron and steel | 2 | - | - | 3 | 3 | - | 11 | 2 | - | 13 | 2 | - |
| Mech.& elec. eng. | - | 4 | - | 5 | 9 | - | 18 | 10 | - | 11 | 3 | - |
| Chemicals | - | - | - | 8 | - | 2 | 11 | 2 | 11 | 28(1) | 2 | 1 |
| Construct. materials | - | - | - | 4 | 6 | - | 40 | 7 | 6 | 27 | 4 | - |
| Agric.& food industry | 1 | - | - | 17 | 2 | 2 | 16 | 6 | 6 | 70 | 7 | 2 |
| Textiles | 2 | - | 3 | 2 | - | - | 4 | - | 2 | 19 | 1 | - |
| Leather | 2 | - | - | 1 | 1 | - | 4 | 1 | 1 | 3 | - | - |
| Wood, paper & misc. | - | - | - | 1 | 2 | 1 | 12 | 4 | 1 | 24 | 3 | 2 |
| Local & craft ind. | - | - | 7 | - | - | 30 | - | - | 78 | - | - | 578 |
| Total | 7 | 5 | 10 | 71 | 23 | 36 | 164 | 37 | 106 | 248 | 28 | 587 |
| Total excl. Hydroc. | 7 | 5 | 10 | 56 | 23 | 36 | 139 | 33 | 105 | 220 | 23 | 586 |

Source: Ministry of Planning.

1 Including 11 large and medium projects in petrochemicals.

Table 2.9: Average annual rate of growth of industrial VA in real terms (at 1978 prices)

| Sub-sectors & branches | 1967-1969 | 1970-1973 | 1974-1977 | 1978-1979 | 1967-1979 |
|---|---|---|---|---|---|
| Hydrocarbons | 8.9 | 10.41 | 4.38 | 8.60 | 11.18 |
| Water & energy | 13.03 | 14.12 | 24.64 | 9.42 | 17.94 |
| Mining | 15.25 | 6.73 | -2.11 | -0.31 | 8.34 |
| Iron & steel,mech. & elec. engineer. | 23.25 | 5.72 | 10.17 | 24.94 | 18.32 |
| Constr.materials | 21.63 | 0.89 | 23.7 | 43.75 | 18.57 |
| Agri.& food ind. | 10.54 | 13.32 | 3.09 | -5.5 | 8.22 |
| Textiles & leather | 6.39 | 12.53 | 0.28 | 31.85 | 14.15 |
| Chemic.,wood,misc | 13.6 | 14.29 | 10.81 | -10 | 9.12 |
| Subtotal Manufac.sub-sector | 12.82 | 9.30 | 6.43 | 11.11 | 11 |
| Const.& pub work. | 9.43 | 6.23 | 11.07 | 19.83 | 9.94* |
| Petro. pub works | 25.64 | -1.34 | 23.41 | 5.46 | 13.9* |
| Total indust sect. | 10.74 | 24.95 | 11.75 | 10.72 | 9.32 |

* 1967-78 period.
Source : Table A.6 in the Appendix A.

As Figure 2.2 indicates, the most important change that has occurred in the branch composition of the industrial VA has been the steady growth of the manufacturing sub-sector (particularly iron and steel and mechanical, electrical engineering and construction materials) and the decline of the hydrocarbon sub-sector.

2.2.1.5.Industrial employment

Regarding employment, the period 1967-80 was marked by the creation of 360,000 industrial jobs (11) (including those in hydrocarbons but not those in construction and public works). As a result, the number of workers in industry increased by a factor of 4.35. The contribution from the various sub-sectors and branches varied widely as seen in Table 2.10. The hydrocarbon sub-sector employs a relatively small percentage of the total work force. Within the manufacturing sub-sector

Table 2.10: Industrial labour force (1000 jobs)

| Sub-sectors and branches of industry | 1967 | % | 1980 | % |
|---|---|---|---|---|
| Hydrocarbons | 7.3 | 6.74(2) | 92.4 | 10.25(1)<br>19.6 |
| Mines and quarrying | 12.1 | 11.17 | 24.2 | 2.68<br>5.14 |
| Electricty | 5.8 | 5.35 | 24.5 | 2.72<br>5.20 |
| Agricultural & food ind. | 20.2 | 18.65 | 64.2 | 7.12<br>13.64 |
| Textiles | 7.7 | 7.10 | 71.8 | 7.12<br>15.25 |
| Leathers | 7.3 | 6.74 | | |
| Chemicals | 6.3 | 5.81 | 32.8 | 3.64<br>6.64 |
| Construction materials | 7.5 | 6.92 | 27.7 | 3.07<br>5.88 |
| Iron and steel | 3.9 | 3.60 | 97 | 10.7<br>20.61 |
| Mechanical and elect. engi. | 15.3 | 14.12 | | |
| Wood, paper & miscellaneous | 14.9 | 13.75 | 36 | 4<br>7.64 |
| Manufacturing sub-sector | | | 329.5 | 36.58<br>70 |
| Construction & public works | ... | | 430 | 47.74 |
| Total industrial sector | ... | | 900.6 | |
| Total industrial sector without CPW | 108.3 | | 470.6 | |

Source: Table B.2 in the appendix B.

(1) The first line following each subsector or branch always indicates the percentage according to the total of the labour force in the industrial sector.
(2) The second line under each sub-sector or branch always indicates the percentage according to the total of the labour force in the industrial sector excluding construction and public works.

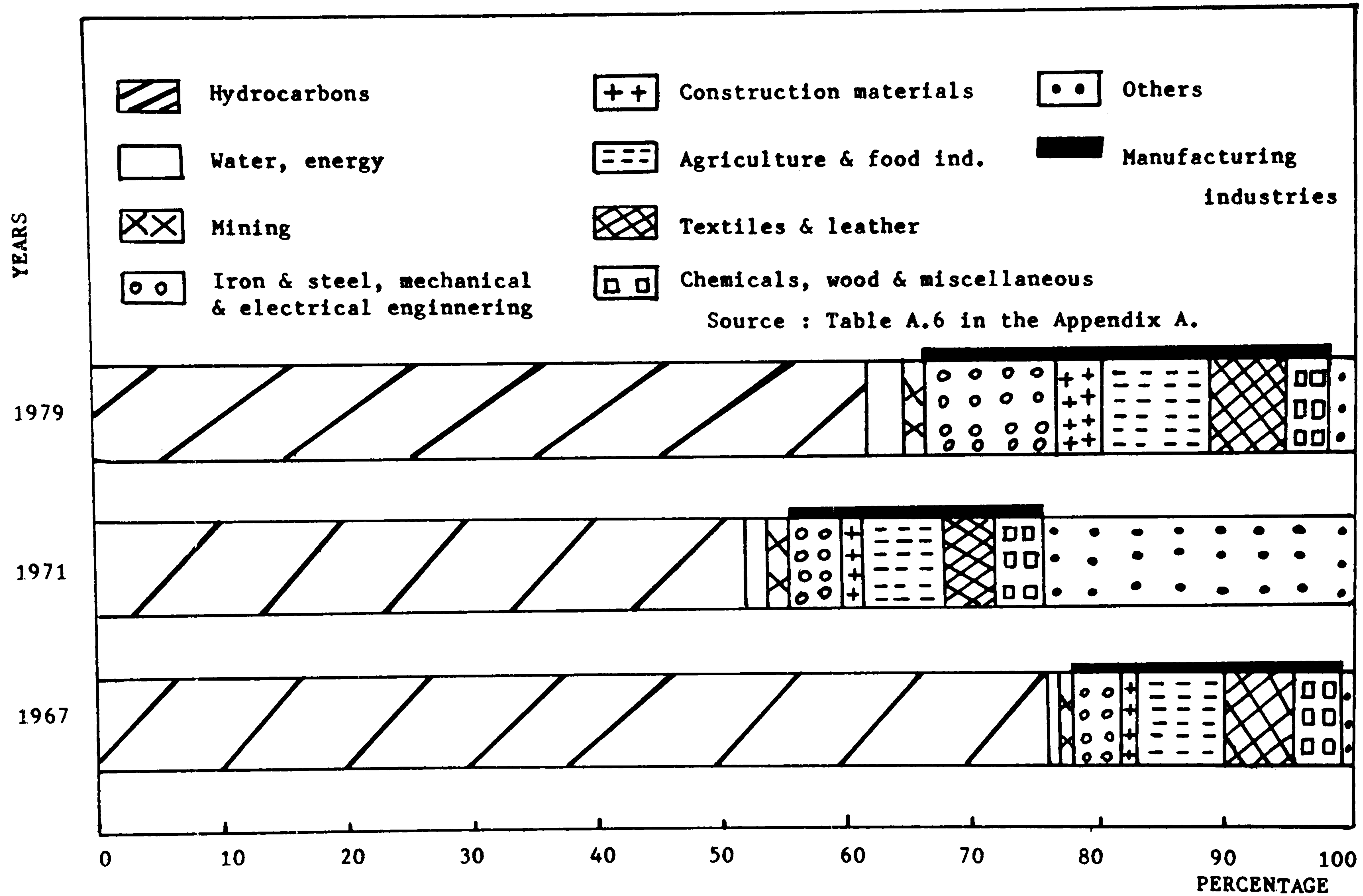



Figure 2.2 : Share of each branch of industry in total industrial value added (in real prices) 1967-1971-1979.

the agricultural and food industries employ the largest percentage of the total labour force. The light industries employ many more workers than the heavy industries or the hydrocarbon sub-sector.

From Table 2.11, it can be deduced that the highest employment growth rates are encountered in hydrocarbons, metal industries, chemicals, textiles and construction materials. Mining and wood, paper and miscellaneous industries showed an employment growth well below average. The chemical industry, the textile industry, the agricultural and food industries, the construction materials industry and energy showed accelerating employment rates of growth at the end of the period.

When comparing these data with the evolution of VA by branch and per person employed as illustrated in Table 2.12, two branches show an overall improvement in their work productivity. These are the energy and construction materials industry. In the other branches productivity declined sharply. This is particularly true of the textile and leather industries. Between 1967 and 1979 the overall tendency follows an irregular trend. The metal and construction materials branches followed a rapid recovery between 1977 and 1979.

2.2.1.6. Imports and exports

The rapid development of the industrial sector is also reflected in the evolution of imports. From 1967 to 1978 the total volume of imports rose at an average annual rate of 13.6%. The share of the industrial sector increased more rapidly, 15.1% on average, rising from 77% of the imports in 1967 to 89% in 1978, as indicated in Table 2.13 and Figure 2.3.

Table 2.11: Average annual rate of growth

of employment by planning period.

| Sub-sectors & branches of industry | 1967-1969 | 1970-1973 | 1974-1977 | 1978-1979 | 1967-1980 |
|---|---|---|---|---|---|
| Hydrocarbons | 18.2 | 26.34 | 23 | 4.25 | 21.56 |
| Electricity | 2.6 | 6.7 | 27.9 | 16.2 | 11.7 |
| Mining | 2.8 | 2.1 | 8.3 | 9.7 | 5.5 |
| Iron & steel,mecha. & elec.eng. | 14.8 | 18 | 11.56 | 7.6 | 13.73 |
| Construction materials | 8.3 | 24 | 13.2 | 16.2 | 10.6 |
| Agricult.& food indust. | 17.6 | 31 | 10.4 | 22.8 | 9.3 |
| Textiles and leather | 42.7 | 3.2 | 4.7 | 36 | 12.8 |
| Chemicals | 9.1 | 1.6 | 20.6 | 65 | 13.5 |
| Wood, paper & miscell. | 7.1 | 10.5 | 12.33 | 4.6 | 7 |
| Subtotal manufactur. sub-sector | 17.35 | 10.22 | 11.5 | 19.2 | 11.2 |
| Construction and public works | - | - | 25.25 | 0.9 | 12.4* |

* 1973-1980 Only.

Source : Table B.2 in the Appendix B.

Table 2.12: Average annual rate of growth of VA

per person employed in real terms (at 1978 prices)

| Sub-sectors & branches of industry | 1967-1969 | 1970-1973 | 1974-1977 | 1978-1979 | 1967-1979 |
|---|---|---|---|---|---|
| Hydrocarbons | -7.3 | -12.4 | -11.5 | -2.2 | -5.3 |
| Water,energy | 9.8 | 10.7 | 0.7 | 1.4 | 5.6 |
| Mining | 24 | 1.7 | -3 | 4.6 | 3.8 |
| Iron & steel/mechan. & elect.engineering | 7.5 | -5 | -4.5 | 32 | 2.1 |
| Construct. materials | 12.1 | -7.9 | 11.6 | 19.8 | 5.1 |
| Agriculture & food indus. | -4.7 | 8.7 | -4.6 | -5.5 | -0.8 |
| Textiles,leather | -19.8 | 6.3 | -3 | 2.6 | -2.4 |
| Chemicals & miscellaneous | 5.3 | 10.1 | -4.7 | -12 | -0.3 |
| Subtotal manufacturing sub-sector | -4.3 | 2.8 | -5 | 6.2 | -0.8 |
| Construction,public works | - | - | -2.8 | 9.6 | - |

Sources : Tables A.6 and B.2 in the Appendix A & B, respectively.

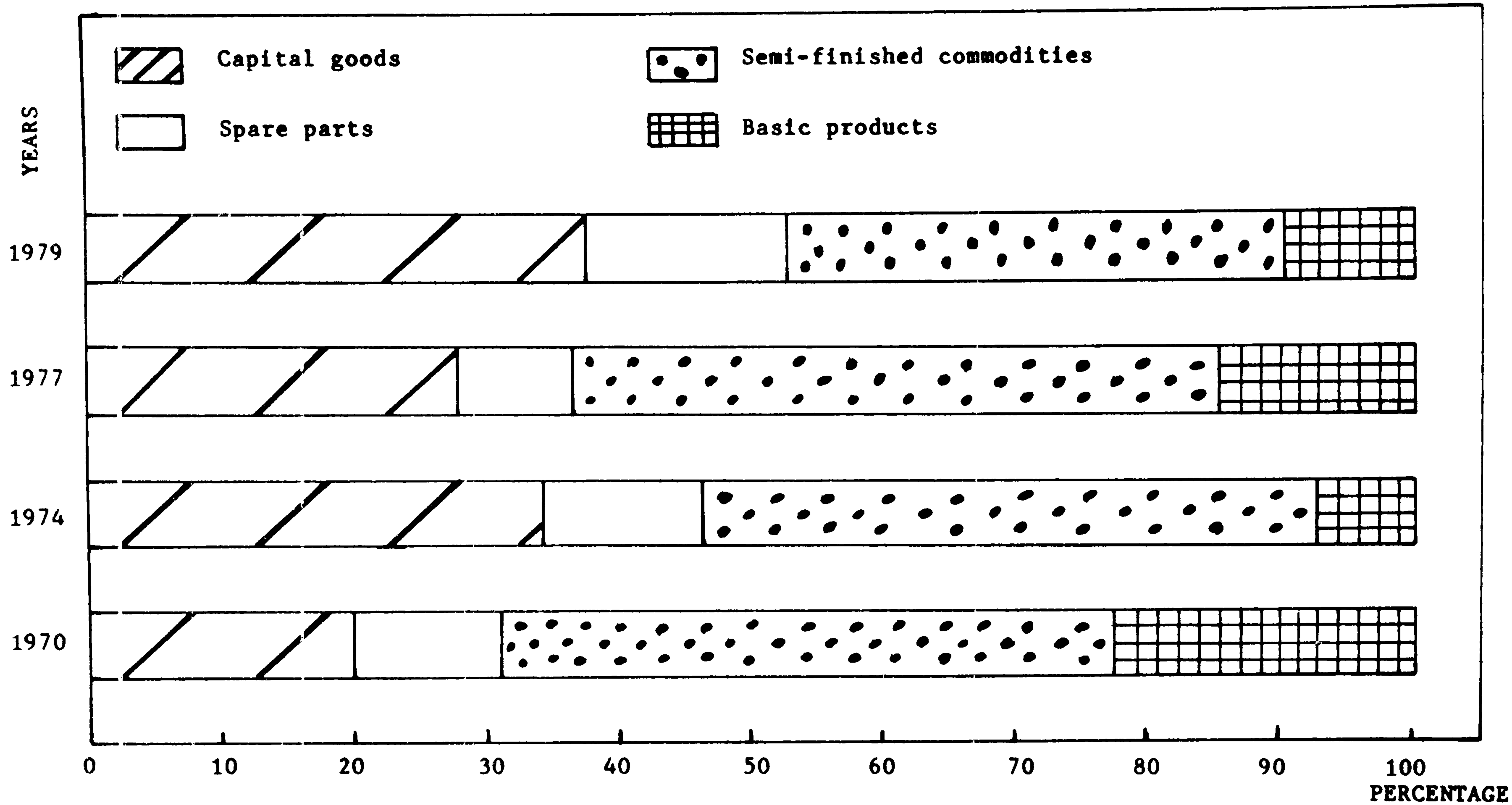



Figure 2.3 : Change in import structure within the industrial sector ( in percent ).

Source : Table B.3 in the Appendix B.

Table 2.13: Average annual rates of growth of main categories of industrial imports (in percentages).

| | 1967-70 | 1970-74 | 1974-78 | 1967-78 |
|---|---|---|---|---|
| Total imports | 18.2 | 17 | 7 | 13.6 |
| Industrial imports | 22.2 | 17.8 | 7.4 | 15.1 |
| -Food products | -17.3 | 45.2 | -2.5 | 7.7 |
| -Capital goods | 39.1 | 10.6 | 18.2 | 20 |
| -Semi-finished goods | 26 | 17.5 | 0.3 | 13 |
| -Primary commodities | 11.5 | 22.4 | 1.7 | 11.6 |

Source: Table B.3 in the Appendix B.

One can also notice differences within the industrial imports according to their nature. Food imports for the agricultural and food industries increased much more slowly (7.7%) than the rest of industrial imports (16.8%)(12). It should be noted, however that the rate of growth of food product imports reached the highest value, 45%, between 1970 and 1974. Between 1967 and 1978, imports of industrial goods machinery and transportation equipment increased at an annual rate of 20% and 32%, respectively (13). Imports of capital goods rose from 24% of the total in 1967 to 47% in 1978. These imports increased by a factor of eight. In contrast, imports of semi-finished intermediate goods other than food products rose less rapidly, at an average rate of 13%. Raw materials and basic products show the lowest average growth. Finally, the highest average rate of growth was recorded for capital goods imports. This rate was high during all periods although it decreased slightly (10%) between 1970 and 1974 after reaching a peak value of 39% for the period 1967-69.

In 1979, as indicated in Figure 2.4, Algerian exports consisted almost entirely of hydrocarbon products (crude oil, liquefied natural gas and some refined products: 97%). This can be contrasted with exports during the 1960's which were

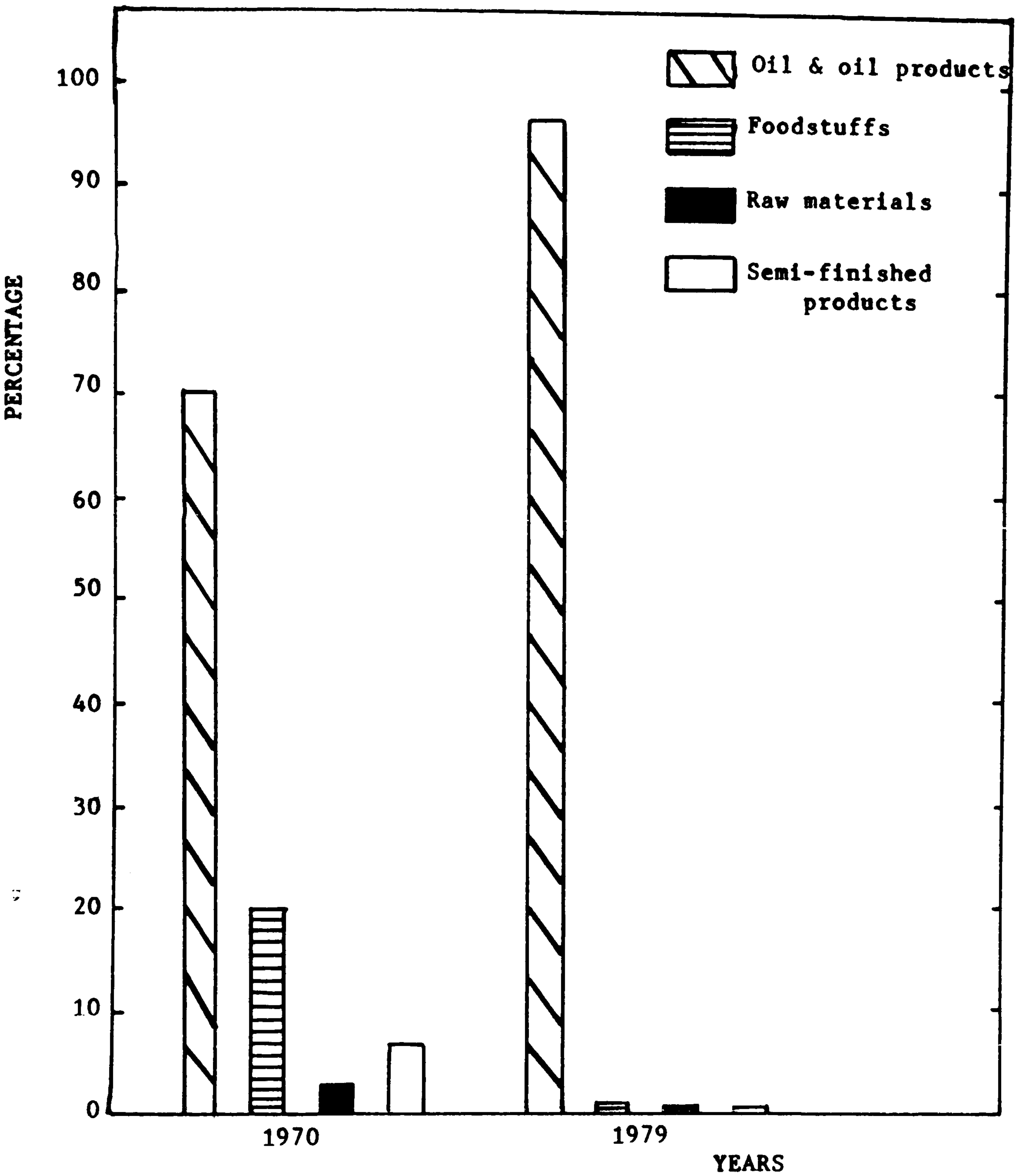



Figure 2.4 : Exports of major groups in percentages 1970-1979.

Source : Table B.4 in the Appendix B.

mainly agricultural and mineral goods. By 1970, exports were already dominated by oil and oil products. In 1979, foodstuffs, raw material and semi-manufactured goods accounted for only 1.2%, 0.7% and 0.5% of total exports, respectively. The rest (capital and consumer goods) accounted for less than 0.5% (14). Figures 2.5 and 2.6 indicate that the geographical distribution of trading partners is still unbalanced in favour of the Western Countries as opposed to the Socialist and Third World Countries.

The structure of imports and exports reveal different difficulties: Algeria's growing dependence on food imports and the creation of new dependency links on capital goods, intermediate products and spare parts for industrial machinery as well as technical assistance. The level of integration and self-sufficiency set by the Algerian government are far from being achieved. This may be attributed to the fact that the building and acquisition of new plants and the maintenance of existing capacity depend on the external supply of spare parts and technical assistance.

### 2.2.2. Analysis by branch of industry

#### 2.2.2.1. The hydrocarbon sub-sector

The hydrocarbon industry plays a major role in the country's regional and industrial development. The intensive activity of this sub-sector reflects the fact that Algeria is endowed with abundant hydrocarbon resources. The reserves of crude oil are less important than those of natural gas (see part 1.4). This sub-sector has a strategic position in the Algerian economy as it contributes to 97% of export earnings (see Figure 2.4). It constitutes the main source of finance of Algerian development (see part 1.7). In 1980, for example,

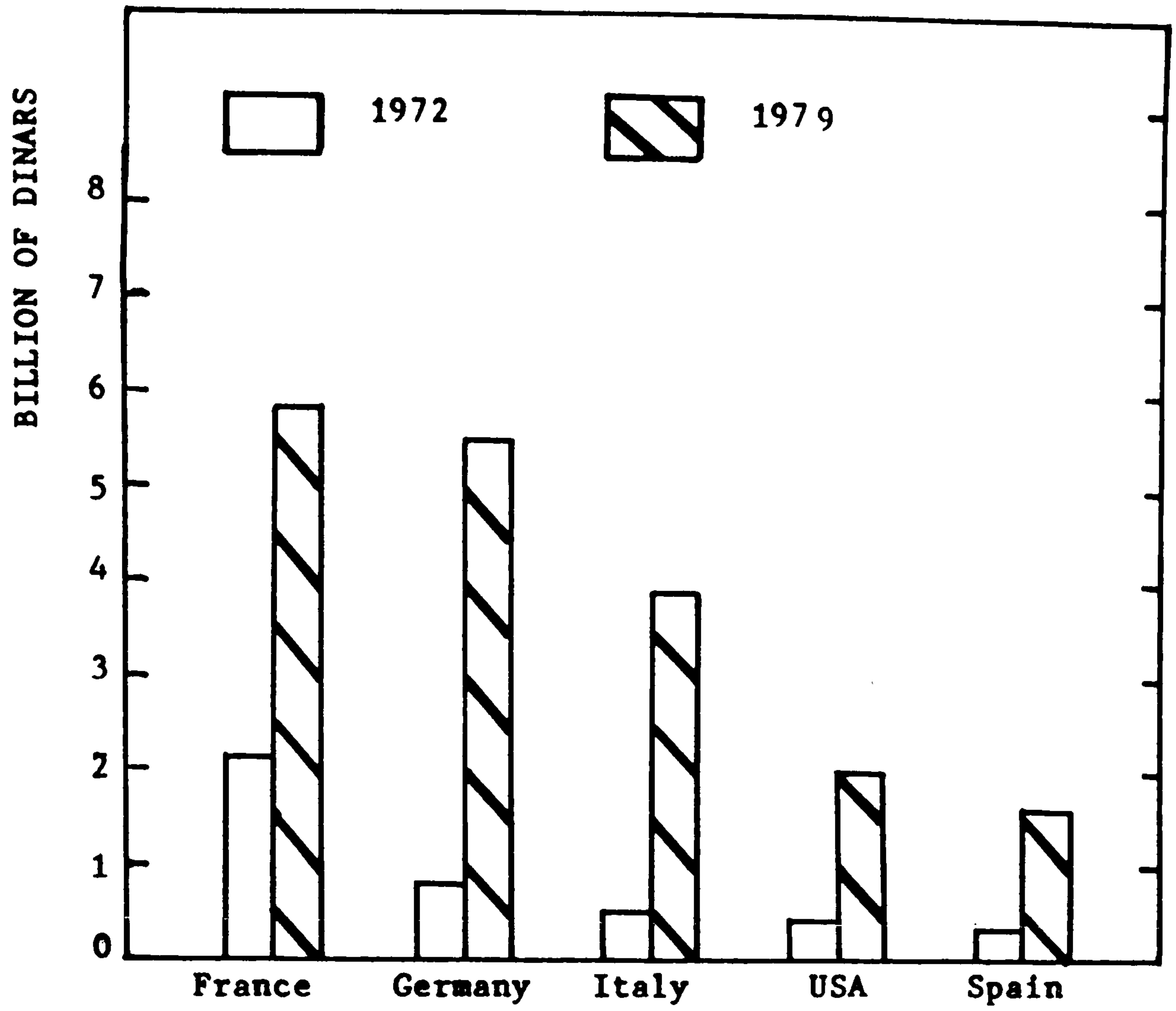



Figure 2.5 : Main import trading partners (c.i.f.).

Sources : Table B.5 in the Appendix B and Ministry of Finance, Direction des Douanes, Algiers.

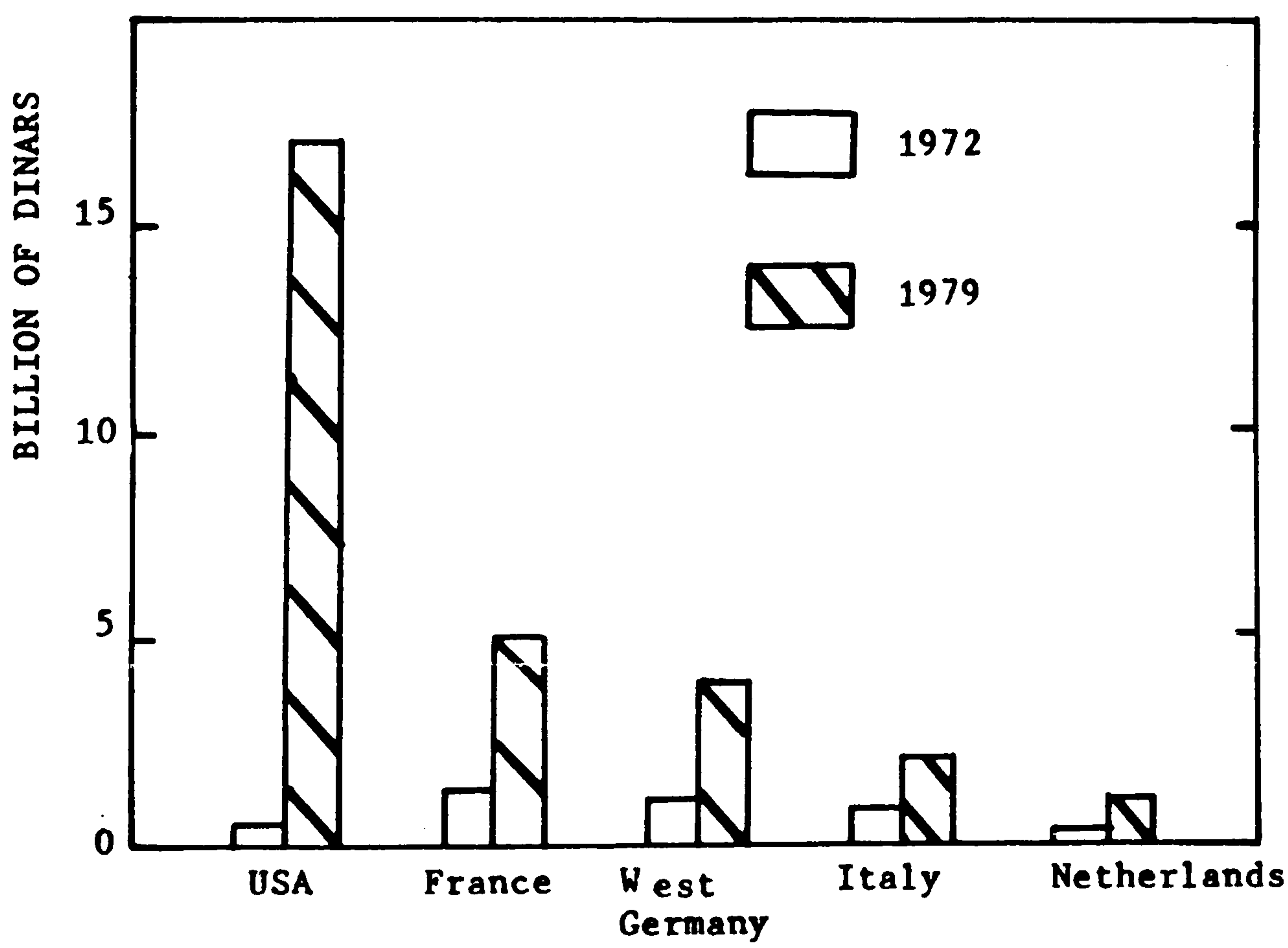



Figure 2.6 : Main export trading partners (f.o.b.)

Source : Ibid Figure 2.5.

it contributed 68% of the total tax revenues that financed different projects. The outputs of this sub-sector are used within the sub-sector (e.g., raw materials in petrochemical and fertiliser plants) and by other industrial branches or sectors as a source of energy and/or intermediate inputs. Outputs supplied by other industrial branches are also used by this sub-sector. The hydrocarbon sub-sector is considered to be a perfect example of an industrialising industry (see part 1.1) and thus is expected to stimulate industrial development.

The petroleum industry involved in the production of semi-finished and finished products is not well-developed. Activities such as the liquefaction of natural gas and the transport and distribution of hydrocarbons are significant. Crude oil and natural gas production capacities have only increased since the rapid expansion of this sub-sector in the early 1970's. In 1980 the production of crude oil and condensates reached 51.54 million tons a year (15) (including 4.32 million tons of condensates) and the production of natural gas was 21.38 (16) billion cubic metres a year (17).

The production of crude oil and natural gas, together with transportation and the refining, liquefying and processing stages (almost all the activities of the sub-sector) are controlled by one public enterprise: SONATRACH. SONATRACH, which is under the supervision of the Ministry of Energy and Hydrocarbons, is a large public enterprise which was created in 1963 (18). The nationalisation process of hydrocarbon plants and concessions which started in 1968 and ended in 1971 gave SONATRACH total control of all hydrocarbon plants with the exception of one small refinery (which is jointly owned with a foreign company (49%)). Exploration, on the other hand, is conducted by foreign companies which have only been allowed to invest in this sub-sector because of technological and financial constraints facing the Algerian government.

a. Refining and liquefying

Substantial refining and liquefying capacities have been acquired. The first refinery (Algiers refinery) was built before independence. Since then its capacity has been increased to about 2.7 million tons a year and five other refineries have been constructed. All the refineries except one, which is situated in the South, are located on the coast. In 1980, the total refining capacity was about 23.5 million tons a year with additional facilities in construction representing another 5.5 million tons a year. The refineries produce a full range of products, from lubricants (bitumen and naphtha) and liquefied petroleum gas (LPG) to all types of fuel including fuel oil, motor gasoline and diesel oil. This remarkable increase in production capacity was needed to supply domestic demand and meet the growing requirements of the petrochemical industry. For a number of years the refining capacity was sufficient to meet the domestic demand for petroleum products. More recently slight imbalances between domestic market requirements and refinery yields led to the exports of heavy products (e.g., diesel and residual fuel oil) and the imports of light products (e.g., gasoline). The first liquefied natural gas (LNG) plant was still in construction at independence. Since then three LNG plants and several extensions have been built. All the LNG plants are located on the coast near the ports (their entire production is exported). In 1982 the LNG capacity was 47.6 billion cubic metres a year with further capacity still under construction (19). The refineries and LNG plants are supplied by several pipelines (see Figure 2.7) from the oil deposits which are located inland in the Sahara Desert. Two of these pipelines were built before independence. The high cost involved in the liquefaction process and shipping has recently encouraged the use of other means of supplies to potential buyers such as underwater gas line links. One is at present in operation linking Algeria to Italy via Tunisia.

b. Petrochemical, fertiliser and plastic industries

The petrochemicals, fertiliser and plastic industries rely upon Algerian oil and gas resources. Their development has been given priority in the development plans. All the plants have been built after independence in the late 1970's. The main outputs are methanol, resins, ethylene, nitrogen fertilisers (ammonia and ammonium nitrate), phosphatic fertilisers (TSP, NPK) and plastic polymers (polyethylene and polyvinyl chloride (PVC)). These outputs are produced by 19 plants: 2 petrochemical, 4 fertiliser and 13 plastic plants. The heavy petrochemical plants are highly concentrated: the Arzew complex comprises two ammonia and ammonium nitrate plants for the manufacture of nitrogen fertilisers, and a methanol and a resins plant. The Skikda complex consists of plants producing ethylene and PVC. Annaba, which focuses on fertilisers, comprises an ammonia and ammonium nitrate plant--duplicating the second Arzew plant--and a phosphatic fertiliser complex. The petrochemical and fertiliser plants are located near the supply point on the Algerian coast while the plastic plants are widespread throughout the Northern part of Algeria. In 1979, the production capacity of petrochemicals was 368,000 tons a year of which methanol comprised 115,000 tons a year (20). In 1980 the production capacity of plastic was 78,000 tons a year and the production capacity of fertilisers was

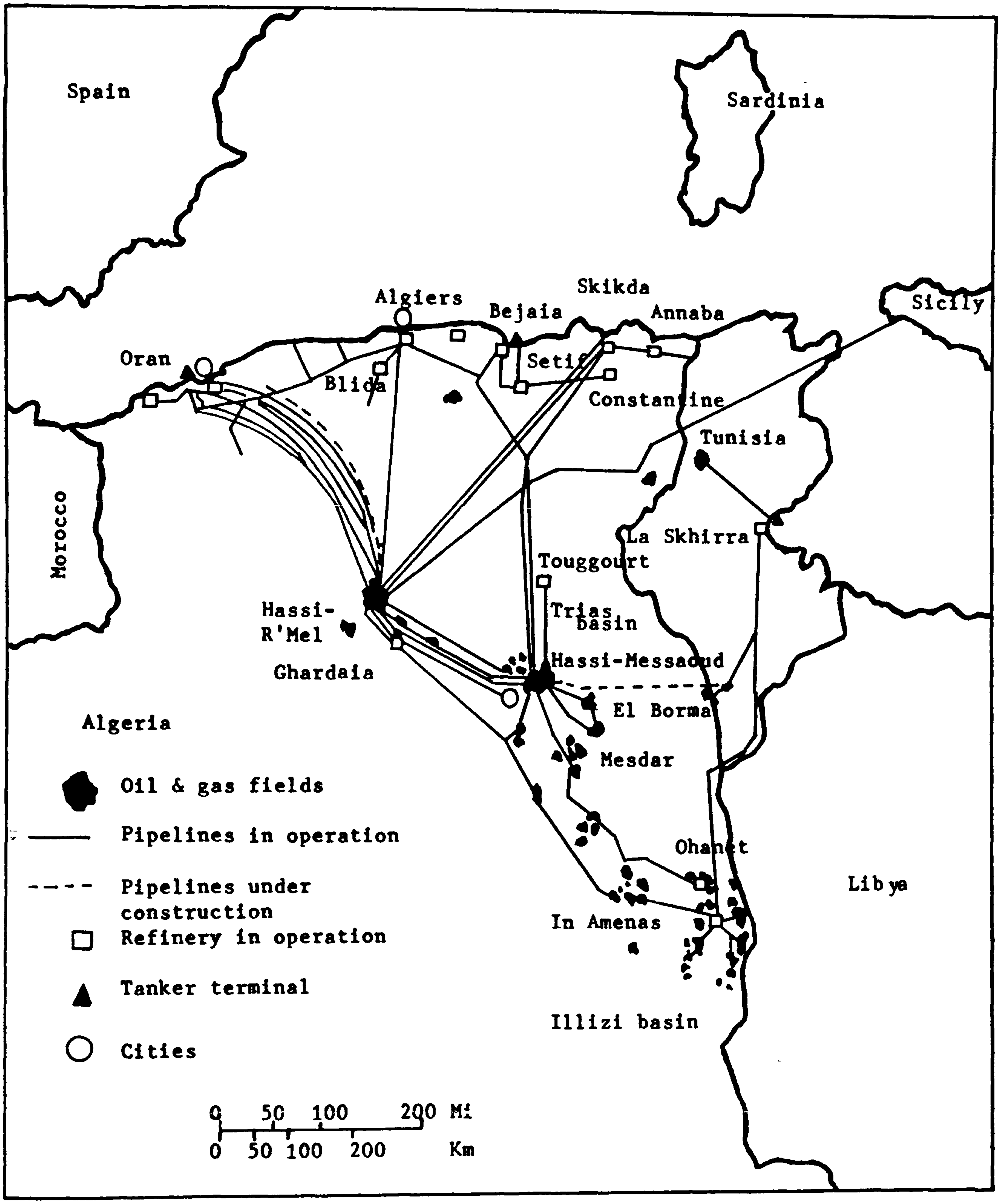



Figure 2.7 : Petroleum map of Algeria.

Sources : Le Monde Diplomatique of June 1978 p 28

and other sources.

1,309 tons a year (21). Since plastic production was just starting and the fertiliser industry encountered numerous problems, production in these industries was almost nil. To make up for this lack of production, fertiliser was imported to satisfy local demand. Work is underway to enlarge these plants and possible construction of additional plants are being considered, e.g., a polyethylene plant with a capacity of 80,000 tons a year and downstream processing plants manufacturing plastic products and tires.

The production of this sub-sector is mainly for export. This sub-sector uses only capital intensive technology which reinforces its links to and dependence on the international market (22). Despite all efforts, this sub-sector is not integrated. Large quantities of crude oil are still exported but non-refined exports have decreased while the quantity of refined exports has increased. The contribution from the hydrocarbon industry to GDP rose sharply after 1974 following the worldwide increase in oil prices (32% in 1980). It should be noted that this increase was largely due to the rising price of petroleum since production rose only slightly (23). The development of this sub-sector was given first priority and therefore received more investment during the implementation of the various plans than the other branches or sectors (as indicated in Figure 2.1). The substantial increase in investment was not followed by a similar increase in the VA. In fact the VA rose only from 2.58 billion AD in 1967 to 33.7 billion AD in 1979 (24). The hydrocarbon sub-sector contribution to the total VA, 61.9% in 1979, indicates clearly the importance of this sub-sector in the national economy.

Despite benefiting from the highest investment rate, the hydrocarbon sub-sector employs only a relatively small percentage of the total employed labour force. In 1977, for example, the hydrocarbon sub-sector employed only 2% of the total work force (25). These industries cannot be counted upon for the creation of much local employment because there are very capital intensive. Employment in this sub-sector increased by a factor of twelve. Its contribution to total employment in the industrial sector (excluding construction and public works) rose from 6.74% in 1967 to 19.6% in 1980. The sharp increase in employment recorded in this sub-sector is due to the replacement of departing expatriate personnel and to the operation of new installations. In addition, the productivity of this sub-sector is low (see part 1.6).

2.2.2.2.Energy and water

The energy branch became Algerian state property in 1962. It was taken over by EGA which was replaced in 1969 by SONELGAZ which is the only enterprise operating in the power sub-sector. This branch of industry, as opposed to the hydrocarbon sub-sector, represents a group of social public utilities directed towards the satisfaction of domestic demand. Between 1969 and 1979, 22 mainly gas turbine power stations were built (26). This added to the 4 steam power and gas turbine power stations which existed before 1969. In 1979 the total installed generating capacity in Algeria was estimated at about 1,882 megawatts, of which 3% was diesel, 15% hydraulic and 82% thermic. Nine additional plants were going on stream in 1980. In addition, the distributional capacity of gas was evaluated at 28,200 million thermis. Since independence the energy distribution network improved greatly with the nationwide installation of electric and gas pipelines. The production of electrical power increased by a factor of three. Similarly, in 1979 the number of consumers was 2.2 times that of 1969. Between 1967 and 1978 the final supply of gas in thermis increased by a factor of five. The number of cities supplied by natural gas increased to 64 in 1979 compared to only 14 in 1969. This shows the increasing domestic and industrial demand for energy as the standard of living rises and the industrial sector expands. Moreover, average energy consumption per capita increased from 252 kg of coal equivalent in 1960 to 687 kg of coal equivalent in 1974. This figure is slightly higher than the average figure for the Middle East and North Africa (545 kg of coal equivalent) but is much lower than that for Latin America and the Caribbean (1,055.9 kg of coal equivalent). In 1980 the per capita consumption of electricity was 335 kilowatts/hour which is about 19.5% of the world average, 30% of that of Brazil and 5.4% of that of Japan (27). Despite a concerted effort to strengthen this branch, the high industrial and consumer demand for electricity and gas is not fully met. This is especially true in high voltage electricity as will be illustrated later.

The spectacular growth in the number of energy stations resulted in a high rate of growth of VA. From 1967 to 1980, the energy branch experienced one of the highest rates of growth of VA in the industrial sector (28), 18%. From 1967 to 1977, energy production increased by a factor of 6 reflecting the large investments made. These varied between 4.8 and 7.3% of the total investment allocated to the industrial sector during the various plans. It should be pointed out that most of the investment allocated to energy and water industries was absorbed by the energy branch. Moreover, between 1967 and

1980 employment growth in the energy branch increased by a factor of 4.2. Its contribution to the industrial sector without construction and public works decreased slightly. The share of employment in the energy branch decreased from 5.35% in 1967 to 5.2% in 1980.

On the other hand the water industry, which did not benefit from similar investments, suffers from the aging network inherited at the time of independence. Consequently the increasing demand is not met. For example, only 77% of the population had access to safe water, 80% in urban areas and 40% in rural areas. This problem is particularly acute in the industrial sector, which greatly suffers from the shortage of water (this will be illustrated later).

2.2.2.3.Mining and quarrying

The development of natural resources has been given a high priority by the government in its efforts to develop a modern and industrialised economy. While petroleum resources are exploited intensively and are the main source of income for Algerian development programmes, other Algerian mineral resources are exploited at a much lower scale. Government policies specify that these resources (mining) should be used by domestic industries and not used as a source of foreign currency earnings. This can be clearly seen from the production and export figures of natural resources other than hydrocarbons.

Exploration, production and marketing of minerals other than hydrocarbons are controlled by a single public enterprise totally owned by the state: SONAREM. SONAREM was created after the nationalisation of the mining sub-sector in 1966 and is under the supervision of the Ministry of Heavy Industries. Before nationalisation, this branch was in the hands of foreign capital and was mainly directed towards export. Nowadays SONAREM exploits a large range of minerals. Among the most exploited are the light grade iron ore, phosphates, lead, zinc and antimony. In 1978, the capacity of production of iron was 3.9 million tons a year, the phosphate capacity was 1.4 million tons a year and the zinc capacity was 42,000 tons a year. The role of this branch of industry is to supply the domestic market whose needs in minerals have greatly increased since independence. The consumption of iron ore by local industries has increased gradually every year since independence particularly with the growth of a domestic steel and petrochemical industry. The iron ore of the Ouenza mine, for example, is expected to be totally used in 1999 by El-Hadjar complex (SNS) (29). Mineral production, which is not absorbed by the domestic market is still exported. This constitutes only a small proportion of total production and export earnings. For instance, in 1979, 3.5 million tons of minerals were exported contributing to only 0.7% of total Algerian exports (30). The development of this branch has not been encouraged by the government and therefore numerous Algerian deposits are not exploited. The exploitation of the Saharan deposit is expected to start with the future increase in manufacturing needs. Regarding exports, SONAREM has widely diversified its partners over the years (Japan, USSR, Rumania and Hungary, to name the most important). This can be contrasted with a single partner -France- before independence.

Production in the mining and quarrying branches rose during the first two plans, but it leveled off at the beginning of 1974. This is due to the conservation plan adopted by the government and to the exhaustion of some mines and quarries whose exploitation started before independence.

The development of mineral resources did not need large investments because no major development was planned. During the first two plans SONAREM received very little investment. This enabled it to almost triple its VA in real terms which rose to 395 billion AD from 1967 to 1973 (31). The 1980-84 plan does not include any particular decisions regarding the exploitation of newly discovered resources (iron and uranium ores). In real terms employment in this branch increased (i.e., the number of employed workers doubled over a 14 year period from 121,000 in 1967 to 242,000 in 1980). Its contribution to the industrial sector dropped from 11.1% in 1967 to 5.2% in 1980.

### 2.2.2.4. Iron and steel and metal, mechanical and electrical engineering

Iron and steel as well as metal, mechanical and electrical engineering, which were virtually non-existent in 1962, currently provide a fair range of products. The development of these branches has been largely motivated by the fact that they are industrialising industries and that Algeria has rich iron ore reserves. The iron and steel, and the metal, mechanical and electrical engineering branches are the core of the intersectorial integration process which is one of the main objectives of the Algerian development strategy. These branches of industry are dominated mainly by four public enterprises: SNS, SNMETAL, SONACOME and SONELEC. The private sector contribution to these branches of industry is small. Only a few small scale firms specialised in the production of finished products exist. The private sector employs an insignificant number of workers when compared to the public sector. Since 1962 SNS, SNMETAL, SONACOME and SONELEC have grown considerably. About half the plants were built after independence. The first Algerian steel complex, El-hadjar (SNS), was part of the Constantine plan and some plants in that complex started to produce in 1964.

In 1980, 37 plants belonged to SNS (13 other plants were going on stream) (32). Most of these are concentrated on the East coast of Algeria (in Annaba) and around Algiers and Oran (the two largest cities in Algeria). SNS is geared to the production of flat products including mainly cast iron (1.7 million tons a year) and steel (2.3 million tons a year), first stage rolling mills (hot and cold) and second stage facilities which manufacture a whole range of finished products such as seamless tubes, gas bottles, metal containers and kitchen utensils. Despite all these efforts, the iron and steel branch is not yet integrated.

SNMETAL is involved in metal engineering. In 1979 SNMETAL had 16 plants, 11 of which were built before independence. SNMETAL outputs range from holloware, wagons, industrial boilers and iron works (45,000 tons) and cranes (110 units) to metallic works (8,000 tons) (33). In fact, 77% of the semi-finished outputs produced by SNMETAL are used in the construction of projects. Consequently, SNMETAL is also involved in industrial engineering and civil engineering. SNMETAL produces more than 85% of the outputs of the metal engineering branch and employs more than 75% of the labour force in this branch (34). Only a few outputs (17,000 accumulators for example) are produced by the private sector. In 1980, the metal engineering branch production satisfied only 40% of domestic demand; the rest was supplemented by imports.

SONACOME is involved in mechanical engineering (the vehicle industry). SONACOME was created in 1967 and geared to the production of metal products. Its main outputs range from agricultural machinery and tractors, machine tools, combustion engines and buses to lorries and cycles. The mechanical components entering into the production of the above products are produced by SONACOME (at 70%). Among the 17 plants and complexes belonging to SONACOME (integrated at 70%), 4 were built before independence (35). At the present time the vehicle industry is specialised in the production of lorries and buses only. The automobile industry is not developed at all. Plans, however, have been made to develop this branch. The private sector has seen its contribution to this branch decrease during the past years. SONACOME controls 90% of the branch activity. This can be contrasted with the increase in the contribution of private firms relative to that of public enterprises in other branches. The private firms are small or medium size enterprises and often specialised in the production of a very limited number of finished products.

SONELEC, which was created in 1969, is mainly involved in electrical engineering. SONELEC is geared to the production of wires, cables and telephones (for example, 80,000 electric lines and 140,000 telephones and interphones), batteries, bulbs (23.6 million unit), refrigerators (300,000 units), air conditioners (150,000 unit), audio and video equipment (150,000 cassette players, 150,000 turntables, 50,000 color televisions and 190,000 radios) and gas cookers (15,000 unit) (36). The electronic and electric components entering into the production of the above products are produced by SONELEC. These outputs are mainly electrical appliances for domestic use. Among the 11 plants and complexes belonging to SONELEC, 5 were built before independence. The private sector in this branch (which accounts for the assembly of 36,600 black and white televisions) is almost non-existent.

SNS, SNMETAL, SONACOME and SONELEC were created in order to satisfy domestic demand and to acquire heavy and import substitution industries. In these branches the plants and complexes built after independence are all large scale. These are widely spread throughout the Northern part of Algeria. A large part of their inputs are supplied by the local market. A few inputs such as coke, some semi-finished inputs and the bulk of capital goods and spare parts are imported. For instance, 30% of the semi-finished products used by SONACOME are imported. The burden of imports (semi-finished goods in particular) is becoming very heavy, creating an incipient dependence of Algerian industry on external assistance. The various outputs are semi-finished inputs used within the industrial sector (public and private) and consumer products. Most of the outputs of the iron and steel branch are intended for construction and public works (flat products), since the vehicle industry just started to develop. The increasing domestic demand in long products is only met through imports. This is likely to be the case in the near future. It seems likely that these branches will develop further in the future.

The iron and steel and metal, mechanical and electrical engineering branches benefited from a large and sustained investment effort aimed at building a capital goods industry in addition to the hydrocarbon sub-sector. Most of the investment received by these branches came from public sources. Up to 1979, these branches absorbed the highest investment ratio in the manufacturing sub-sector. Despite all these efforts, the iron and steel and metal, mechanical and electrical engineering branches of industry are not integrated. Most of the semi-finished and finished products are still imported. The high investments were not immediately reflected in the VA of these branches, which increased slowly compared to the VA of investments made before 1977. The construction of various projects and the training of the work force ran into severe difficulties delaying the execution of the programmes and the build up of production. In fact, of the 63 plants and complexes that had started in these branches since 1967, 24 (38%) were not completed by 1979. Nevertheless iron and steel and metal, mechanical and electronic engineering growth has become far from negligible (see Figure 2.2). Their contribution to the industrial VA, which was only 3.6% in 1967, reached 10.1% in 1979. In real terms, the VA of these branches increased at an average annual rate of 18.3%, rising by a factor of 6 for the 1967-79 period, compared to a factor of 2.2 for that of the industrial sector without CPW.

Iron and steel and metal, mechanical and electrical engineering are likely to further develop with the construction of a second iron and steel complex at Jijel which will be geared to the production of long products (1.8-2 million tons of liquefied steel a year) supplying two to three mills which will produce rods and average sections. The construction of an electrical cable plant (33,000 tons a year) at Biskra, a battery plant (90 million batteries a year), an iron hardware plant, an electrical equipment plant for building construction and a high tension post plant are also planned. The 1980-84 plan also includes the development of several other plants. Expansion of existing plants is also planned in the development of these branches (37).

### 2.2.2.5. Light chemical

The colonial inheritance in the light chemical branch was important. Nowadays it consists of small plants producing outputs absorbed by the domestic market such as paints, varnishes, cosmetics, detergents, maintenance products, household cleaning and ceramic products. These are mainly consumer goods oriented towards the satisfaction of domestic demand. The activity of the light chemical and allied branch is covered by two public enterprises : SNIC and "Central Pharmacy" and 303 private firms.

SNIC is specialised in the production of light chemicals and the "Central Pharmacy" is involved in the production and conditioning of pharmaceutical products. Half of the 16 plants belonging to SNIC were built before independence. Most of these plants are small scale. Those built after the early 1970's are medium and large scale plants. In 1980 the paint production capacity of SNIC was over 76,000 tons a year, that of glass was almost 0.1 million tons a year and that of detergent was more than 50,000 tons a year (38). The pharmaceutical industry is only at the beginning stage of its development. The main task of the CENTRAL PHARMACY now is the conditioning and marketing of imported pharmaceutical products, but one should add that a plant producing antibiotics was built. Large efforts are being made to develop this branch.

The light chemical branch is one in which the private sector plays an important role. In 1978, there were more than 303 private plants providing 50.7% of the total employment in the light chemical and allied branch, contributing to 50.8% of the VA and 50.3% of the sales revenue in this branch. The private sector outputs are mainly household cleaning products such as bleaching liquid (3,160 cubic metres), washing soda, liquid detergent (3,758 tons), soap (600 tons), cosmetic products and paints and varnishes (4,700 tons a year). Some plastic products (e.g., rubber products, pneumatics, plastic and rubber shoes) are also produced by the private sector(39).

Investment in the light chemical and allied branch was relatively low. Despite the construction of some large plants, the relatively low increase in production reflects the difficulties encountered by this sub-sector. Consequently between 1967 and 1979 its VA increased by only a factor of 2.7. This low rate of growth of VA is also due to the low realisation rate of projects. For instance, 60% of the total number of projects that had started in this branch since 1970 were still unfinished at the end of 1979. Absolute employment remains low despite the fact that from 1967 to 1980 employment increased by a factor of 5. In the light chemical branch, relative employment with regard to that of the total industrial sector excluding CPW and the hydrocarbon sub-sector, increased only slightly between 1973 and 1980. The rate of growth of employment in this branch increased sharply between 1978 and 1980 (48%) and may continue to do so in the near future. The light chemical and allied branch will continue to grow through public sector investments. The 1980-84 plan foresees the construction of three pharmaceutical plants, three adhesive and maintenance products plants, a sodium products complex (150,000 tons a year), industrial gas plants and three glass plants (40).

### 2.2.2.6. Construction materials

Production in the construction materials branch is oriented towards satisfaction of the domestic market. Most inputs are obtained locally but all capital goods and almost all spare parts are imported. SNMC, which is endowed with a large production capacity, is the main public enterprise in the public sector. Half of the 74 plants belonging to SNMC were built after independence. For instance, seven new cement plants (8.3 million tons a year) were built. SNMC also possesses other construction materials plants producing plaster (267,000 tons a year), red brick and tile (1.89 million tons) and ceramic tiles (2.65 million tons), to name a few (41). Again, the contribution of the private sector (779 firms in 1978) in this branch is important (SNMC produced the total output of only cement, cement asbestos, ceramic sanitary fittings and marble). The private sector produces the greatest share of plaster (50,400 tons), lime (20,200 tons), tiles (21,000 square metres), bricks (70,000 cubic metres) and ceramic tiles (425,000 square metres) (42). The private sector also accounted for 10.4% of the total sales revenue of the construction materials branch and contributed to 11.1% of the VA of this branch. The private sector employed 22.8% of the total workers in this branch as well. The construction materials branch is one of the few Algerian branches which is relatively integrated. Nonetheless, certain goods such as refractory tiles or special cement are still imported since they are not produced in Algeria.

The development of the construction materials branch was irregular over the period 1967-77. During the 1967-69 plan, Algerian cement production exceeded demand, so this branch of industry received only 0.6% of total industrial investment.

The next two four-year plans have experienced exceptional efforts to overcome the shortage that followed the satisfactory production reached in the 1960's. Consequently the share of the construction materials branch in terms of total industrial investment rose. The problems that occurred at the time of the implementation of the investment, however, led to delays in their execution, a fact which entailed large costs. For instance, of the 71 large and medium size projects that had started in this branch since 1970, 27 were not completed by 1979. The level of investment gave rise to a rapid growth of VA which increased by a factor of 6.7 between 1967 and 1979.

Similarly the level of employment in construction materials rose from 75,000 in 1967 to 277,000 in 1980. It increased by a factor of 3.6, one of the highest increases recorded in the industrial sector. Substantial investments are to be allocated to this branch during the 1980-84 plan. The new projects comprise cement works (4 million tons a year), brick works and a number of plants producing plaster, tiles, aggregates and concrete pipes.

2.2.2.7. Agricultural and food industries

In 1967, the agricultural and food industries were the most highly developed branch of the industrial sector though rather small at the time. This was reflected in 1967 by the high contribution of the agricultural and food industries, 31.5%, to the industrial sector VA. The agricultural and food industries are specialised in the production of tobacco, matches, beverages, grains processing (especially flour, semolina and pasta), oil fats, sugar, canned products, daily products and fish, meat and eggs. These industries are directed towards the satisfaction of domestic demand.

Tobacco and match production is monopolized by one public enterprise: SNTA. SNTA is a small public enterprise created in 1963 after the nationalisation of several foreign firms (e.g., JOB and BASTOS). Sixteen plants producing tobacco and matches belonged to SNTA. In 1979, the production capacity of tobacco was 22,000 tons a year and the production capacity of matches was 572 million boxes a year (43).

Beverages are produced in part by three public enterprises : SNEMA, ONCV and SOGEDIA, and by a substantial number of private firms. ONCV, which was created in 1968, is specialised in the wine industry, SNEMA, established in 1966, is involved in the production of spring water, carbonated drinks (e.g., Cocacola and Fanta) and beer, and SOGEDIA (for a small proportion of its activity) in the production of fruit juice. ONCV monopolizes the production of wine. SNEMA has four plants producing beer and three plants producing spring water for which it monopolizes the production. SOGEDIA, which in 1972 was created by the fusion of three public enterprises (SOGEDIS, SOALCO and SNCG, created between 1966 and 1967), has 25 plants of which 12 produce fruit juice (citrus products and grapes). The important private sector is only involved in the production of carbonated beverages (1.74 million hectolitres).

SNSEMPAC, which was established in 1964, is involved in the processing and commercialisation of grains. SNSEMPAC is the most important public enterprise in this branch. Among the 88 plants belonging to SNSEMPAC, 73 were inherited from the colonial period. For instance, 63 plants are flour and semolina mills, 14 are pasta plants and 3 are couscous plants. The production capacity of flour and semolina is 1.45 million tons a year (44). A large number of private firms contributed to the activity of this sub-sector. These are small scale firms involved mainly in the production of wafers and biscuits (15,400 tons a year).

Oil, fats, sugar and canned food are mainly produced by the public sector. SOGEDIA participation in this branch is relatively large. SOGEDIA also produces oil, sugar and canned food. SOGEDIA has 8 plants producing margarine, vegetable fat and soap. The production capacity of margarine and vegetable fat is 246,300 tons a year and that of soap 70,200 tons a year. SOGEDIA has 5 other plants producing sugar (231,000 tons a year) and a conditioning capacity of sugar of 147,000 tons a year (45). Local production covers only 55% of domestic demand, the rest is imported. SOGEDIA has 12 additional plants which produce canned food as well as fruit juice. The production capacity of canned food and fruit juice is 85,000 tons a year (46). The private sector also plays an important role. A large number of small private firms contribute to the production of canned food (14,510 tons), oil (2,000 tons) and fats.

The rest of the activities of the agricultural and food industries are equally shared by the private and public sectors. The important role played by the private sector is outlined by the number of private firms (525 in 1978) and the fact that this sub-sector employed 24.5% of the total number of workers in this branch. Moreover, the private sector contributed to 16.1% of the sales revenue and 15.8% of the VA of the agricultural and food industries (47).

In 1967, most of the inputs processed by the agricultural and food industries were supplied by the domestic market. This is in contrast to the fact, that due to increasing

...ltural and food industries process mainly imported products. This underlines the increasing Algerian dependence on imported agricultural products. The different plants are widely spread throughout the Northern part of Algeria. The average age of the plants reflects the relatively low investment received by this branch during the three previous plans. It rose slightly in the 1978-79 interplan to keep pace with the extremely rapid rise in domestic consumption of this branch's outputs. The processing capacity of basic food products was too low to cope with the rapid increase in demand. This resulted from the fact that, at the end of 1979, 67% (70 plants) of the large and medium size projects which had started since 1967 were still under way. Consequently, the rate of growth of VA in this branch is very low. Employment rose from 202,000 workers in 1967 to 642,000 workers in 1980, increasing by a factor of 3.17 for the whole period. The agricultural and food branch of industry is one of the few branches showing very high productivity levels (48). The reason is that high productivity has to be maintained in order to keep up with domestic demand. The 1980-84 plan proposes a sharp increase in investment in order to alleviate the present pressure imposed by the increasing domestic demand. The creation of new cereal milling facilities (500,000 tons a year) and modernisation and renewal programmes are planned.

2.2.2.8. Textiles and leather

The outputs of the textile and leather industries are consumer goods directed toward domestic demand. These branches of industry are not very developed in Algeria. This is in contrast to a large number of Third World Countries, such as India and Pakistan. The development of the textile and leather industries has not been considered a priority since Algeria is poorly endowed with the necessary resources (e.g.cotton). In 1967, the contribution of the textile and leather industries, which was second only to that of the agricultural and food industries, accounted for 23.4% of the industrial VA. At that time, the textile and leather industries were using labour intensive technology (most of it craftworks) requiring very little investment.

SONITEX and SONIPEC are the two public enterprises operating in these two branches. SONITEX was created in 1972 by taking over the activities of SONAC which was established in 1966. SONITEX, which is specialised in the production of textiles, has 44 plants widely spread throughout the Northern part of the country. SONIPEC, which was created in 1972, has 19 plants specialised in the production of leather (tanning and finished products) and in the production of a few plastic products such as plastic shoes. The two public enterprises have only become involved in all stages of the production lines recently. The public sector was specialised in the production of cotton, bonded fibber thread, pure and mixed yarn, knitted wool, cotton and synthetic materials. Recently its activities expanded to the downstream stages of production lines of this branch, manufacturing all sorts of materials: cotton, woolens, blankets, underwear, shirts, trousers, readymade for men, towels, sheets, footwear, leather bags, leather jackets and leather shoes. Cloth production capacity is 143 million metres a year, shoe capacity is 18 million pair a year and thread capacity is 24,200 tons a year (49).

These two branches are characterised by a large contribution from the private sector. In 1978 private firms numbered

1,596 in textiles and 805 in leather. In 1978, the private sector contribution to VA in the former was 60.4% and in the latter, 42.8%. The private sector also contributed to more than 50% of the sales revenue of each branch. In addition, the private sector in each branch accounted for 52.9% and 45.6%, respectively, of the employment of each branch. The private sector is mainly involved in the downstream stages of the production lines of these branches, manufacturing products such as knitwear, readymade clothing (11.05 million units), footwear (13.72 million pair), mugs (33,900 square metres) and blankets (920,000 units) (49). It also produces cotton cloth (3.58 million square metres) and synthetic cloth (63.64 million square metres).

The public sector invested in capital intensive technology requiring the use of imported inputs such as cotton, synthetic and bonded fibbers and only a small proportion of domestic inputs such as wool hides of animals, goatskin and camel hair. Algeria does not produce any cotton and subsequently the outputs are mostly synthetic fibbers. The private sector, on the other hand, still makes use of traditional ways though some private plants are modern and use capital intensive technology. At present, production is sufficient so that no imports are required. One should mention that part of the demand is alleviated by the black market, supplied mainly by legal imports from immigrants and, to a lesser extent, illegal imports.

These branches received relatively low investment during the first two plans (at least as far as the public sector was concerned), but this was followed by a rapid increase in investment. These two branches also suffered from delays in the implementation of the public projects. In fact, 60% (22 plants) of the projects that had started since 1967 were still in construction in 1979. Private investments were quite high during the two plans, however, somewhat balancing the lack of public investments. As a consequence of the low investment rate, the VA of the textile and leather branches rose at a rate below average. The 1980-84 plan foresees an increase in the public sector capacity regarding the manufacturing of finished products by the construction of eight clothing, three knitwear, one blanket and three footwear plants and a new tannery capable of handling 10 million square feet of hides.

2.2.2.9. Wood and paper

The public sector occupies a relatively unimportant place in the wood branch while it plays an important role in the paper branch of industry. The two public enterprises in these two branches are SONIC and SNLB. SONIC, which was created in 1968, controls the paper industry. The eleven plants belonging to SONIC produce the total output of pulp paper and the major share of printing, writing and packaging paper and cardboards. The production capacity of straw pulp and esparto pulp is 106,600 tons a year, that of printing and writing paper is 55,000 tons a year and the capacity of packaging paper and cardboard is 96,000 tons a year (51). SNLB, which was established in 1972, is involved in the production of cork and the manufacturing of wood furniture in its 12 plants. SNLB relies on important imports since Algeria is poor in forest resources. Similarly, SONIC imports most of the intermediate inputs for the production of finished products. The wood industry, and particularly the cork industry, has not benefited from large investments. Consequently, production has not followed the changing requirements of the international demand in this branch leading to a substantial lowering of cork export volume.

In 1978, 707 firms, mainly in the wood industry, belonged to private investors. This outlines the importance of the private sector in the wood branch. Private sector importance is further shown by the fact that this sector employed 47% of the wood branch work force and contributed to 34% of the sale revenues and 26.4% of the VA of the wood and paper industries. The private sector deals mainly with the manufacturing of wood furniture (272,700 unit) and the transformation of large quantities of paper into exercise-books, envelopes, wrapping paper and corrugated and compact cardboards (27,500 tons) (52).

The outputs from the wood and paper industries are consumer goods for both the domestic and international markets. Currently no paper is exported. The ratio of investment to total industrial investment was low. Thus, as one expects, the rate of growth of the wood and paper industries' VA is low. The increase in employment is relatively small. For instance, from 1967 to 1979, employment rose only by a factor of 2.3. This is also partly due to the low rate of investment realisation in the public sector. In fact, 65% (24 plants) of the large and medium projects that were planned to be constructed for the period 1967-79, were still not operating by 1979. The construction of several new plants is planned in the 1980-84 plan. A household furniture plant, two plants producing communal facilities and plants producing cardboard packaging materials are planned.

### 2.2.2.10. Construction and public works

The rapid pace of economic development and particularly the sharp rise in industrial investment have created needs for construction and for newer infrastructure as well as the development of operational capacity. At the end of 1979 there were more than 200 enterprises in the public sector and about 600 small and medium Algerian private enterprises in construction and public works. The public sector consists of public enterprises at the national, regional, Willaya and Daira (commune) levels which are in charge of construction and public works. SONATRO (road works), SONATRAM (maritime works), SONAGTHER (water works), DNC, SONATIBA, ECOTEC (housing and community infrastructure), SORECO and SORECAL (regional enterprises for construction and civil engineering) were established. Later Willaya and Daira enterprises involved in construction and public works as well as in the development of inter-communal sites and services associations and municipal construction undertakings were created to reinforce the construction and public works sub-sector. In 1978 and 1979, regional public works and water development capacities were strengthened by the establishment of six general works enterprises and four other public enterprises. The size and resources of some large public enterprises such as DNC in particular is enormous as DNC can carry out as many work projects as can 19 public enterprises under the Ministry of Housing. The private sector is extensively developed in construction and public works and in 1979 it amounted to more than 30% of total sales revenue in this sub-sector. The private sector works in close collaboration with public enterprises but encounters serious difficulties in obtaining credit and equipment.

The high investment realised brought about an increase in VA. Between 1967 and 1978, the average annual growth of VA for construction and public works was 10% while that of petroleum construction work was 14%. In 1979 the contribution of construction and public works (including petroleum public works) to the total industrial VA increased to 27.6% (20% in 1967). This irregular growth was inadequate to respond to Algerian needs. Between 1973 and 1980, employment in construction and public works doubled. In 1980 it accounted for 47% of total employment in the industrial sector. This high ratio reflects the use of labour intensive technology.

The needs of the country are enormous, especially since social needs such as housing have only recently been taken into consideration. In addition, the recent earthquake of El-Asnam increased the demand for construction materials, construction and public works. The development of construction and public works is expected to experience continuous growth.

Under the initiative of the state and through public enterprises, the structure of Algerian industry has been deeply modified. From a public sector composed of a few industries mainly involved in the extraction of minerals and the production of consumer goods, there has been an expansion into the production of capital goods (heavy industries) and the installation of import substitution industries. The public sector plays an important role in the Algerian industrial sector while the private sector plays a minor role. This may be attributed to the political options adopted by the Algerian government. In addition, foreign investment (exploration mainly) is almost non-existent except in a few branches such as hydrocarbons, metal and mining but only as a joint partner with the state. Algerian industry is based on hydrocarbons and on construction industries (e.g., steel and construction materials). The consumer goods and mechanical industries, together with electrical and instrument engineering, are not very developed. In addition, the economic and social infrastructure suffers from a lack of investment. The industrial sector is far from being integrated. Concerted efforts are still to be made. The development of the Algerian industrial sector is in line with the country's domestic needs. Industrial sector dependence increased with the imports of inputs such as capital, skilled labour, intermediate inputs and spare parts. Despite the enormous investment made in the industrial sector, a large number of plants do not produce at full capacity for reasons which are the focus of part two of this thesis.

References

1 In 1958, Algeria had 155,000 craftworks and only 9,600 industrial plants (small and medium scale). Most of the labour force was concentrated in about 1,000 firms. Refer to Barbe, C.: Les Classes Sociales en Algerie, Economie et Partie Politique, 1st September 1959 quoted in Raffinot, M. and Jacquemot, P. : Le Capitalisme d'Etat Algerien, op cit. pp 31-32.

2 See Appendix B.1 for more details.

3 The Constantine Plan (1959-64) was launched in 1958. An iron steel work at El Hadjar, CAMEL (liquefied natural gas), some assembling mechanical plants, to name few, were part of the plan. For more details on the Constantine Plan see Rapport General du Plan de Constantine, Governement General (1960) and Compte Economiques (Algiers).

4 Amin, S.: L'Economie du Maghreb, op cit. p 196.

5 Ibid p 262.

6 The values of the contribution to GDP given in Table 2.3 for the developed countries are the average values for various developed countries quoted in Temmar, H.: Structure et Modele de Developpement de l'Algerie, op cit.

7 See Amin, S.: Economie du Maghreb, op cit. p 194 and Schnetzler, J.: Le Development Algerien, op cit. p 74.

8 Schnetzler, J.: Le Development Algerien, op cit. p 75.

9 Ourabat, M.: Les Transformations Economiques de l'Algerie (Edi. Publisud, Paris, 1982) p 31.

10 See Table A.5 in the Appendix A for more details.

11 See Table B.2 in the Appendix B for more details.

12 Calculated from Table B.3 in the Appendix B.

13 Ibid.

14 Calculated from Table B.4 in the Appendix B.

15 All the tons are metric tons in this thesis.

16 Natural gas production represents the amount of gas delivered to the users or processors. Production is a misleading concept, for a great deal of natural gas is withdrawn and then re-injected. This remark was made by Mazri, H.: Les Hydrocarbures dans L'Economie Algerienne (SNED, Algiers, 1975) pp 57-59.

17 The Ministry of Energy and Hydrocarbons.

18 SONATRACH will be described in more detail in Chapter Eight.

19 Refer to Chapter Eight for more details.

20 Ibid.

21 Ibid.

22 Refer to part 2.2.1.6 for more details.

23 Refer to Chapter Eight for more details.

24 See Table A.6 in the Appendix A.

25 Statistics, 1967-78 (MPAT, Algiers).

26 Schnetzler, J.: Le Developpement Algerien, op cit. p 110.

27 United Nations 1980 Yearbook of World Energy Statistics.

28 Throughout the thesis, the figures related to the industrial sector do not include those of construction and public works.

29 Refer to Pole de Development et Arriere Pays: Le Cas de Annaba El-Hadjar 3C, Reproduction et Politique Sociale, INEAP, Algiers, July 1981 p 11.

30 Refer to Table B.4 in the Appendix B.

31 See Table A.6 in the Appendix A for more details.

32 See Chapter Nine for more details.

33 Temmar, H.: Structure et Modele de Developpement de L'Algerie, op cit. p 242.

34 Ibid.

35 See Chapter Ten for more details.

36 Temmar, H.: Structure et Modele de Developpement de L'Algerie, op cit. p 244.

37 The 1980-84 Plan (MPAT, Algiers, 1980).

38 See Chapter Seven for more details.

39 Refer to Les Industries Legeres en 1980 (MIL, Algiers, Mars 1980) and Production Industrial et Agricoles 1978-80 (MPAT, Algiers, August 1981).

40 The 1980-84 Plan, op cit.

41 See Chapter Six for more details.

42 Refer to Les Industries Legeres en 1980, op cit. and Production Industrial et Agricoles, op cit.

43 Ibid.

44 La Synthese du Bilan Economique et Social de la Decemie 1967-78, op cit. p 88.

45 See Schnetzler, J.: Le Developpement Algerien, op cit. p 138.

46 Temmar, H.: Structure et Modele de Developpement de L'Algerie, op cit. p 256.

47 Refer to Les Industries Legeres en 1980, op cit. and Production Industrial et Agricoles, op cit.

48 This is true except in the canned industry sub-branch.

49 La Synthese du Bilan Economique et Social de la Decemie 1967-78, op cit. p 88.

50 Les Industries Legeres en 1980, op cit. and Production Industrial et Agricoles, op cit.

51 See Chapter Five for more details.

52 Les Industries Legeres en 1980, op cit.

# CHAPTER THREE : GOVERNMENT POLICIES

The economic structure provides the framework in which firms operate and thus affects their industrial structure and performance. Government intervention in economic activities can therefore have a strong bearing on industrial structure and performance. In Algeria, the present policy framework is dominated by planning, by public investment leading to public ownership of modern means of production, by public financing, by Socialist Management, by a foreign trade monopoly and by an extensive administration of prices. The effects of economic policies may be direct or indirect, negligible or significant, immediate or delayed. Economic policies influence the rate of industrial investment, the pattern of industrialisation --the choice of product and the choice of technology as well as the orientation toward foreign or domestic markets-- and the quality of economic performance. Thus, it seems appropriate at this stage to examine the main features of government policies in Algeria. We shall review the main policies insofar they relate to the public industrial sector. In the first section, investment policy will be described, followed by investment financing policies in the second part. In the third part, labour legislation and policies will be analysed. Foreign trade policies will be discussed in part four. Finally, price policy will be examined.

## 3.1. Investment policy

Following the promotion of rapid industrialisation, structural reforms were undertaken in order to reduce economic dependence on France. One of these structural reforms was the extension of central planning to the economy (see part 1.5). Since the launching of the 1970-73 four year plan, the plan has become imperative and highly centralised. Investment decisions, the method of selection, the choice and the implementation of projects are the focal points of this section since investment structure and investment rates were already discussed in Chapter One.

### 3.1.1. Investment Decisions

Based on the directives of the "Council of the State", in line with the objectives set by the Algerian development strategy and the draft plan of each ministry, a decision regarding the investment share of the medium term plan for each sector is finally made by the Central Organisation of Planning (OCP) (1). The investment share decision is not concerned at this stage with the different projects to be chosen but with the gross objectives of each sector and branch. These objectives are related to the long term plans worked out by the planning department of each ministry and the MPAT. According to the ordinance of the 12th of November, 1975, the draft plan proposed by each ministry includes not only the selected projects among those proposed by the public enterprises under its supervision but may include projects proposed by the Planning Department of the ministry itself. Projects proposed by public enterprises are only selected after discussion and consultation with the supervisory ministry. Proposed projects take into account recommendations and directives made by the government, the MPAT and the supervisory ministry as well as the long term plans. They are the responsibility of the Board of Directors of the public enterprise. Investment share decisions take into consideration the projects proposed by the Board of Directors of different plants and the recommendations of the Public Enterprise Workers Assembly (AEW). Before a project can be implemented, pre-investment studies based on technical studies are made by the public enterprise under the supervision of its ministry.

Proposals made by the ministry are analysed by OCP and projects are then selected. After a project is chosen by OCP, an inclusion decision is signed which means that the project becomes part of the investment programme (annual plan). This decision occurs within a month following the selection. During this month checks on norm, size, cost and geographical location for example are carried out. At this stage the investment programme is submitted to the government (2). A government decision is needed only for medium and long term programmes. For the annual plan, the OCP decision is equivalent to that of the government.

Different projects are selected on the basis of technical and economic studies carried out by a public enterprise under the supervision of its ministry. These technical and economic studies are elaborated based on the directives and procedures presented in "The Evaluation of Projects Manual"(3). According to this manual each project proposal should include the following elements:

1) market study results,

2) main technical elements of the project,

3) planning of the plant implementation and the progressive increase of production capacity over the years,

4) total amount of investment subdivided into a number of specific subsections (terms). For example, total investment may be divided into local and foreign currencies in relation to the origin of capital goods and services.

5) planned financing of the investment,

6) social, economic and financial information concerning the investment as well as the planned income statement for the first ten years which is in fact the study of the return on the investment (4).

3.1.2.Selection methods

Before proceeding to the decision to include a project into an investment programme, OCP requires a certain amount of information based on quantitative data in addition to the technical and economic studies. The decision is partly based on indicators of the efficiency of investment: value added and investment cost. This information is passed on by the MPAT and the Ministry of Finance.

The MPAT identifies four objectives assigned to the industrial sector which serve as the selection criteria of a project. These are: an expansion of the country's capacity of accumulation (in foreign currencies), the creation of import substitution industries (which best satisfy essential consumer needs), economic integration and the decrease of local imbalances. Nevertheless, the correct evaluation of a proposed project based on the above criteria is difficult. On the other hand, the selected methods of the Ministry of Finance, as determined by Circular no. 1536 of the Ministry of Finance, are the independent constraints of public enterprise, the return on investment, the financial capacity of public enterprise (in order to pay back the loan contracted) and the particular nature of the investment (5). The financial aspect prevails among the objectives of the Ministry of Finance. It should be noted that the criteria taken into account for the selection of a project by the Ministry of Finance and by the MPAT are different if not contradictory. Contradictions appear between the social and the economic objectives emphasized by the Ministry of Planning and the profitability objectives stressed by the Ministry of Finance.

3.1.3.Choice of project characteristics

The important characteristics of a project are output, scale, level of integration, geographic location, intensity (labour or capital) and level of technology. Outputs to be produced are worked out according to the plan aims, to the availability of resources and to the need for proper balance and integration of interdependent production processes. Scale depends not only on available technology but also on political decisions and on economic studies. In fact, the government has favoured large scale plants rather than small scale ones. Since independence, a high degree of integration has been encouraged by the government. Decisions concerning location are made mainly on political grounds (regional equilibrium) and partly on economic grounds when the availability of natural resources becomes a constraint. In fact, either the public enterprise or local authorities decide on the precise location. This decision must comply with government directives which specify the location of the project. For instance, the 1967-69 three year plan designated that all plants had to be located in the Northern part of Algeria. The 1970-73 four year plan indicated that they had to be situated in the Northern inland regions. The 1974-77 four year plan designated that they had to be located in the regions bordering the Northern part of the Sahara. The choice of technology depends on the available technology on the international market and on political grounds. The most modern and sophisticated technology which is, nonetheless, a capital intensive technology, is generally favoured. Among various production processes, the final choice is made by the public enterprise managers (a decision which is in fact made by the contractor). Advice on the technological aspects and on the standardization of capital goods are the tasks assigned to INAPI.

### 3.1.4. Implementation of a project

Following the decision to include a project in an investment programme, the public enterprise is required to obtain:

1) the approbation granted by either the Market Central Committee (ministry) or the public enterprise Marketing Board.

2) the signature of the external financing contracts after the bank negotiation. This implies that agreement between the Algerian Primary Bank and the foreign bank has been reached.

3) the decision concerning transfer of funds as established by the exchange control services of the Primary Bank.

4) approval of the contract by the BAD.

5) the provision of the necessary credits to the Primary Bank by either the BAD or the Treasury, for credit payment by a public enterprise.

6) the support of the Primary Bank regarding drafts on previous credits, provided that these drafts have been approved by the public enterprise (6).

After having obtained all these documents, a public enterprise can adopt one of the following formulae for the carrying out of the investment: decomposed, turnkey, product-in-hand or cost-plus-fee contract. Description and advantages and disadvantages of these contracts are described in detail in Appendix C.1.

### 3.1.5. Major criticisms of investment policies

The execution of investment policies led to two different types of problems. The first type of problems results from the planning process itself (i.e., constraints due to administrative procedures) and from the chosen level of development (i.e., availability of skilled workers). The second type of problems is related to the functioning of instruments used in investment planning.

The first criticism of public investment in Algeria is related to the absence of methods of project appraisal. The cost appraisal of a project is often characterised by an insufficient mastery of the parameters (7). This cost is supposed to determine the real cost as well as the foreign contractor cost. Consequently, technical and economic studies are insufficiently elaborated. Such inefficiencies generate a number of reappraisals. This situation is to be expected given an insufficiently skilled labour force, lack of national statistics and information which do not allow the mastery of certain key parameters.

The inclusion decision phase of projects, which includes checks on norms, cost, size and location, for example, is also inaccurate and inefficient. This occurs because cost, which depends on existing infrastructure, cannot be assessed accurately at the preliminary stage. Often plant location is only decided after the evaluation of the project. Precise planning regarding the origin of capital goods and services necessary for the construction of the plant cannot be made. These problems are well illustrated by the case of the paper plant of Mostaganem which was located in an area where there is a shortage of water and electricity. These constraints were not taken into consideration when the site was chosen. The employment benefit to the region was considered to be more important than these constraints. Other examples are the large scale food plants (Blida, Mostaganem, Sfizef) built without taking into account the national agricultural resources. The above examples are the result of inadequate evaluation of projects, inappropriate project characteristics and delays and slowness of these procedures (8).

An inclusion decision or a request to reevaluate a project may take 4 to 6 months. This leads to delays in the carrying out of a project. These delays occur either at the beginning of a project's carrying out or at the time of completion when a reevaluation is required. In addition, when the project is part of a programme of investment (which is often the case), all contracts or orders have to be countersigned by the BAD. This process, which takes about two months, delays the work in progress and also generates higher costs.

The inappropriate choice of project characteristics may lead to problems at the implementation level of an investment and later at the production level. The choice of location, which is based mainly on socio-political factors, can have considerable effects on efficiency. These are due mainly to the weakness of economic infrastructure and imbalanced distribution of scarce skilled labour (9). Government policies regarding the scale of a project lead to excessive delays in project execution and to difficulties in mastering the plant (production) and managing personnel. For example, a large plant is obviously more difficult to organise, the management is more complex, the coordination and control more difficult and the requirement of skilled workers and social needs much higher than for a small plant. Besides, the adoption of a highly integrated plant using sophisticated technology creates similar difficulties. This has led to increasing foreign dependency. The allocation of sites by the local authorities is another cause of delay in the carrying through of projects. For example, the request for the site of the tire project at Bouira (SONATRACH) was made in 1974, but the agreement was obtained only in 1977.

As described earlier, the implementation of a project is submitted to cumbersome bureaucratic procedures. For example, the transport of personnel and materials is often difficult and progress in the construction of plants is subject to the availability of resources (energy, water and telephone) and infrastructure. The authorisation of imports of capital goods (AGI) (see part 3.4) is often lower than that requested. For instance, the AGI investment in 1979 was only half of that required by SONATRACH for the completion of liquefied natural gas plant (LNG) no. 2. Consequently, planned investment was not carried out. In addition to these difficulties, the execution of an investment is often difficult due to problems caused by investment planning as described above(see part 1.5) and investment financing policies (described in part 3.2).

Aid, international credit and technology available on the international market also play an important part in the execution of an investment and the efficiency of a plant, particularly in the steel industry. Consequently, the choice of an appropriate technology is sometimes limited by what is available and/or by what is offered by aid donors or international credit organisations, often leading to the adoption of a technology that has suboptimal characteristics.

The large number of ongoing projects carried over from one plan to the next confirms the reality of the problems discussed above. The effect of these problems is not only the long delays and high cost involved in the realisation and execution of a project but the underutilisation of production capacity. This will be analysed later in the following chapters.

### 3.2. Investment financing policies

Investment financing policies have been instituted in order to carry out various public investments. It was not until 1970 that clear investment financing policies were formulated. As described in Chapter One, public investments can be financed by different sources. As a consequence, different investment financing policies have been enforced.

#### 3.2.1. Investment financing policy of investment financed by the banking system (10)

Parallel to the request for inclusion of a project is the application sent by the public enterprise to the Ministry of Finance (Department of Treasury, Credits and Insurance), the Primary Bank, the BCA and the BAD through its supervisory ministry. It is a request to establish the project financial plan and to seek for the necessary credit (11). This request must be submitted by the 10$^{th}$ of September of each year (12). Agreement on the investment financial plan is subject to the inclusion decision; however, no project can be undertaken without a financial plan.

##### 3.2.1.1. Elaboration of a financial plan

During the month following the request a financial study is conducted by the public enterprise's Primary Bank. The Primary Bank studies and assesses the independent constraints of the project, the return on the investment, the financial capability of the public enterprise to pay back loans and the special nature of the investment (13). These are, in fact, the selection criteria of the Ministry of Finance. Besides the study, the bank indicates the medium term loans it is able to grant. On these bases, the financial plan for the project, which takes into account both long and medium term credit from local or foreign sources, is worked out by the Board of Directors of the BAD or the Technical Committee (14). As soon as the MPAT decides that a project is to be included in an investment programme, the financial plan is adopted.

The adopted financial plan includes different means of financing which have been approved for project execution. The financial plan is then passed on to the Ministry of Finance (Department of Treasury, Credit and Insurance) for approval (15). Approbation of the financial plan must be signed by the Minister of Finance (16). The approved financial plan is then sent to the supervisory ministry, the MPAT, the BAD, the BCA, the Primary Banks and the concerned public enterprise. The financial plan covers the whole planned investment which may extend over a period of several years. The public enterprise is only authorised to use the granted loans when credit conventions are signed between the public enterprise and the Primary Bank for medium term loans and between the public enterprise and the BAD for long term loans.

3.2.1.2.The credit convention

The credit convention binds the public enterprise to the Primary Bank and the BAD (17). The respective obligations of each partner, the precise amount, the credit conditions (e.g., the rate of interest and the duration of the loan) and the payment modalities are specified in the credit convention. In addition, avoidance clauses and stipulations which allow the bank to control project implementation are enclosed in the credit convention. The share of credit by nature and by terms of the investment is stated in the appendix of the convention. Utilisation of credit is only authorised at the conclusion of the credit convention. This convention is similar to the one which exists in socialist countries (18). The different loans granted are progressively unfrozen when needed. The granted loans are deposited in the public enterprise investment account. To avoid any misuse of funds allocated for project implementation, the public enterprise is required to hold two separate accounts: an investment account and a current account. The Primary Bank keeps a strict record for each project separately, involving details such as long term credit, short term credit, foreign financing and self-financing (19). Foreign loans are subject to more rigorous control.

Every semester the public enterprise is required to communicate its planned expenses to the BAD and to the Primary Bank. Payments are made by the Primary Bank for expenses approved by the BAD only when they are part of the project. In relation to the project, the public enterprise sends three reports per year to both the MPAT (Direction des Programmes) and the Ministry of Finance (Department of Treasury, Credit and Insurance). These reports include details on the physical execution and the financial implementation of the project. In the first report, which is due by the 31st of July, details, including the physical and financial commitments made during the first semester, planning for the second semester and new projects to be started during the following year, are given. An updated report is due by the 30th of September. Finally, the last report, which is due by the end of February, gives details on the physical and financial implementation during the passed calendar year (January-December). In addition to these three reports which are sent to the two ministries concerned, the public enterprise is expected to give monthly information to its Primary Bank on the physical and financial implementation of the project and the utilisation of local and foreign loans. Each trimester, a schedule of payment orders by source of financing, utilisation of foreign credit statement, description of used credit and the realisation rate of investment as well as a brief presentation and analysis of the development of each project are sent to its Primary Bank. The Primary Bank may require any supplementary documentation. Based on this information the Primary Bank manages investment carrying out and may propose adjustments for the future. On a monthly and quarterly basis, the different accounts related to credit utilisation by project and by category (long, medium and foreign terms) are managed by the bank. These documents are transmitted to the BAD. Based on the information communicated by the Primary Bank and public enterprise, a monthly report is issued by the BAD. These reports are sent to the MPAT, to the Ministry of Finance, to the supervisory ministry and to the public enterprise concerned.

### 3.2.2. Investment financing policy of self-financed investment

Until 1971, depreciation and reserve funds of any public enterprise as well as profit had to be transferred to the Treasury in order to be recycled into the national economy (20). Depreciation and reserve funds and profit were only kept when a joint decision by both the Ministry of Finance and the supervisory ministry was granted (21). Treasury bonds were issued in return for the deposited funds. These bonds were issued for a period of 5 years with an annual interest rate of 5.5%. This practice prohibited self-financing of public investment by a public enterprise.

Since 1976 public enterprises have access to their depreciation and reserve funds and profit (22). A public enterprise may, therefore, self-finance public investments. Self-financing of investment, however, does not reduce the control exercised by the central planning and finance apparatus. The criteria of acceptance and control of self-financed investments are similar to those of investments financed by the banking system as described above. The only difference is that self-financed investment is not subject to a credit convention since the enterprise's own assets are used to finance the project.

### 3.2.3. Investment financing policy of investment financed by the Treasury

Each year the amount of credit destined to finance non-reimbursable capital goods expenditures is fixed by the budget. The granted credit is divided by sector of activity. A list of the projects to be financed with this credit is established by the Ministry of Planning. This list is then transmitted to the Budget Department of the Ministry of Finance in order to isolate and grant the corresponding credit (23). Financing of an investment by the Treasury is carried out as follows (24): a contract (engagement) is established by the Treasury which is then transmitted to the state financial controller for approval. A double check on the existence of the credit covering the proposed commitment and on the authorised expenses for the project are carried out before including this engagement in the budget. It should be noted that any investment expense must carry the approval of the state financial controller. The amount of the expense is then precisely determined and payment may be initiated. Treasury accountants are in charge of payment and management of expenses. Payment is transferred to the bank account of the beneficiary public enterprise. The financial plan can be reassessed in the event of reevaluation. The demand for reevaluation goes through the same process as that described above. Demands for modification regarding cost, object, title or implementation cannot be made to the MPAT without the consent of the concerned ministry (25). This gives rise to a new decision by the Treasury.

### 3.2.4.Criticisms of investment financing policies

The low implementation rate of investments confirmed by the large number of ongoing projects at the end of each plan (see part 1.5 and Chapter Two) is not only due to investment policies (as described in part 3.1.5) but to investment financing policies. Inadequacies in the conditions of investment financing, worsened by ineffective project evaluation and delays in its implementation constitute the main financial problems encountered by public enterprises. These inadequacies are mainly the result of the financial structure and the duration of reimbursement of credit.

#### 3.2.4.1.Financial structure

The financial structure of a project is decided by the BAD. The financial plan must respond to the financial requirements of the project. In a large number of cases, credit allocated through the financial plan is often insufficient. Technical, economic and financial studies of project preparation frequently result in poor and inadequate estimates of financial need. This is due to initial financial undervaluation of the project, delay in the attainment of allocated credit, lengthiness of procedures and especially the absence of resources for the prefinancing of some investments such as preliminary expenses, studies, training and safety stocks. Procedures involved in the attainment of an agreeable annual financial plan also lead to long delays. These procedures can take up to two months. During this period the public enterprise may have to contract high interest loans in order to pay for some orders. The BAD has to grant a visa to all the orders related to the project. This process hinders the operation. In addition, the undervaluation of investment is aggravated by the fact that the MPAT grants a lower amount than the amount requested by public enterprises (26). Imported capital goods which should be duty free are subject to heavy taxes due to lack of knowledge of the regulations. These heavy taxes are bound to bring about financial revaluation and supplementary credit demands which in turn lead to further delays in the implementation of a project. Lack of coordination between project approval and financing authorities frequently results in a lengthy time lag between the two decisions. Consequently, in several cases it was necessary to revaluate the cost estimates. Such inadequate financial planning increases financial charges and leads to financial problems.

3.2.4.2.Duration of credit reimbursement

Delays in the implementation of projects and/or the allocation of credit are not taken into account when the average repayment period of loans is fixed. In fact a public enterprise is sometimes obliged to start repaying loans before completing the project. In other cases, repayments due are so large that they exceed the cash flow or the working capital of the plant. Public enterprises are therefore constrained to resort to short term overdrafts in order to reach a minimum financial equilibrium. In addition, the existence of important cost overruns yields an inefficient initial financial plan even when adjusted from phase to phase. These adjustments only occur with long delays which means that public enterprises must search for new financial resources. Financing of an important proportion of investments by short term credit gives rise to high financial charges and consequently leads to imbalances in the financial structure of public enterprises (27).

The confused financial situation of public enterprises and the absence of an accurate and complete financial plan have not allowed banks to set up the necessary instruments for an efficient analysis of projects. Banking procedures are, therefore, cumbersome, which results in paying strict respect to administrative rules without taking into account the return on the investment (28). One should add that insufficient resources such as infrastructure, transport, housing and training may have the same indirect effect. Expenses required to mitigate this situation are often the responsibility of public enterprises. Such expenses, however, are not accounted for in the planned investment allocated to a project, resulting in the contraction of additional short term credit and therefore worsening the financial situation of public enterprises.

### 3.3. Labour policies and legislation

Labour policies and labour legislation are of importance in the study of the performance of industrial public enterprises since they influence labour costs, recruitment, mobility and attitude at work. They can also affect labour performance through wages, conditions of work, number of working hours and productivity. In addition, they can force a public enterprise to employ more workers than required and can prevent it from using its dismissal right. In contrast to a large number of other countries, labour policies and legislation in Algeria have not been greatly influenced by trade unions (29). It cannot be denied, however, that worker benefits improved with the provisional installation of self-management between 1962 and 1966, during which trade unions played an important role. Workers' material benefits and working conditions, though, have improved greatly only since the introduction of Socialist Management (SM) in 1971. SM introduced workers to the opportunity of being directly involved in public enterprise affairs and indirectly in the economy. Thus, SM plays an important role in labour policies and legislation. First, the Socialist Management Charter and Code (30), together with problems encountered with SM introduction and effects on worker participation, will be described. Second, labour legislation will be examined.

### 3.3.1. Socialist Management in Algeria

The adoption of SM in public enterprises was an important turning point in labour policies and legislation. It coincided with the big wave of nationalisation and the emergence of a dominant public sector. SM, which was adopted in 1971 and applied in 1974, allowed workers' participation. With the adoption of SM, the government intended not only to establish solid foundations for Algerian development where workers play an important role in the production process, but also to involve workers meaningfully in management of their own productive efforts (31). SM requires a full and active association of workers in management. The worker becomes a producer-manager and the public enterprise his own property. Objectives, interests and aims of the producer-manager and the state become inseparable. Workers are constantly encouraged to improve productivity, to eliminate waste, to report misappropriations and to check any tendency towards bureaucracy or technocracy. Workers are expected to be as motivated to increase plant and national production as they would be to increase their personal income (32). Through SM, the state guarantees and protects the stability of employment and intends to apply the equal pay for equal work principle. SM is also seen as a school where workers can be economically, politically and socially trained, through the association of workers in planning and management of public enterprises.

It is through the existence of collegial organs such as the Worker's Assembly (WA) and the permanent committees, as well as the Board of Directors (BD), that workers' participation is realised. The most important organ is the WA. The WA at the plant is elected by the plant labour force (APW) while the WA at the public enterprise level (AEW) is elected by the different APWs. Each WA is elected for three years and has between 7 and 25 members (and sometimes more). All elected members must be members of the union (UGTA) for at least 6 months and be over 21 years of age. Consultative and co-managerial powers have been attributed to the WA to protect the basic rights of workers and to watch over the just fulfilment of their obligations. Power of the WA extends to the supervision of management and to the implementation of programmes. The WA also makes recommendations related to proposed development plans, production programmes and investment expenditures. Thus worker-managers contribute to the general policies of the public enterprise and exercise a certain amount of financial control. It is through one or two representatives of the WA on the Board of Directors (33) and the WA itself that workers are associated with all decisions related to the life and future of their plant.

The functions of the APW and AEW are actually carried out by standing committees (SC). The number of these committees varies from one to five according to the size and needs of the public enterprise and plant. There are economic and financial SC, social and cultural SC, personnel and training SC, disciplinary SC and finally safety and health SC. These committees are composed of members of the WA except for the disciplinary SC and the safety and health SC which have half their members appointed by the managers of the plant or public enterprise, respectively. Each of these important bodies is responsible for a variety of duties. The economic and financial SC studies all production and management problems associated with the conclusion of business transactions. It supervises all matters related to contracts, marketing and supplies. It also draws up plans in order to improve profitability. The social and cultural affairs SC is concerned with all social and cultural aspects such as welfare and raising the cultural standards of the worker-managers. The personnel and training SC participates in the development of personnel and training policies. It is also consulted on recruitment, salaries, fringe benefits and training matters. The disciplinary SC gives a preliminary opinion on all questions regarding staff discipline. The disciplinary SC makes sure that the rights of workers are safeguarded and the regulations in effect are enforced in order to protect the general interest of the plant or public enterprise. The safety and health SC is concerned with safety and health problems.

A preliminary analysis of SM does not seem to be warranted in view of the lack of accessible information and in view of its recent introduction (1974). In 1980, SM was effective in 92 businesses consisting of 1,051 units and employing 423,151 permanent workers (34). The implementation of SM has been slow. The effect of workers' participation is difficult to assess, particularly because SM is a long term policy. Difficulties, however, arose from the beginning for a number of reasons. The major difficulty was the continuous conflict of interest between managers and workers (35). The appropriate role of managers appointed by the state and the representatives elected by workers was not clearly defined. The introduction of change was difficult to accept because of past experience, workers' backgrounds and managers' attitudes. For example, the managers were used to making decisions without the consultation of the labour force. This attitude is, to some extent, supported by SM because more emphasis is placed on production than participation. In addition, the dominant role of managers is still very much retained by SM. Managers feel more vulnerable than workers to possible government sanctions.

Workers' participation is only effective through the two leading organs, the WA and the Board of Directors, but in fact, power is concentrated in the hands of the general manager of the public enterprise and the supervisory ministry (36). Essential factors such as price, level of integration, scale of the plant, conditions of supply and investment financing, are determined without consulting the public enterprise and plant. Consequently, the representatives of the WA and various committees cannot always intervene in management decisions. Thus, the WA and its committees do not function properly (37). This is mainly due to the low level of education of the work force and non-implementation of the texts. As far as the standing committees are concerned, they often have a restricted scope which limits their duties and thus the progressive side is often forgotten. The activity of the economic and financial SC, for example, is practically non-existent. This is greatly encouraged by managers who do not feel that the existence of this committee is justified (38).

In addition, the texts do not clearly define the precise role of the WA. It is not clear if the WA should participate with the managers and/or control the management. Consequently, there is an erroneous interpretation and apprehension about SM. From the SM Charter and Code it appears that equal importance was given to production, supervision, participation and democracy. In practice, however, the participation goals have been put aside. This may be attributed to the needs of the economy, to the economic situation and to the resistance to change of the managers. Finally, candidate selection methods are not satisfactory. The party (UGTA) and the supervisory ministry select the possible candidates among those who wish to stand. All of these different reasons have a negative effect on worker participation.

Despite a number of problems encountered in the application of SM and the short term results which may not appear to be very successful, positive effects have already been felt regarding worker participation. It may, therefore, be said that the long term results may have positive effects on the performance of public enterprises and thus on the Algerian economy. Workers' participation depends also on the satisfaction of their social needs. Effective worker participation, therefore, will only be reached when the workers' basic needs are satisfied.

### 3.3.2. Labour legislation in Algeria

Before and during the early post-independence periods, French legislation was effective. Some of the laws, such as social security, which became effective in 1949, collective bargaining, conciliation and arbitration, which were introduced in 1951, were appropriate to Algeria (39). Since independence a large number of changes have been introduced, particularly with the adoption of the current development strategy. Most of the labour legislation in practice now was published after independence. Algerian post-independence labour legislation started with decree no. 63.95 of March, 1963 which legalised the workers' committee as the basis of the self-management system. Decree no. 63.98 of the 28th of March, 1963 legally set the distribution of income in self-management undertakings (40). Ordinance no. 66.183 provided the payment of compensation for employment accidents and occupational diseases. 1971-73 saw the publication of ordinances related to social insurance in agriculture, to the SM Charter and Code and to collective labour relations in the private sector (41).

According to the SM Charter and Code, workers are guaranteed some rights which are even reinforced by their direct association with the managers of public enterprises or plants. Workers are equal regarding their rights and duties, they receive the same salary and advantages for the same work, a guaranteed minimum income and family allowances. Workers may receive productivity bonuses, enjoy satisfactory health and safety conditions and be entitled to a part of the profit.

They also have a right to vocational training. Besides their rights, their duties are also defined. It is their duty to increase production and productivity, to strive for a constant improvement of quality and to accomplish the plans'objectives. They also have to ensure that national patrimony is firmly protected and that there is no waste nor malpractice of any kind. Other decrees published in 1973 and 1974 clarify the application of SM in public undertakings.

In 1975, ordinance no. 75.31 fixed the general conditions of work in the private sector, giving details on employment relationships, income, conditions of work, to name only a few (42). In addition, in 1978 act no. 78.12 made general provisions for workers'conditions of employment (43). This law set the basis for work contracts. Workers' rights (21 articles) and duties (17 articles) are defined in the first two chapters of this act. The right to work is guaranteed. Workers have equal rights and obligations. They are entitled to the same salary and advantages for equal amounts of work with equal qualifications and productivity. The state also guarantees social protection, stability and security of employment. Every worker has a right to training, health and safety conditions. Workers enjoy all the rights conferred to them by law in connection with the welfare schemes. Every worker is entitled to a vacation and to a retirement allowance. According to the law, strikes can only occur in the private sector. All workers enjoy the right to organise. Obligations of the workers concerning the increase in efficiency and the requirement to work, for example, are also defined. The employment relationship, giving details such as conditions and procedures for recruitment, hours of work, absence, leave work rules, wages and training, is also covered.

Initiated in 1978, act no. 81.03 prescribes the statutory hours of work. This act fixes the number of working hours to 44 hours per week but with different possible daily arrangements. For example, an employee may work 9 hours per day for 4 working days and 8 hours for the fifth. It defines the night shift working period between 9 pm and 5 am. It also regulates overtime. Act no. 81.07 states the purpose, the scope, the contracts and the supervision of apprenticeship. Act no. 81.80 sets the general rules and conditions for the annual leave which is fixed at two and a half days per working month. This entitles a worker to a salary during his leave. The basic period of leave may be increased in special cases.

The minimum industrial salary had been fixed at 600 AD in 1976 and increased to 800 AD in 1978 (44). In 1978, civil servant salaries rose by 30% while other sectors reported only an 18% increase (45). The guaranteed minimum wage in the agricultural sector equalled that in industry just after the election of Chadly Bendjedid to the presidency. In 1980, public servant pay rose by 15% while salaries in education increased by 25%. In addition, in 1979, income tax was reduced and a tax free allowance for a minimum monthly income was decreed (46).

All the decrees laid down by labour legislation benefited and improved the conditions of workers. Since the introduction of SM the labour force of the industrial sector has benefited greatly. There has not been a comparable improvement in the economic and social conditions of the workers, particularly in housing and social security.

### 3.4. Foreign trade policies

The state felt that foreign trade had to be rapidly controlled after independence in order to prevent disorganisation of the economy, the appearance of a dual class system (rich and poor) and to break the ties between the local private sector and multinationals. As a result, foreign trade has become a state administered and controlled activity. As early as 1963, three measures were taken to regulate foreign trade. These measures are the import and export quota system, the increase of customs duties and the exchange control. In this protectionist state, two types of organs have intervened successively to undertake the operation of foreign trade: the "purchasing group" and the monopoly of foreign trade.

#### 3.4.1. Historical development

In 1963, the quota system was introduced and the nature and quantity of imported and exported goods were fixed in advance. These procedures, conceived by the Ministry of Trade, brought about import and export licensing, an effective means of controlling foreign trade. As early as late 1963, a move towards a monopoly of certain imports by the National Office of Commercialisation (ONC) was started. The main function of the ONC was to import staple products such as sugar, coffee and butter for the local market. Commodities for industrial public enterprises were also sometimes imported by the ONC. No later than 1964, several monopolies were granted to companies. Professional purchasing groups brought state and private investors together to form foreign trade companies in which more than 60% of the assets were public. Five groups were constituted and granted monopolies for a given range of products. These included wood and its by-products, artificial textiles and cotton, milk and its by-products, leather and animal skins and other textiles (other than the artificial textiles and cotton). Public and private enterprises were still able to import directly with a license granted by the Ministry of Trade.

In the early 1970's, a monopoly on foreign trade operations was granted to public enterprises only. The system moved to a monopolistic foreign trade system. A monopoly was granted to nineteen public enterprises: nine public enterprises under the supervision of the Ministry of Industry, six under the supervision of the Ministry of Agriculture, three under the Ministry of Information and one under the Ministry of Health. A monopoly was granted but imports and exports were not necessarily restricted to the monopoly holders as licenses were still obtainable. With the introduction of the monopolistic system in 1972, import and export licenses were abolished. Public and private enterprises had to go through the monopoly holder for any type of imports and exports. In 1974, a more flexible system was adopted to alleviate the many difficulties and problems encountered by the monopoly holders regarding the organisation and planning of foreign trade. Since 1974, public and private enterprises have been able to obtain a permit from the Ministry of Trade allowing them to directly import and export goods without going through the public enterprise which holds the monopoly. A law passed February 11, 1978, regulates the monopoly of foreign trade. This puts an end to a process which began in 1963 with the creation of the ONC (replaced in 1967 by the Algerian National Office of Commercialisation (ONACO)).

Despite restrictions imposed by the monopolistic system, in practice, goods listed under some 600 tariff headings and sub-headings included in the free list may be imported or exported freely. Furthermore, some goods are prohibited regardless of their nature because of their origin or their destination. In addition, some are prohibited because of their nature regardless of their origin or destination. Free and prohibited exports and imports, however, represent only a small proportion of total foreign trade. The bulk of exports and imports are only permitted within the framework of the annual import and export programmes. Required needs from abroad are determined by the plan. The annual export and import programmes consist of authorisations (permits) granted by the Ministry of Trade to public and private enterprises. These are three different total authorisations of imports (AGI) : the functioning AGI, the monopoly AGI and the investment AGI. The functioning AGI covers all the imported inputs needed for the normal functioning of a public enterprise. The monopoly AGI includes all imports required by private enterprises and consumers for which the public enterprise has the monopoly. The investment AGI covers all imports necessary for projects under construction by the public enterprise. A small number of restricted commodities, unless covered by an AGI, require an individual preliminary authorisation of import (API). Private firms have to apply to the public enterprise holding the monopoly for a specific import except when they are granted an authorisation for import.

Since 1978, the foreign trade system has been mostly state controlled. Trade is conducted by national marketing boards or by state enterprises that hold the monopoly for the import and export of specific goods. Foreign trade is conducted with about 100 countries, of which half have signed commercial agreements with Algeria. Most of the agreements concern parameters of trade and payment arrangements.

3.4.2. Import policy

Authorisations of import are only granted twice a year to public enterprises and once a year to private enterprises. Applications for the different AGI have to be made separately. Figure 3.1 indicates a simplified block diagram of the circuit involved in the attainment of an AGI. Based on the production plan, the needs of each individual plant and project are assessed. The request has to be made two months before the closing date of application and must be very detailed and specific. The requests for functioning AGI made by the various plants are then gathered and consolidated at the foreign trade department of the public enterprise before being submitted to the public enterprise Marketing Board. The request for a monopoly AGI includes all the requests made by the private and public enterprises while the investment AGI includes those made by different projects within the public enterprise. The combined requests for AGI are proposed to the supervisory ministry, which in turn presents them to the Ministry of Trade. When the AGI is granted, copies of notification of the AGI are sent to the respective public enterprise through its supervisory ministry and to the Algerian Foreign Bank (BEA). The BEA transmits the copies to the local banks. This operation takes about one month. It is only after the local bank has received the copies that guarantee of payment is given to the supplier. Regarding exports, the buyer's payment guarantee must be presented to the bank for security before the export is made. When an AGI is granted and the bank is notified, the choice of supplier is made by the public enterprise Marketing Board. The foreign trade department of

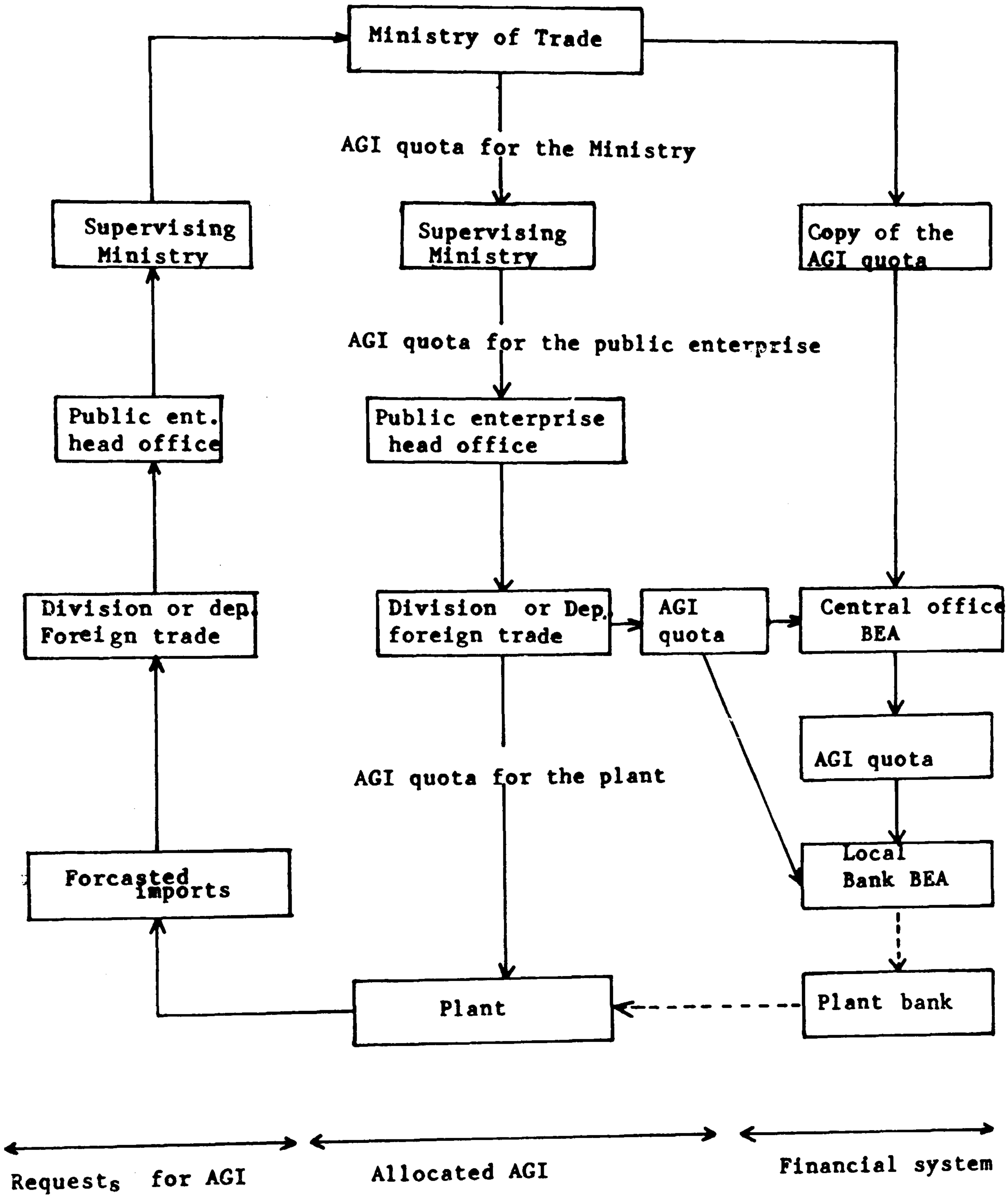



Figure 3.1 : Block diagram of an AGI.

Source : Survey data.

the public enterprise then orders the goods according to the choice made. Payment is made through the local bank. On arrival, the different concerned departments of the public or private plant are then notified to collect the imported goods. Before 1978, spare parts and components were ordered through SONACOME which had an absolute monopoly. This procedure rapidly gave rise to long delays in the attainment of ordered spare parts and components due to the inability of the SONACOME foreign trade department to cope with the large number of orders and, more particularly, with the large number of suppliers. Since 1978, public enterprises are authorised to import spare parts and components directly. Imports, however, must still be channeled through the AGI regulations and private firms still have to go through the monopoly holders.

3.4.3. Customs policy

In order to clear goods, custom duties and taxes must be paid by public and private enterprises. In 1979, three different tariffs were in practice: one for goods coming from countries that granted a favourable clause to Algeria, the second one (a special tariff) applied to goods coming from countries or groups of countries that had correlative advantages, and the last one (higher than the first two) applied to countries which did not grant a favourable position to Algeria (47). In addition, different taxes applied to staple goods, secondary goods and luxury products. Preferential tariffs and tax procedures are still in practice. The clearance of goods is still subject to cumbersome bureaucratic procedures despite the creation of transit services specially created to deal with orders placed by public enterprises.

### 3.4.4. Exchange control

Since October 1963, a unique though adjusted several times, exchange control has been in practice in Algeria. From April 1964 to December 1973, a fixed exchange rate with respect to the French franc was maintained, but since January 1974, the value of the Algerian Dinar (AD) has been allowed to float against the major world currencies. The official rate of the AD per US$ is given in Table 3.1. In 1982, the AD was officially worth about 1.4 French francs (FF) (100FF=71.42 AD). On the official market the AD is greatly overvalued. In fact, on the black market 10 FF were equal to 20 AD and sometimes to 30 AD during the same period.

### 3.4.5. Problems encountered by public enterprises

Although the monopoly of foreign trade has some advantages, the disadvantages cannot be ignored. Apart from the restriction imposed by AGI, public enterprises are subject to the bureaucratic inefficiencies of a centralised system of imports. Application for licenses as well as for AGI are often subject to long delays mainly because the Ministry of Trade processes the requests at fixed dates twice a year for the public sector and once a year for the private sector. The lag between the application for AGI and the actual attainment of AGI affects delivery and creates ruptures of stocks. This is further worsened by the inability of the Ministry of Trade to respect the fixed dates of allocation of AGI (January and July). For instance, in 1980 all public enterprises received the AGI in March although they were expected on the 1st of January. These procedures directly affect the process of production. The fixed amount of foreign currencies allocated to a public enterprise via the AGI depends on the extent to which the foreign trade department of the public enterprise

Table 3.1: Exchange rates (AD per US $)

| | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Official exchange rate(1) | 4.937 | 4.937 | 4.644 | 4.556 | 4.185 | 3.997 | 4.125 | 4.359 | 4.035 | 3.835 | 3.755 | 3.972 | 4.378 |
| Trade conversion factor(2) | 4.937 | 4.937 | 4.913 | 4.484 | 3.959 | 4.181 | 3.949 | 4.164 | 4.147 | 3.966 | 3.853 | 3.837 | 4.316 |

Source: International Financial Statistics, IMF.

1 End of period.
2 Period (year) average.

can convince the financial authorities. It also depends on available foreign currencies. Allocated AGI, therefore, are often less than requested AGI. This creates a shortage of inputs and a competitive situation between different plants since the total amount is a bulk amount. SONIC, for example, received only 55% of its requested functioning AGI in March, 1980. This resulted in shortages of some imported inputs in the Mostaganem plant. This could have been avoided if the money allocated to other particular imports could have been used for this purpose. Unfortunately, this is not possible with the present policies because the money allocated to a particular import cannot be used for another import. There is no flexibility in the use of allocated foreign currencies.

After facing burdensome administrative procedures to obtain the needed foreign currencies, it takes an additional month before the plant is able to use the allocated AGI; i.e., it takes one month for the notification copies to reach the local bank. This is especially crucial since most foreign suppliers require financial guarantees which are granted by the local bank only when the copies are received. Different plants and foreign trade department have to once again face bank control when the money is transferred. Full payment is required by the bank on order of the goods. In order to meet the payment, the plant or even the public enterprise often resorts to short term loans carrying a high interest rate. This procedure creates imbalances at the financial planning level and increases financial charges.

Imports sometimes do not conform to the specifications of the stipulated request because the choice of supplier is made by the Marketing Board of the public enterprise. The quality of the intermediate inputs is sometimes not adapted either. In addition, delays arise in negotiations of the orders with the supplier, its approval by the bank and finally in the delivery schedule because of the lack of infrastructure. Another problem is the slowness of the distribution network.

Bulky foreign trade procedures also keep plants and public enterprises from taking full advantage of low price opportunities when they occur, particularly for imports that are affected by seasonal prices. This inability means a higher cost to the economy. In order to prevent shortages of imported inputs, some plants build up stocks to hedge against delays when money is allocated to them. This results in the locking up of capital in stocks, worsening the situation of other plants which may need imports urgently. Clearance of goods is another lengthy and bulky process. The customs administration procedure is time consuming and results in further delays. Such heavy administrative costs do not seem to be taken into consideration.

As far as exports are concerned, their contribution to the Algerian economy is quite poor (except hydrocarbons). Foreign trade department lacks the flexibility, incentives and skills necessary to promote exports though, at the present time, only very few public enterprises would be able to do so. Bank procedures for exports are also very cumbersome. Public enterprise exports could grow with innovative and commercial dynamism. They could expand in existing export markets and break into new ones.

Present foreign trade policies create shortages of imports in projects and plants and therefore have direct consequences on the utilisation of production capacities. This will be discussed in more detail in the following chapters.

## 3.5. Price policy

One aspect of government policies which is related to the emergence of the Algerian public sector relates to price. In any planned economy prices are fixed by the state, they are not regulated by the market as in a free market economy. In this section, we will first deal with actual price setting. In the second section, the main functions of prices in a planned economy are described and the predominant role played by prices in the Algerian economy is analysed. Price trends and the causes of inflation are examined in the third section. Last, an evaluation of Algerian price policy is presented.

### 3.5.1. Price setting in Algeria

From the early stage of the post-independence period, the state has exercised tight control on most prices. The responsibility of price setting is shared by the Council of Ministries, the Ministry of Trade, the National Price Committee (PNC) and the Wali (local authority). At present, the essential features of this control are as follows:

a) Prices of basic food products and services such as coffee, tea and cooking oil are fixed by the government. The list of these products is fixed by decree. The purpose of this procedure is to ensure price stability and price standardization across the country. In addition, this procedure is aimed at balancing the high prices of some products with that of others. For example, staple products are sold at a lower price than their actual value while other luxury products are sold at a higher price than their actual value in order to make up for the eventual loss.

b) Special or frozen prices for a range of products during a determined period is decided by the government independently, to some extent, of their real costs. This allows different inputs to be sold at a similar price in both cities and inland areas (which are inaccessible). Subsidies may make up the difference between actual price and real cost.

c) In order to carry out investment programmes, prices of inputs such as intermediate inputs or capital are worked out by the government. This procedure alleviates the effect of world inflation on the cost of projects.

d) Control of trade margins is implemented for wholesale and retail prices. The objective of such a practice is to eliminate any notion of free price. All prices are subject to this procedure except those which are determined by the government as described above. Profit margins, tax, and ceilings are used as means for fixing the prices of locally produced or imported goods.

e) Control based on prior price registration is the most frequent kind of procedure. The price of any product other than those falling in the categories described above, must be registered with the price authorities which decide on the final price. If a proposed price is felt to be overvalued, the price authorities may fix a lower price than that proposed.

It may be said that present Algerian price policies affect both locally produced and imported products. In addition, the managers of public or private enterprises are not free to increase or decrease the price of their products. The managers do play an important role in suggesting changes in prices to the price authorities. When the price of a product is not fixed, steady or special, producers can ask the price authorities for a price increase as soon as the production cost rises by more than 5%. The price authorities have 30 days to refuse the request for an increase. If, after the 30 days, the price authorities have not vetoed the request for a price rise, the increase becomes effective.

Production costs which are evaluated by the production or commercial plant for each product are proposed to the price authorities. Most production costs which are jointly determined are calculated approximately because of the lack of necessary data and means of analysis. When the price of a product is fixed, frozen or steady, the production cost evaluation allows the computation of the price itself and, more importantly, the calculation of subsidies to be distributed in order to cover the eventual difference between production cost and price. These subsidies are arbitrarily distributed leading to problems of treasury at the plant level. When the price of a product is not fixed, frozen or steady, it is only when production cost increases that managers can apply for a price increase.

Different benefit margins and taxes are added to both locally produced outputs and imported products. For locally produced outputs as indicated in Figure 3.2: (a) A profit margin of 8% is added to the production cost when the product is sold to another plant in the same branch of industry. When the product is sold to another branch of industry, a turnover tax is added on top of the 8% profit margin. The turnover tax is calculated according to the specific rate published by the tax authorities. (b) The wholesale profit margin has been fixed at 20%. This margin is added to the industrial price. (c) The retail profit margin has been fixed at 30%. This margin is added to the wholesale price.

Regarding the imported goods subject to monopoly, profit

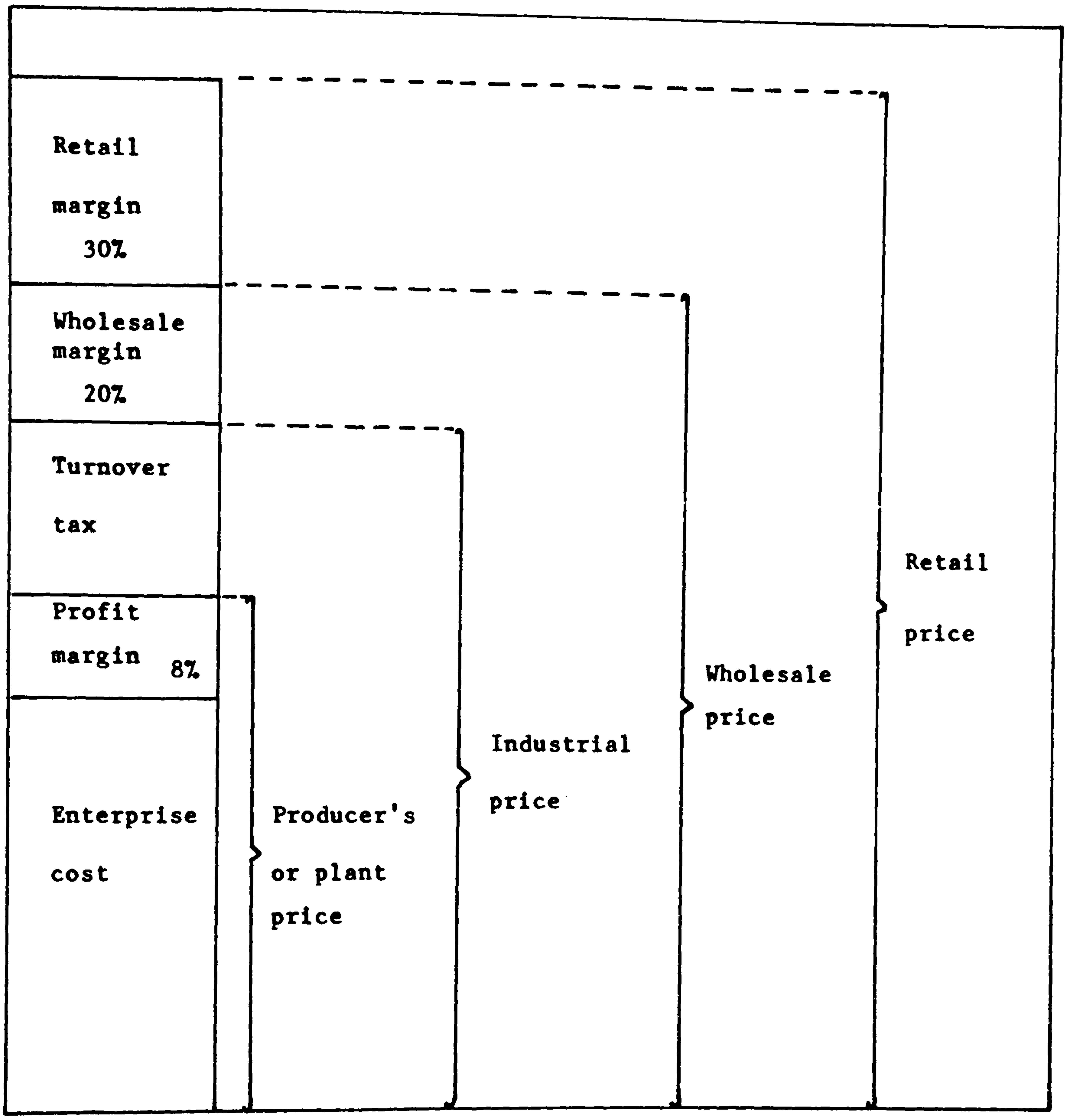



Figure 3.2 : Different trade margins.

Source : Reglementation des Prix: Textes Fondamentaux, Ministry of Trade, Direction des Prix, Algiers, 1976.

margins are calculated according to the destination of the products. As indicated in Figures 3.3 and 3.4, a profit margin of 3% is fixed for imported goods sold to other public enterprises, while a margin of 10% is fixed for imported products sold to private wholesalers. A special margin of 30% is charged when the imported goods are sold directly to consumers and a special margin of 20% is charged when the imported product is sold directly to the users (industrial sector). All of these margins are added to the c.i.f. price of the imported good. When the imported product is sold directly to the consumer or user the special margins may be added to the enterprise cost which is calculated by adding transport charges to the c.i.f. price.

### 3.5.2. Main functions of price

In a planned economy prices have four main functions: allocation, control, measurement and income distribution.

#### a. Allocation

Prices generally reflect relative scarcity and may influence economic decisions. In a planned economy, administrative planning bears the primary responsibility for allocation, although prices play a limited role. Prices that are centrally determined and based on average branch costs do not totally reflect relative scarcities.

#### b. Control

Price policy is an important instrument. It is the most important means of control of production processes and of enterprise management. In both planned and free market economies, profit mechanisms and profit variants can act as control devices. Profits do not play an allocative role, although targets are given and controlled in value terms. Thus, in a planned economy prices are used to evaluate and control

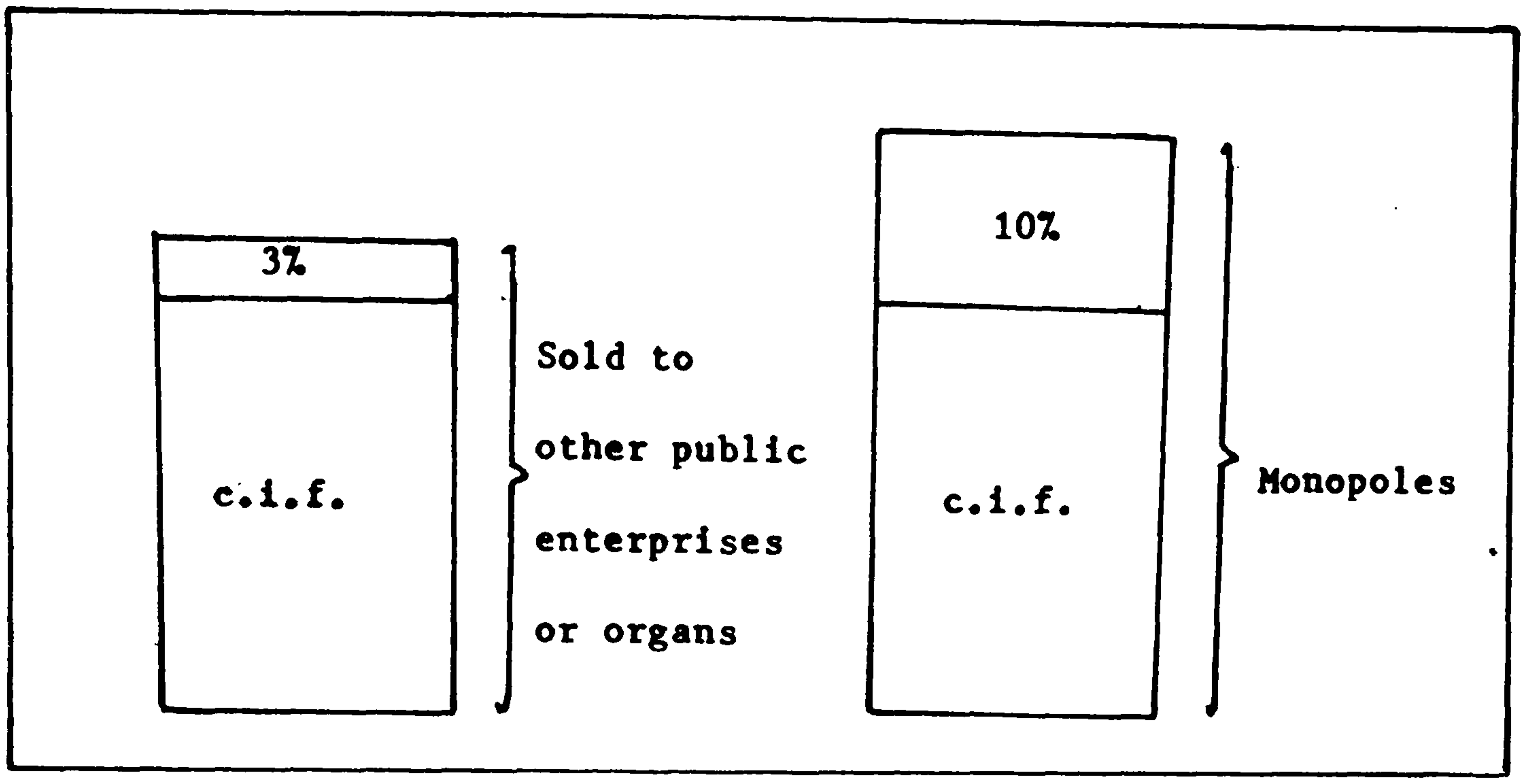



Figure 3.3 : Margin for imported goods.

Source : Ibid figure 3.2.

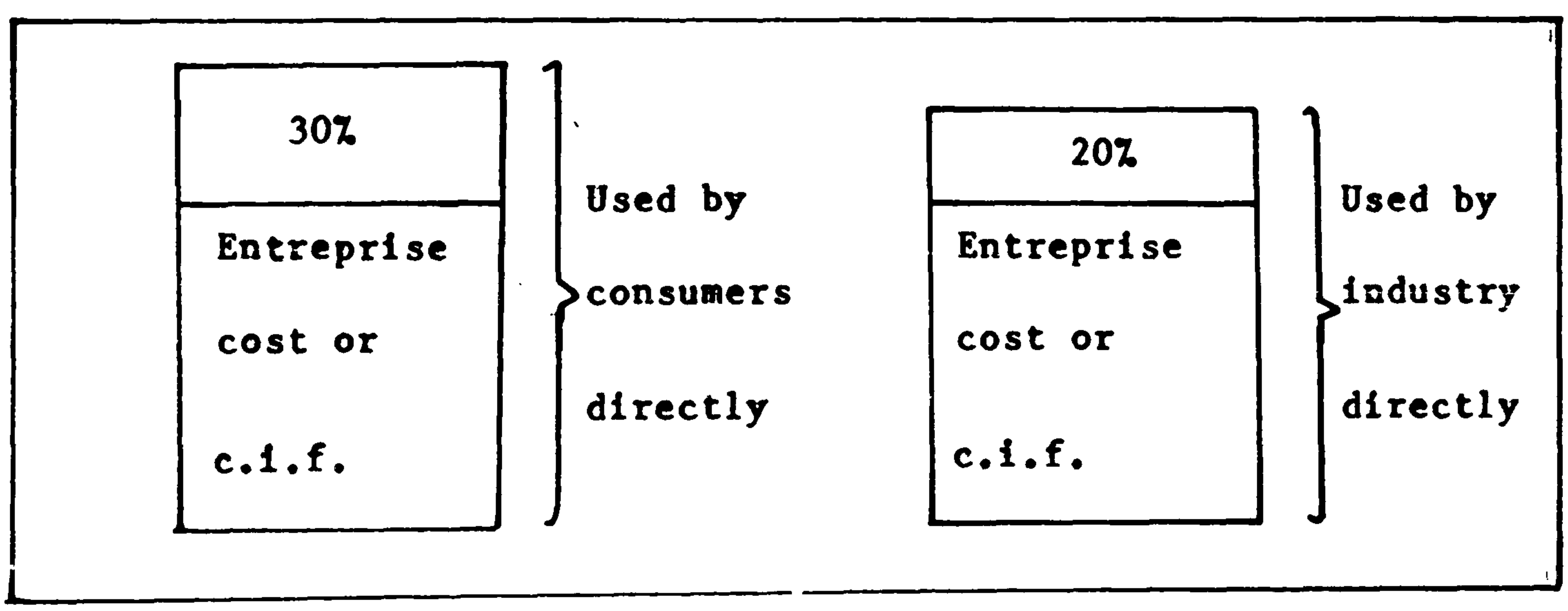



Figure 3.4 : Margin when goods are sold directly to consumers or users.

Source : Ibid Figure 3.2.

performance at all levels. Value indicators are widely used to indicate deviations from planned activities. Control is mainly carried out through physical control and directives.

c. Measurement

This function is, in various aspects, similar to the control function. Prices are required to assess the results achieved in a given economy. For example, without prices one cannot determine at what rate the economy is growing and the trend followed by the capital/output ratio.

d. Distribution of income

Prices play an important role in determining the distribution of income. In addition to the centrally determined wage scale that directly affects the distribution of income, pricing authorities can influence the distribution of real income through retail prices.

In Algeria the price system is formulated in an attempt to stimulate the economy in general and favour the development of some sectors in particular. A more egalitarian redistribution of incomes and participation in the financing of development through commercial taxes are also expected to be achieved. The main purposes of price policy are to prevent a rise in the cost of living of the poorest segment of the community and carry out the objectives established by development plans. Redistribution of income has been the predominant function of prices in the Algerian economy.

3.5.3. Price trends and the causes of inflation

During the period 1969-80, prices were subject to frequent increases. This is indicated in Tables 3.2, 3.3, 3.4 and 3.5 which show changes in wholesale prices, consumer prices and general prices. Between 1970 and 1976, wholesale prices rose

Table 3.2: Wholesale price index of industrial production

by branch of industry. Base 1969=100.

| Branch of industry | Weight | 1970 | 1972 | 1974 | 1976 |
|---|---|---|---|---|---|
| Energy & water | 51.22 | 100 | 100 | 102.2 | 102.2 |
| Mines & quarrying | 35.46 | 118 | 115.9 | 195.6 | 223.6 |
| Metal industries(1) | 22.15 | 110.1 | 103.1 | 107.7 | 113.6 |
| Chemical & rubber | 58.77 | 104.3 | 107.5 | 117.1 | 136.5 |
| Food industries | 598.49 | 100.2 | 105.4 | 113.9 | 153.3 |
| Textiles industries | 114.66 | 112.8 | 115.7 | 133.9 | 162.6 |
| Skin & hide industries | 29.96 | 104.1 | 107.4 | 117.3 | 130.1 |
| Wood and paper | 40.08 | 99.2 | 115.2 | 128.9 | 181.4 |
| Miscellaneous | 4.61 | 4.6 | 105.6 | 139.9 | 158.1 |
| General Index(2) | 1000 | 102.6 | 107.1 | 120 | 153.7 |

1 Metal industries: Iron and Steel and metal, mechanical and electrical engineering.
2 Total without hydrocarbons, steel and iron and metal engineering industries.

Source: MPAT 1977 quoted in Le Cout de la Vie en Algerie depuis 1962 by Ali-Toudert A. (Economica, Paris, 1982) p 21.

Table 3.3: Consumer price index.

Base 1969=100.

| Years | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1978 |
|---|---|---|---|---|---|---|---|---|---|
| Index | 100 | 106 | 109 | 113 | 120 | 126 | 136 | 147 | 196 |

Source: Ibid Table 3.2 p 28.

Table 3.4: Consumer price index by group.

| Groups | weight | 1969 | 1975 | 1978 |
|---|---|---|---|---|
| 1 Food,drinks & tobacco | 456.6 | 100 | 149.4 | 235.1 |
| 2 Clothing & shoes | 147.9 | 100 | 139.2 | 198.9 |
| 3 Rent & charges | 131.5 | 100 | 106.6 | 120.3 |
| 4 Furniture | 68.8 | 100 | 136.5 | 193.5 |
| 5 Medical serv. & health | 25 | 100 | 114.8 | 125.5 |
| 6 Transport & communicat. | 72.5 | 100 | 121.1 | 136.3 |
| 7 Entertainment & leisure | 43.2 | 100 | 117.9 | 203.1 |
| 8 Other services | 55.1 | 100 | 137.7 | 203.1 |
| Total | 1000 | 100 | 136.4 | 195.9 |

Source: Ibid Table 3.3.

Table 3.5: Consumer and general price index and their annual rates of growth. Base 1974=100.

| | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|
| General price | 115 | 127.7 | 141.2 | 159.4 | 195.9 |
| Consumer price(1) | 118.5 | 132.7 | 155.5 | 173.7 | 190.5 |
| | | Annual percentage change | | | |
| General price | 10 | 11 | 10.6 | 12.9 | 22.9 |
| Consumer price(1) | 8.9 | 12 | 17.2 | 11.7 | 9.7 |

(1) Greater Algiers area consumer price index only.
Source: MPAT, Algiers, 1981.

Table 3.6: Annual increase in consumer prices and in prices of imported goods price (in percentages).

| Years | 1969-71 | 1972-75 | 1976-79 | 1980 |
|---|---|---|---|---|
| Consumer price(1) | 4.6 | 5.8 | 12.4 | 9.6 |
| Import price index | 6.3 | 13.5 | 8.8 | 7.7 |

1 Consumer price for Greater Algiers only.

Source: MPAT, Algiers, 1981.

at an average annual rate of 7.7% (48). The largest increase occurred after 1973 and affected different branches of industry unequally. For example, as illustrated in Table 3.2, in the mining and quarrying and the textiles and food industries wholesale prices were subject to a much higher increase than in energy and water. In some branches of industry wholesale prices were purposefully kept low and many industrial enterprises were operating under state subsidies. Similarly, for the 1969-78 period retail prices rose at an average annual rate of 6.7% (49). For instance, as indicated in Table 3.6, consumer prices for Greater Algiers rose steadily from 4.6% per annum during the 1969-71 period to 12.4% per annum during the 1976-79 period. Table 3.4 indicates that this rise did not affect the different groups to the same extent. It can be seen that rent and charges increased very slowly in contrast to the price of food and tobacco products which, together with entertainment and leisure retail prices, were subject to the highest increase. As shown in Table 3.5, the highest annual rate of growth for consumer prices, 17.2%, was reached in 1978. In 1980, this rate decreased to 9.7%. The annual rate of growth of general prices increased steadily from 10% in 1976 to 22.9% in 1980.

It should be noted that actual prices were often higher than official prices. Rates of growth are calculated using subsidized prices while many retail prices were higher than regulated prices. The difference between official and actual price is sometimes very large. For example, in 1977 the price of cement on the black market was five times the official price (50). The published figures underestimate the real price increases and should, therefore, be analysed with some reserve.

The main factors determining the price increases were manifold. The increase was due, in part, to the impact of international inflation reflected in the price rise of imported goods and services and to the accelerated increase in the money supply and in claims on the Treasury (51). As shown in Table 3.6, the high prices of imported goods are reflected on domestic prices with a three year lag. In effect, when the rise in the consumer price index for Greater Algiers is compared with the rise in imported goods, Table 3.6 shows clearly that the initial jump in the rate of increase in the price of imported goods was followed automatically by a rise in the consumer price index. The increase in consumer prices during the 1976-79 period (12.4% per annum) reflected the increase in the imported price index during the period 1972-75. Similarly, the lower rate of increase in consumer prices recorded since 1979 (1980: 9.6%) corresponded to a lower rate of increase in the price of imported goods during the 1976-79 period (8.8% per annum). In addition, high population growth tremendously increased the country's needs and consequently, demand which has a large effect on price. The creation of new jobs increased the bulk of wage earnings and consequently, money in circulation rose tremendously. The revenue increase, however, rose more rapidly than the production of goods, services and capital goods (52). Consequently, the large amount of money in circulation created an increase in the demand for staple products which accentuated the upward movement of domestic prices.

The rate of inflation rose more rapidly in the late 1970's despite government success in combating price increases in certain areas. This high inflationary situation resulted in a deterioration in the standard of living of the proportion of the population receiving a relatively fixed income. This situation was worsened by frequent shortages of staple products, favouring the development of a black market. The Algerian income distribution policy had relatively few successes despite large efforts made by the government to stabilise the prices of staple products. Parallelling this, enormous and quick profits obtained through the black market were used to finance an overconsumption of luxury products. These lucrative savings were not reinvested in the national economy. As a consequence of the high inflationary situation, hardly any real saving was accomplished by the public sector except for the hydrocarbon sub-sector.

### 3.5.4.An evaluation of Algerian price policy

Prices are used by the planning authorities in decision-making related to capital formation and future production and to the current operations of existing enterprises. Studies based on existing prices are carried out in order to choose between different projects. Calculations of costs and benefits are often made from inadequate prices which do not indicate the real price of the resources involved. Consequently, the allocation of investment cannot be optimal. An alternative allocation using the same volume of resources may be a better choice.

Prices used by the existing public enterprises do not reflect input scarcity; consequently, production costs are artificially low. Managers are not prompted to economise on the use of scarce inputs and to minimize production costs by increasing efficiency. When prices are distorted and the prices of factors of production are not scarcity prices, a combination of inputs that minimize costs for the enterprise does not release resources to create output elsewhere.

Fixed prices go very quickly out of date. They become inadequate and are not representative of the cost of different inputs especially when prices of imported inputs increase quickly. This procedure calls for frequent reassessment because of the rising costs in both the local and international markets. As already indicated calculations of costs are only approximate (53). Thus, price rises are not always implemented on time. Such a price system results in extensive state subsidies. This situation does not encourage a reduction of high production costs and fails to penalize high cost producers. Consumers, therefore, are not properly protected against high prices charged by inefficient public enterprises.

The Algerian economy has been subject to growing inflationary pressures. These pressures were almost non-existent before the first four year plan (1970-73) but increased gradually each year until 1979 when the inflation rate began to decline. Inflation would have been higher if price control policies, which included the payment of subsidies for consumer staple products, had not been implemented by the government. This system had the effect of alleviating the impact of rising prices for imported goods, too. The present price system is not flexible and does not allow rapid and easy adjustment of prices in response to changing economic conditions. The major drawback of these policies is that there is no incentive to reduce high production costs by making better use of inputs. Consequently, enterprises are likely to be inefficient.

## References


1 Presidential Circular of 14th August 1970, JORA, Algiers.

2 Refer to 1971 Ordinance published in The Methodes et Instruments de Planification des Investissements: Procedure d'Inscription de Financement and the Suivi des Investissements, Circuit Bancaire (MPAT, Algiers, January 1977).

3 The manual contains the precise details of the data sheet which should be filed by the public enterprise (MPAT, Algiers, 1977).

4 See for more details Bouzidi, A.: La Planification des Investissements en Algerie, RASJEP, Special 20eme Anniversaire, Algiers, 1982 p 255.

5 Refer to Circular no. 1536 of 26 July 1971, JORA, Algiers and see Bouzidi, A.: La Planification des Investissement en Algerie, op cit. pp 258-260.

6 Refer to Bouzidi, A.: La Planification des Investissement en Algerie, op cit. p 265.

7 This problem was also stated in La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. pp 321-322.

8 Ibid p 322.

9 Ibid p 325.

10 See Appendix C.2 for more details on the Algerian banking system.

11 See Finance Act of 1971 and Methodes et Instruments de Planification des Investissements: Procedure d'Inscription de Financement and the Suivi des Investissements, Circuit Bancaire, op cit.

12 Presidential Circular of 14th August 1970, JORA, Algiers.

13 Refer to Circular no. 1536 of 26 July 1971, JORA, Algiers and Recueil des Textes: Investissement et Gestion des Entreprises Socialiste (the Ministry of Finance (Department

of Treasury, Credit and Insurance), 3th part, Algiers, undated) p 14.

14 The Technical Committee consists of the Managing Director of the BAD or his Deputy Managing Director, a representive of the MPAT and of the concerned Ministry, the Treasury Managing Director or his assistant and a representative of each of the following banks: BNA, CPA, BEA and BCA.

15 Refer to Nomenlature des Investissements du Premier Plan Quadrienal: Manual d'Evaluation des Projets de Developpement (MPAT, Algiers, undated).

16 Refer to Presidential Circular of 14 August 1970, JORA, Algiers and see Methode et Instruments de Planification des Investissements, op cit. p 41.

17 Methodes et Instrument d'Evaluation de Planification des Investissements, op cit. p 41.

18 Refer to Boussoumah, M.: L'Entreprise Public en Algerie (Economica, Paris, 1982) p 582.

19 See Naibi Douaouda, A.: Le Financement Extra Budgetaire de Plan, unpublished DES dissertation of public law, Algiers University, April 1977, p 168 quoted in Boussoumah, M. op cit. p 582.

20 Article 26 and 27 of the Finance Act of 1970, JORA, Algiers.

21 Article 26 and 27 of the Finance Act of 1971, JORA, Algiers.

22 Ordinance no. 75-93 of 31 December 1975 and Ordinance no. 76-114 of 29 December 1976 related to the Finance Act of 1976 and 1977, JORA, art. 18 p 1104 and art. 9 p 1250, respectively.

23 Circular of the Ministry of Finance no. 4067 of 14 August 1970, JORA, Algiers.

24 See for more detail Benouchfoun, Y.: Les Procedures d'Execution des Depences d'Investissements de l'Etat

Effectuees a Titre Definitive, Revue Financiere, no. 1 p 23 and no. 4 p 7, Algiers, 1976.

25 Article 14 of ordinance no. 73-64 of 28 December 1973 related to the Finance Act of 1974, JORA, Algiers.

26 Refer to Bouzidi, A.: La Planification des Investissements en Algerie, op cit. p 262.

27 This problem was stated in La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 330.

28 Ibid p 343.

29 See for more detail on the subject Clegg, I.: Workers' Self-management in Algeria (Monthly Review Press, USA, 1971) and Boutefnouchet, M.: Le Socialisme dans l'Entreprise: Evolution de la Gestion Socialiste des Entreprises en Algerie (ANEP, Algiers, 1978).

30 See Charte de l'Organisation des Entreprises (ANEP, Algiers, 1971) and Ordinance 71-74 of 16 November 1971 laying rules of socialist management, JORA no. 101 of 13th of December, 1971 p 1346.

31 La Charte de l'Organisation des Entreprises, op cit.

32 See for detail Nellis, J.R.: Socialist Management in Algeria, The Journal of Modern African Studies, Vol. 15, no. 4, Dec. 1977, pp 547-552.

33 More detail on the Board of Directors is given in part 4.1.

34 See Boutefnouchet, M.: Le Socialisme dans L'Entreprise, op cit. p 90.

35 Refer for more detail to Grimaud, N.: Les Relations de Travail en Algerie, Le Cinquieme Congree de l'UGTA in Maghreb-Machrek Review, Paris, no. 80 April-June 1978 p 57 and Nellis, J.R.: Socialist Management in Algeria, op cit. pp 547-552.

36 See Grimaud, N.: Les Relations de Travail en Algerie, le

Cinquieme Congres de l'UGTA, op cit. p 60 and Boutefnouchet, M.: Le Socialisme dans L'Entreprise, op cit. p 114.

37 See EL-Moudjahid October 1975 quoted in Nellis, J.R.: Socialist Management in Algeria, op cit. p 550 and Boutefnouchet, M.: Le Socialisme dans L'Entreprise, op cit. p 114.

38 Grimaud, N.: Les Relation de Travail en Algerie, op cit. p 60.

39 Refer to ILO Legislative Serie, 1959, France 1 and 4.

40 Ibid 1963 Algeria 1A and 1B.

41 For more detail see ILO Legistalive Serie, Algeria 1971, 1.

42 Ibid 1975 Algeria 1.

43 Refer to Le Statut General du Travail, SNS centre de formation aux techniques de manutention (SNS, Algiers, 1978).

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45 Les Relations de Travail en Algerie by Grimaud, N. op cit. p 62.

46 See Africa Contemporary Record, 1979-80 Vol. XII, Annual Survey and Documents.

47 Codes des Douanes (OPU, Algiers, 1980).

48 Refer to Ali-toudert, A.: Le Cout de la Vie en Algerie depuis 1962 (Economica, France, 1982) p 20.

49 Ibid p 28.

50 Ibid p 34.

51 For more detail see La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. pp 247 and 248.

52 Ibid.

53 Except SONATRACH, DNC and SNMC, no other public enterprise calculates accurately the cost increase of outputs.

# PART TWO

# CHAPTER FOUR : INTRODUCTION TO PART TWO

Since president Boumediene came to power in 1965, a development strategy based on the "industrialising industries" theory has been adopted in Algeria. This strategy underlies the development plans implemented since then. As a result of large investments (53% of total investments since 1967), the public industrial sector has become more important (1). The Algerian industrial GDP has been growing at an average annual rate of about 10% for the past 12 years compared to the 7% average annual growth rate of GDP over the same period. In 1980, the industrial sector contributed to 57% of the country's gross domestic product and accounted for no less than 24% of the total employed labour force. Despite rapid industrial growth, the industrial public sector is faced with a wide range of difficulties.

To measure the performance of the Algerian public sector, capacity utilisation is calculated for Algerian public enterprises. In a labour surplus economy such as that of Algeria, the rate of growth of national output is given by:

$$g = s / v$$

where s is the proportion of national output which is saved and v the incremental capital/output ratio. It can be seen that for a fixed value of s, g increases as v decreases. v is therefore related to efficiency and is affected by the rate of capacity utilisation. Economic efficiency, and therefore the performance of the public industrial sector, depends on capacity utilisation. The efficiency at which the different raw materials, intermediate inputs, installed fixed capital and available labour force are used in the Algerian public industrial sector is an important factor in that it determines industrial performance. Capacity relates to the degree at which resources are fully employed. An increase of capacity utilisation results in a higher level of output leading to a higher per capita income. It also affects the rate of growth of national output. This is because an inefficient use of the factors of production has adverse effects on the levels and rates of growth of industrial sector output and employment and generally detracts from the formation and building of a sound industrial programme.

The inefficient use of the factors of production which results in underutilisation of production capacity will be subject to a detailed examination in the present study with empirical content being drawn from the specific conditions found in public enterprises studied during 1980-1981. If the empirical evidence obtained show that production capacity is not efficiently (fully) used, an increase in capacity utilisation will have a great effect on the level of income and rate of growth. Additional employment will also be provided by increasing the number of shifts over which capital equipment is used. Thus, by using the production capacity which is left idle part of the time, the level of employment as well as the level of output may be increased.

Capacity utilisation estimates and identification of the causes of inefficiency are the main objectives of this study. The identification of these causes of underutilisation and resulting inefficiency will allow policy makers to initiate corrective action and yield the type of policy needed to help solve the problems encountered in Algerian public industrial enterprises. In the Algerian case, it is far more important to find out why scarce capital is underutilised than to determine the precise degree of underutilisation. Some suggestions regarding a more efficient use of scarce capital are made in the concluding chapter.

In the first section of this chapter, the Algerian industrial public enterprise is analysed. The objectives set through the creation of public enterprises, the structure of organisation, decision making and the control of public enterprises are examined. In the second section, the methodology, the survey and sample and the questionnaire used in this study are discussed. The common causes of inefficiency are described in the third section based on both public enterprise managers' views and opinions and analysis derived from the different case studies.

## 4.1.Algerian public industrial enterprise

One of the structural reforms undertaken by the state was the expansion of the state to the entire economy by the creation of public enterprises in industry and services. Since the early 1970's, the public enterprise has been the chosen means to reach the ambitious objectives of rapid industrialisation combined with an increase in the country's economic independence. During the early post-independence period, firms abandoned by the French settlers were organised in plants self-managed by workers. With the nationalisation of vital industries and the launching of development plans, the public enterprise structure emerged. Since then their numbers have rapidly increased resulting in a growing industrial public sector. The scope of activity of public enterprises has become exceedingly wide, reflecting the comprehensive involvement in national infrastructure, in commercial and industrial developments, in modernisation of agriculture and in regional and urban developments. The study of industrial public enterprises having production as their major function and constituting the public industrial sector is the focus of this section. These enterprises' major function is production, but their activities extend to imports, supply, sales and, in a few cases, research, development and engineering.

The public enterprise is created by presidential decree which defines its objectives, its privileges, its form of management and its relationship with various ministries. The public enterprise is defined as a corporate body and as a separate entity for legal matters which is able to enter into contracts and to acquire property. The public enterprise operates as an autonomous financial entity having its own bank account. Thus it is not subject to the national budget. Profit is not required as a condition for survival. Public enterprise employees are not civil servants. They are recruited and paid under terms and conditions which are determined by the ministry for all the public enterprises under its supervision. In fact, only the managing directors, the divisional, functional and plant managers and the members of the Board of Directors are appointed by the supervisory ministry. All the industrial public enterprises are wholly owned by the state in the majority of cases. A few plants are owned jointly by the state and private foreign firms on a 51%-49% basis, respectively.

4.1.1.Creation of public enterprises

There are numerous government objectives fulfilled by the creation of public enterprises. Public enterprises have aimed at securing state control of the commanding heights in the economy. By doing so, they ensure the expansion of the role of the state and put the power in the hands of the Government for matters of importance. The presence of a public sector, therefore, allows the interference and manipulation (to a certain extent) of economic activities through different state policies. Other objectives are the injection of new investment, the creation of new jobs and demand in order to ensure conditions for economic growth and investment. Public enterprises also mobilise resources from the international financial market through bilateral and multilateral loans. Furthermore, they have provided the economy with infrastructural support. They allow the restructuring of the allocation of resources in order to counter imbalances. One of their objectives has been to avoid the buildup of foreign or private capital interest. Public enterprises have, to that effect, been used as a means to nationalise foreign firms (e.g., oil and gas in 1971) and to restrict the development of private Algerian firms to certain industrial branches only. Public enterprises have provided opportunities to build up entrepreneurial and managerial skills that the Algerian population lacked at the time of independence. Besides, public enterprises set up an example for employment standards, labour relations and rewards of employees contracts. Public enterprises, therefore, have become instruments for securing desired social and political changes.

### 4.1.2.Organisational structure of public enterprises

The Algerian industrial organisation is comparable to product departmentalisation in a great multiplant corporation. The organisational structure of the public industrial sector which consists of three ministries, is as described in part 2.2.1.1. Each public enterprise is under the supervision of a particular ministry. The most commonly spread organisational structures among public enterprises are the divisionalised structure based on a group of closely related products and the functional structure. The divisionalised structure is mainly found in large public enterprises such as SONATRACH, SONACOME, SNS and SNMC while the functional structure is found in medium and small public enterprises such as SONIC and SNIC. Figures 4.1 and 4.2 give a broad outline of the two commonly found structures.

In a divisionalised structure, the public enterprise is divided into different divisions. The different divisions are grouped under the head office. Each division is given control on the operating functions. Each division is a self-contained business with respect to purchasing, manufacturing and marketing activities. Each division is granted the necessary power to make the day-to-day decisions concerning its own operations. The division is organised into separate departments which provide specialised contributions to all produced outputs. The manufacturing activity is divided into different plants or complexes. Each complex is divided into plants (or large workshops) grouping different manufacturing activities and different departments into its remaining activities (for example, purchasing and marketing). In a functional structure, the public enterprise is divided into different departments which provide specialised contributions to the whole range of produced outputs. The manufacturing activity is divided into different plants. The plant is divided into different workshops for its manufacturing activities and different services for the remaining activities.

The size and complexity of the managerial apparatus vary with the extent and nature of the public enterprise's operations. Some public enterprises have a few hundred workers, others have a few thousand employees. Some have ten

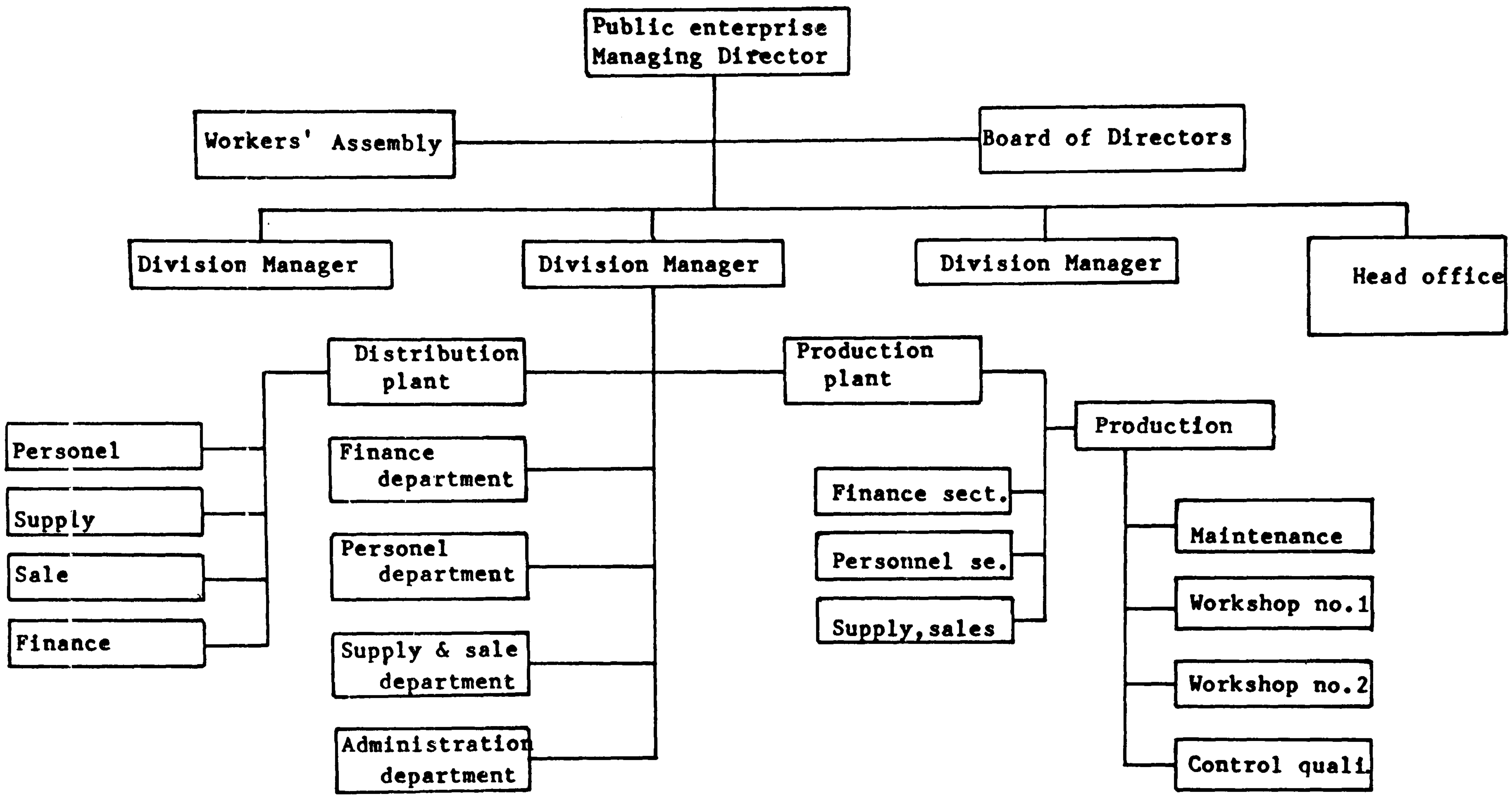


Figure 4.1 : A typical organigramme for a divisionalised public industrial entreprise.

Source : Survey data.

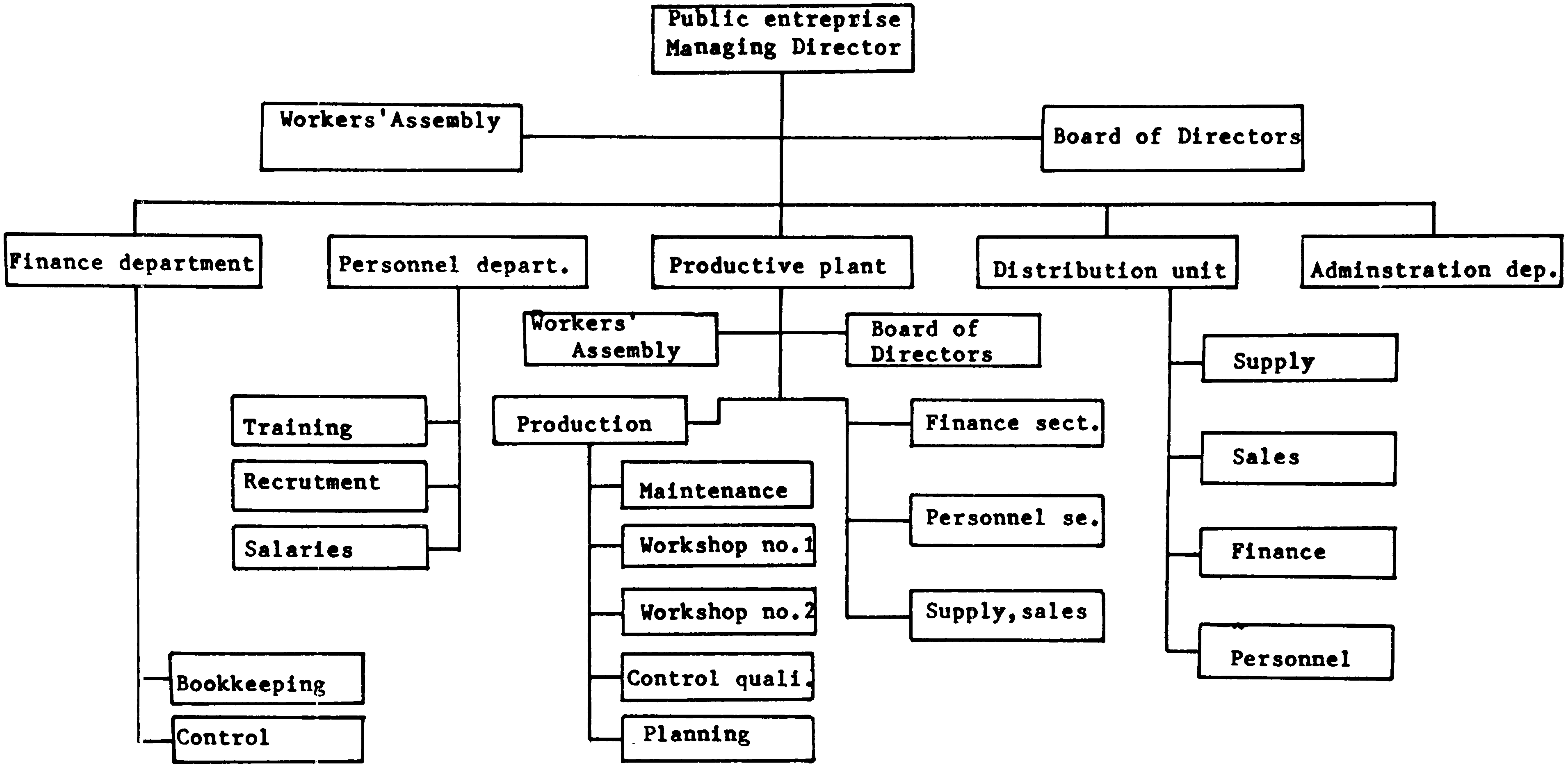


**Figure 4.2 : A typical organigramme for a functional public industrial enterprise.**

Source : Survey data.

or more plants or complexes, others less. The two organisational structures are multi-level (tall) organisations. The average span of control is low because of the large number of levels (more than 7) from the chief executive to the lowest level. The hierarchy forms a formal chain of command. The principle of unity of command and the authority level principle, however, are subject to significant limitations. Hierarchical superiors in the supervisory ministry are liable to issue detailed orders and to exert control on every conceivable matter concerning the public enterprise.

#### 4.1.3. Decision making

In order to examine the decision making process in the public enterprise, we need to focus on particular types of decisions. Among the many which can be chosen, public enterprise decision making with regard to current input or output seems most appropriate for extensive treatment.

Firstly, regarding outputs, several types of compulsory output targets are set by the plan. These are the aggregate values which include profits and sales and the major output targets in physical units. It should be noted that these targets are only defined after consultation with the concerned public enterprise. Thus, public enterprise' managers can influence the content of the plan concerning product assortments and in some cases actually determine the quantities and types of planned production through their initiatives and proposals. Accordingly, they may influence the types and related quantities of outputs and have an impact on aggregate output, cost, resource utilisation and various other plan indices and results. In fact, the diversity of assortments planned by the higher authorities depends chiefly on the nature and extent of the public enterprise's product line. The destination of outputs in the local market is left to the public enterprise manager discretion. The destination of exports is also the enterprise manager's decision, made according to foreign trade policies (see part 3.4). Prices of exported goods are most of the time regulated by international market prices while the price of outputs in the local market is subject to Government policies (see part 3.5).

Secondly, regarding input decisions, it is useful to separate the targets concerning compulsory wage payment of the labour force from those concerning the use of capital and material inputs. The public enterprise plays a minor role in the determination of the minimum wage which is decided by the state. The wage scale adopted by the ministry is enforced in supervised public enterprises. On the other hand, management has considerable independence regarding not only the classification of manpower according to occupations and professions but also the grading of personnel on the basis of skills, abilities and seniority. These decisions are often subject to approval by the personnel and training standing committee within the public enterprise or plant (see part 3.3). Thus, although basic rates and salary scales are established centrally, management influences the total enterprise payroll. Decisions concerning the selection of local material inputs is entirely up to the public enterprise and plant managers. The supply of local inputs is not regulated by government policies. Regulations on imports are imposed by the Central Government (see part 3.4). Thus, the public enterprise or plant managers have all the power regarding the supply of local inputs while foreign trade policies regulate imports. Last, it is the resource allocations rather than the market possibilities which influence the plant output and capacity. Total planned output is calculated from estimated physical production according to the expected plant capacity. Managers' estimates of plant capacity are based on contractor norms, Algerian conditions, the plan goals, the available resources and the need for proper balance and integration of interdependent production processes. Thus, decisions regarding the use of capital are left to the enterprise managers although decisions regarding the choice of outputs and the means of production fall within the competence of the planning authorities.

Thirdly, the central authorities decide on any kind of investment (see part 3.1). The enterprise managers have, therefore, no decision making power concerning, for example, the replacement of an old machine and extension or the building of a new project. Capital allocation is influenced by public enterprise managers when propositions for future investments are made to the MPAT. In fact, the enterprise managers prepare the overall draft plan, defend the planning proposals and implement planning decisions.

The last element of decision making which presents some interest is the sharing of decisions within the public enterprise. Decision making power concerning the day-to-day management of the public enterprise is in the hands of the managing director and the public enterprise's Board of Directors. Decisions have to be made according to the policies and objectives defined by the supervisory ministry and the state. The managing director carries executive responsibilities similar to those of a public enterprise managing director in a free economy. The Board of Directors outlines the framework of actions and establishes the general activity programmes of the public enterprise (sales, production and supply plans). The activities of the Board of Directors extend to decisions regarding the conditions of economic growth, to the extension of capital and to the proposition of plans for future investments. They decide on the organisational structure to be adopted and formulate the workers' status and wage scale projects. These long term decisions are then proposed to the supervisory ministry for approval. In addition, the Assembly of Public Enterprise Workers (AEW) advises the Board on most matters of importance. At the plant level, the day-to-day management is the responsibility of the manager. The Board and the Assembly of Plant Workers (APW) play a similar role and have identical decision making power to the Board of Directors and the Assembly of Public Enterprise Workers (AEW) at the plant level.

Managers of public enterprises do not possess the ultimate authority. Their decisions are either subject to higher approval or can simply be rescinded by superior authorities. In practice, managers significantly influence plans, operations and results of the public enterprise and plant.

4.1.4.Control

The nature of the industrial public sector and the objectives assigned by the industrialisation and development strategy led to the emergence of instruments of control of Algerian industrial public enterprises. Government means of controls are diverse. The type of control exercised on public enterprises is mainly financial.

4.1.4.1.Financial control

Financial control is exercised through the supervisory ministry, the Ministry of Finance and the banking system.

Day-to-day management is controlled by the supervisory ministry through its control of annual plan execution, financial documents, annual reports of the public enterprise and recommendations and reports of the Assembly of Public Enterprise and Plant Workers (AEW and APW). Balance sheets, the execution of financial accounts, the bookkeeping operation, budgets and wages are controlled by the Ministry of Finance. Financial controllers (3) within the public enterprise also check its financial situation. Written reports are sent by the controllers to the supervisory ministry and the Ministry of Finance. Furthermore, when credits is allocated, financial transactions are made and the production and financial plans approved, the public enterprise is controlled indirectly by the bank. The Assembly of Public Enterprise Workers (AEW) also exercises some control on the management according to the Socialist Management Code (see part 3.3).

4.1.4.2.Other controls

The enormous need for foreign exchange has necessitated the adoption of foreign control measures. Foreign trade regulations require that import licenses or AGI must be obtained before goods can be imported (see part 3.4). These regulations were introduced to control the use of foreign exchange, as well as the volume, range and direction of trade. Public enterprise foreign trade is, therefore, controlled through these regulations (the Ministry of Trade, banks and customs). In addition, another principal means through which the government seeks to influence the behaviour and performance of public enterprises is price. The state controls public enterprise prices through price policies (see part 3.5). Other government policies also regulate wages, labour, to name only a few, and therefore control the major important matters of the public enterprise.

One can conclude by saying that there are a combination of government controls with day-to-day managerial autonomy. Government power on matters of importance is ensured through statutes, adopted policies and regulations.

## 4.2.Theoretical background and data collection

### 4.2.1.Methodology

In this study the performance of a plant, public enterprise or branch of industry is evaluated by an efficiency measurement with regard to the use of resources. By measuring capacity utilisation, the efficiency and performance of public enterprises will be assessed. Efficiency in this study means the way in which the main inputs entering the production process, such as raw materials, intermediate inputs, capital and labour, are used to produce output. We are interested in efficiency in physical terms (quantity and, to a certain extent, quality) not in profitability or in value added. This is because the physical volume of output depends on the physical volume of resource inputs used in the production process and on the efficiency with which they are used (i.e., on their productivity). The economic efficiency and performance of the public enterprise depend on how its production capacity is utilised. Since Algeria is a capital-scarce economy, our attention will be focused on fixed capital utilisation. In addition, fixed capital utilisation figures are readily available. The inefficient utilisation of labour and of other inputs are obviously important but, as far as the Algerian case is concerned, their relevance is limited. For instance the inefficient use of labour has a minor effect on the Algerian economy because it is a labour-surplus economy. One should note, however, that the inefficient use of skilled labour force, which is in short supply, is relevant to this study. Unfortunately, labour productivity figures are not available.

Raw materials and intermediate inputs are not used efficiently when their consumption is higher than the norms given by the plant contractor. In principle, overconsumption of raw materials and intermediate inputs can be easily identified. In practice, however, figures are not always available and it is difficult to measure the inefficient use of these particular inputs. Since only a few figures are available, the analysis regarding overconsumption of raw materials and intermediate inputs is mainly based on the impressions of the managers interviewed.

The measure of fixed capital utilisation is capacity utilisation, U, which was derived by Mcgraw-Hill for US manufacturing (4). Capacity utilisation is the ratio of the level of output actually produced, Q, to the capacity output of a plant, Q1, during the base period T:

$$U = Q / Q1$$

When applied to US manufacturing, the capacity utilisation ratio U is based on two factors: Q and Q1. Q1 can be interpreted in various ways and, therefore, different capacity utilisations can be calculated. Capacity utilisation U1 is calculated using Q1 defined as an economic variable representing the planned level of output. Planned (and desired) capacity taken as full capacity is determined by the managers according to profitability and demand criteria. One should note that the ratio of planned to full capacity (i.e., that given by the contractor's norm) can be less than one.

Despite some shortcomings in view of the availability of data, the above method is felt first, to be less liable to erroneous results and misinterpretations than the electricity (5), the shift work (6), the Winston time (Ut and Uti)(7), and the Bautista, et. al. (8) measurement of capital utilisation which are generally used in developed countries but are not always applicable to developing countries (9). Second, the adopted method (survey) is the most hopeful of the approaches since the causes of underutilisation can be identified (10).

In this study, capacity utilisation U1 is defined as the ratio of Q (actual output produced) to Q1 (planned capacity output). Q1 refers to full capacity jointly determined by plant and public enterprise managers in agreement with the various ministries. According to public enterprise managers, full capacity, Q1, is calculated by taking into account the full capacity advocated by the contractor's (or technical) norms, desired capacity utilisation, the experience of the past few years, and Algerian conditions. In fact, no information was given about the exact method used to deduce planned capacity output. It is presumed that each planned capacity output probably follows a different method since there is no standard regarding this calculation. No clear notion of optimal production level enters the evaluation of planned capacity output. Neither is it based on factor demand since, in the vast majority of cases, demand is actually higher than planned capacity output.

The calculation of U1 (actual over planned capacity) relies entirely on planned capacity output. Consequently one may argue that conclusions derived from the analysis of U1, particularly when U1 is equal to one, may be subject to erroneous results since the lack of a standard definition regarding planned capacity output allows managers to respond according to their own subjective definitions of full capacity. Furthermore, the analysis may be limited because the number of hours the plant operates (number of shifts when fixed capital is used) varies according to the managers' preferences. Thus, the planned level of utilisation may still leave fixed capital idle for much of its available time in a resource-scarce Algerian economy. In view of these problems, two additional measures are needed in order to obtain a complementary basis for the analysis.

The U2 measure provides one of this basis. U2 is defined as the ratio of planned capacity output to technical (norm) capacity output. The technical norm is based on the technological capacity of a given output production line supplied by the contractor assuming that working conditions comply with those specified by the contractor. These contractor specifications are usually based on the figures for a similar plant in the contractor country of origin. The calculation of U2 indicates by how much planned capacity is underestimated, especially when U1 (actual over planned capacity) is equal to or higher than one. In general, technical capacity is higher than planned capacity. The analysis in this thesis is made taking into account the two measures (U1 & U2) simultaneously.

The U3 measure provides the second basis. U3 is defined as the ratio of actual to the technical number of shifts (or time). U3 indicates the intensity with which the fixed capital is used. A value of U3 less than one means that the fixed capital is left idle part of the time. This is particularly relevant because Algeria is a labour-surplus and a capital-scarce economy. The analysis of capacity utilisation will take mainly into account U1 and U2 since U3 is not always available and reliable.

Using the collected data, U1, is calculated in all the plants and public enterprises surveyed for each major output, for each plant, for each public enterprise output (total plants producing the same product) and for each public enterprise as a whole. U2 and U3 are also calculated whenever the figures are available. Full capacity utilisation is characterised by a value of U1, U2 and U3 equal to one. A value of U1, U2 and U3 less than one indicates underutilisation of fixed capital. If U2 and/or U3 are less than one, it can be concluded that planned capacity is underestimated and the fixed capital intensity is lower than the contractor norms. Since most of the plants are multiproduct plants, U1 for a plant is taken as the average value of the capacity utilisation calculated for each output. U1 of a public enterprise is taken as the average value of U1 for each plant. The same considerations apply to U2 (planned over technical capacity) and U3 (actual over technical number of shifts (or time)) for the plant, for each public enterprise output and for the public enterprise as a whole. It should be mentioned that, in order to draw more accurate conclusions from the capacity utilisation measure, capacity utilisation should be weighted by invested capital. Unfortunately, values of invested capital were considered to be classified information and were not made available. Capacity utilisation in the Algerian public enterprises surveyed was, therefore, not weighted by invested capital.

Labour utilisation can be calculated through a productivity measure. The productivity measure (output per worker or output per worker/hour) is compared to the norm. Since the norms are not available for public enterprises surveyed, an analysis of labour productivity cannot be conducted. It should be mentioned that since the productivity ratio is inversely proportional to the number of workers given a level of output, overstaffing leads to low productivity. Conclusions can be drawn, therefore, with regard to labour utilisation (e.g., inefficient labour utilisation in overstaffed plants). Unfortunately, figures on overstaffing are not always available so that in this area as well the analysis will rely heavily on the managers' impressions.

4.2.2.Survey and sample

As in other developing countries there is a lack of data in Algeria. No official calculation of capacity utilisation by plant output, by plant and by public enterprise is made on a regular basis. Thus, in order to collect the data necessary for the completion of this study, a survey had to be undertaken at the plant and public enterprise levels. Many difficulties were encountered in the collection of the data. The public enterprise managers and the representatives from the various ministries interviewed were not always willing to pass on information which often was considered classified. The fact that the surveyed plants are widely spread throughout the Northern part of Algeria added to the difficulties. Choices had to be made among the existing public enterprises since it was not possible to analyse and discuss the data of the entire public industrial sector due to time limitations. The survey covers six major public enterprises representing a total of 171 plants and complexes. This work is concerned with the public industrial sector only so no private firms are included in the survey.

Public enterprises were chosen based on several factors which allowed for a representative view of the Algerian industrial public sector. These factors include the size or scale of the plant and public enterprise, the activity of the public enterprise, the amount of output produced, input origin, output destination, the age of the plant and the use of capital or labour intensive technology in the plant. Almost all the large public enterprises are included in the survey. The three ministries supervising the public industrial sector are represented in the survey. SONATRACH is under the supervision of the Ministry of Energy and Hydrocarbons, SNS and SONACOME are under the supervision of the Ministry of Heavy Industries and SONIC, SNMC and SNIC are under the Ministry of Light Industries. SONATRACH, SNS and SONACOME are classified among the large public enterprises, SNMC is a medium sized public enterprise and SONIC and SNIC are small public enterprises. All public enterprises included in the survey have a great economic impact on the Algerian economy. For instance, SONATRACH procures the bulk of the foreign financial resources. All of the public enterprises chosen are industrialising industries on which the Algerian development strategy is based. Public enterprise outputs included in the survey are diversified as indicated in Table 4.1. As far as public enterprise supplies are concerned, some inputs are imported while others are supplied by the local market. There is, therefore, a representative sample of each group. The bulk of the outputs are destined for the local market, some as semi-finished outputs and others as finished outputs. Only a small proportion of national production is exported (crude oil, LNG). It can be said, in addition, that the sample is representative of the Algerian public industrial sector since most of the public enterprises surveyed have pre-independence and post-independence plants, using either labour or capital intensive technology. These plants are small, medium and large scale plant employing more than 50 workers.

Table 4.1: Major outputs of surveyed public enterprises.

SONIC: pulp paper, printing and writing paper, cardboard and exercise-books.

SONATRACH: crude oil, natural gas, petrochemical and plastic products, and fertiliser.

SNIC: paint, varnish, soap, cosmetics, pottery and earthenware, glass and household cleaning products.

SNMC: cement, lime, plaster, red products (bricks), ceramic tiles, ceramic sanitary fittings and cement asbestos.

SNS: iron and steel, iron sheets, non-ferrous metals, metal products (seamless tubes, metallic containers , etc.).

SONACOME: agricultural machinery, tractors, machine tools, engines, lorries and buses.

### 4.2.3.Questionnaire

The questionnaire was designed to collect data for 1980 and/or 1981. Several personal follow-up visits were made to the plants and to the head office of surveyed public enterprises as well as to the various ministries. When it was not possible to visit the plants, information based on plant documents such as annual reports, balance sheets and budgets, to name a few, were collected from the head office or the supervisory ministry. All of the figures were given by the public enterprise managers. Whenever necessary, the data so collected was supplemented by information obtained from published sources. A copy of the questionnaire is reproduced in Appendix D.

During the interviews the first set of questions was asked in order to obtain general information about the surveyed plant. Information was obtained relative to the type of output produced, plant size and the age of the plant, to name a few. Since information on invested capital was not available or was considered to be classified information, the size of the plant was estimated according to the size of the labour force of the plant. The second set of questions was associated with the size, qualifications, function and productivity of the labour force, rates of absenteeism and labour turnover, the overstaffing rate and the number of shifts among others. The third set of questions was connected to the actual output and the planned and technical capacity output. These questions were not always answered mainly because some of the interviewees considered this information confidential. Those answers given without much hesitation were outputs actually produced and the planned capacity output. Contractor (or technical) capacity was not always available. No details on the precise method used to calculate planned capacity output was communicated. The managers were invited to describe different problems they encountered in the management of the plant and the main causes of underutilisation and excess capacity. Questions on the actual number of shifts by output, the number of shifts recommended by the contractor, the number of working hours per day, per week and per shift were also asked. A different set of questions was related to the characteristics of different inputs and spare parts. The imported to total input ratio was not always available since it was not calculated in most cases. Questions about other inputs such as transport, infrastructure, maintenance and working capital were also part of the survey. Together with questions related to demand and sales revenue, those related to the demand for the different outputs were not always answered since demand was only known in a few cases. Sales revenue figures were almost impossible to obtain because these were considered confidential. Information about such items as the distribution process, authorised imports (AGI), price and customs policies were also collected. The answer regarding fixed prices was straightforward since prices are fixed by the state. The method used for the calculation of price was not precisely known, but the interviewees believed that the price of an output did not always cover the production cost. Questions on quality and control of outputs were included in the survey since they were thought to have an influence on the performance of the plants. Autonomy and the decision-making process, communication and organisational structure are thought to have a great influence on the performance of public enterprises and consequently, particular attention was paid to the collection of this information. Questions regarding incentives and wages were asked to find out if the plants and public enterprises operated on a common salary scale and if sufficient and realistic incentives were offered.

At the public enterprise and plant levels, questions were asked to find out about the relationship between the head office and the plants. Interviews were arranged with the AEW and APW. Interviews were also conducted in various ministries to collect information relative to government policies that affect the performance of the various public enterprises and plants.

## 4.3. Common causes of inefficiency in Algerian public industrial enterprises

Now that the methodology, the public enterprises included in the survey and the questionnaire have been presented, attention is focused on the reasons given for inefficient use of the different inputs. The different factors influencing the inefficient utilisation of production capacity are numerous. Only those which are thought to be the most important to Algerian public industrial enterprises will be discussed. In the first part, the economic organisational inefficiencies or X-inefficiency (11) within and outside the public enterprise are analysed. In the second part, supply conditions causing an inefficient use of raw materials, intermediate inputs, capital and labour are investigated. These include the shortages of raw materials and intermediate inputs, the shortages of transport means and infrastructure facilities, the lack of skilled labour and working capital provided by the local market and finally, the shortage of imported inputs. In the third part, allocative inefficiencies which are due to government policies related to the choice of technology, of outputs, of plant location and of price and wage systems, to name a few, are discussed. These are indirect factors inducing inefficiencies. In the fourth part, the causes of inefficiency due to insufficient demand are examined.

### 4.3.1. Organisational factors

Utilisation of inputs is related to economic organisation and environment (12). Conclusions drawn from a number of different case studies indicate that X-inefficiencies arise from various factors. These are, for instance, the relationship between the public enterprise (and plant) and the government, the environment in which public enterprises operate and the bureaucratic administration. Among a large number of factors, only those which are considered most relevant are discussed in the following.

Firstly, there are non-economic causes influencing capacity utilisation such as social, cultural and institutional causes. The Algerian industrial sector has expanded only recently and as a consequence, the labour force with a predominantly agricultural background, is almost devoid of industrial habits and traditions (13). The lack of industrial habits is clearly illustrated by high rates of absenteeism and labour turnover which are of the order of 10% and 3%, respectively, in all the surveyed plants. The data collected indicate that rates of absenteeism and turnover depend on the age and the seniority of the labour force. The survey shows clearly that the rate of absenteeism is lower in plants located in small towns and cities than in plants located in large industrial centres. In addition, the rate of absenteeism is lower but still quite high in the pre-independence plants as compared with post-independence plants. These high rates may be attributed to the lack of social infrastructure, labour transport, housing and health facilities. The lack of housing facilities, the poor means of transportation to and from the workers' residences and their personal security, as well as poor living conditions, are other reasons for the underutilisation of production capacity. These factors also lead to a lower number of shifts than that advocated by the contractor. In addition, increasing the number of shifts is constrained by the presence of female workers who, due to cultural considerations, cannot work during the night shift.

are characterised by incomplete production lines and are faced with high training costs and low productivity.

Secondly the lack of manager and worker participation is mainly caused by an economic organisational structure which placed heavy emphasis on the public sector. For instance, managers perceive that their decision making power is diminished. No real incentives exist for workers and managers to improve the level of production and the overall situation of the plant and public enterprise (14). In addition, workers' and managers' initiative is not encouraged by the suffocating bureaucracy (15). The introduction of Socialist Management in 1972 (see part 3.3) did not result in a net improvement in workers' participation. Workers' and managers' attitudes can be summarized by lack of interest, low morale, shortcomings at work and a lack of discipline as well as initiative.

Thirdly, the cumbersome, demanding Algerian bureaucracy, a result of an adopted system with an emphasis on industrialisation, has also had a great influence on capacity utilisation. The shortage of skilled labour has led to the appointment of civil servants to managerial positions. Thus, public enterprises are run as if they were part of the administration, according to a rigid set of rules. The rigidity, the slowness of operations, the proliferation of paper work and the buck-passing all contribute to the cumbersome bureaucracy. This bureaucratic structure is also reinforced by overcentralised control, an organisation that is slow to react and the very strict interpretation of regulations (16). Information is not passed on to interested individuals or is lost in the organisational structure. This leads to an inefficient internal communication system since rules which fit the specific activities of each public enterprise are rarely laid down. All of these factors point to the lack of autonomy and, consequently, high administrative costs and a lack of competent managers, since managerial ability and capacity are not developed and encouraged. All of these inefficiencies are the result of heavy bureaucratic controls. In particular they influence the participation and initiative of workers, communication and supply conditions.

Finally, the imprecision of job descriptions combined with a lack of autonomy and responsible decision making caused by the lack of business practices, lead to a production of goods according to rules. The result is a minimisation of responsibility that reduces workers' accountability regarding productivity. Consequently, the control procedure is inefficient and various inefficiencies are expected. The large number of administrative positions does not improve this situation, on the contrary it lowers the productivity of the public enterprise and increases its fixed charges. In addition, public enterprises encounter organisational problems due to their large size. The increase in investment, production and distribution activities over the past years has resulted in tendencies towards gigantism which may hinder efficient management. Public enterprises are generally involved in a large number of activities which may be very different in nature and complexity, making the management of these enterprises very difficult and complex and adding to inefficiencies. The wide variety of outputs produced in each plant does not favour high productivity and can also lead to additional problems.

### 4.3.2. Shortages of inputs

The shortage of inputs is an obvious factor which affects the smooth operation of public enterprises. Difficult supply conditions are caused by 1) local shortages of some raw materials and intermediate inputs; 2) insufficient transportation and infrastructure; 3) the lack of skilled workers; 4) the shortage of intermediate inputs and spare parts supplied by the international market; and 5) the lack of working capital.

Firstly, almost all the plants belonging to the six public enterprises surveyed (and probably all the industrial enterprises) are faced with supply difficulties of both raw materials and intermediate inputs even when the inputs are produced in the very vicinity of the plant. For example, when the conveyor belt of the Mefta cement plant (SNMC) broke down in 1976, the plant encountered problems in obtaining the various raw materials which were only a mile or two away. The supply of consumable inputs such as water and electricity (of different voltages) is particularly inadequate and unreliable especially in some regions of Algeria and/or when the demand is high. The shortage of water is mainly due to the fact that Algeria is an arid country. The means to capture water also are inefficient and insufficient (17) and the distribution network is very old (18). Shortages of consumable inputs is often due to an unanticipated increase in demand. Scarcity of these inputs was not taken into account in the choice criteria of these plants. Moreover, the imbalance between planning and growth and the competitive situation between the agricultural and industrial sectors have further compounded the shortage of some of these inputs. The planning decision may also contribute to the shortage of these inputs.

Secondly, almost all the plants have problems with the collection of inputs and/or the removal of outputs. In 1980, for instance, 45.5% of the total transport capacity (lorries) in the light industries (40% of the total number of vehicles available), was not usable (19). Transport is inefficient because of the insufficient number of lorries in working order (which itself is the result of a shortage of skilled labour force and spare parts), an underdeveloped railway network combined with an erratic transport network, a shortage of storage facilities, and irregularities in the collection of supplies or the removal of output. The lack of organisation in the transport sector also influences the utilisation of inputs. Furthermore, in view of the increased number of ships and demand for shipping services, the port infrastructure and services are insufficient. This often results in shortages of imported inputs and delays in deliveries of imported intermediate inputs and spare parts.

Thirdly, it became evident from the interviews and SONATRACH study that all the plants and public enterprises surveyed and probably the entire public industrial sector were deeply affected by the lack of skilled labour force (20). The presence of foreign assistants and civil servants appointed to managerial and technical positions in various plants also supports this evidence. Plants are particularly affected by the lack of technicians and semi-skilled workers on the production lines and at the maintenance level. Shortage of skilled labour is also felt at the level of stock management, preventing the use of rigorous management methods. Public enterprises are deeply affected by the lack of qualified personnel, particularly at the managerial and technical levels. The lack of qualified personnel is also evident in the different ministries and is particularly crucial at the planning level. Most public enterprises suffer from a lack of skilled workers and technical expertise which, in turn, result in organisational problems (see part 4.3.1) and eventually to operational inefficiencies.

Fourthly, most public enterprises rely on the imports of some intermediate inputs and of at least 70% of their spare parts. Availability of these imports is subject to the rigidities of import regulations and bureaucratic procedures as discussed in part 3.4. (authorisation allocation and control of imports). In addition, customs policies are cumbersome, import planning at the enterprise level is often inadequate and, at the plant level, stock management is inefficient. Shortages of intermediate inputs and spare parts often leads to a halt in production and thus to underutilisation of capital and labour.

Finally, all the plants surveyed are faced with insufficient working capital. This can partly be attributed to unadapted project financing procedures (see part 3.2) and inefficient subsidies distribution system. Furthermore, in order to avoid a shortage of imported inputs, plants hold large stocks that are financed by high interest loans. Plants often have difficulties recovering their sales revenue within the public sector. In addition, financial transactions between various plants or public enterprises are subject to the slowness of the banking system (21). The permanent cash deficit have generated exorbitant financial costs which have greatly hampered evaluation of the efficiency of the public enterprise and very seriously affected their management; in particular they have often nullified the effect of the incentives to increase labour productivity through distribution of part of the profits to the employees and created shortages of inputs.

### 4.3.3. Allocative inefficiencies

Government policies have direct and indirect influences on the capacity utilisation of a plant, complex and public enterprise. These policies relate to plant location, the origin of technology, scale, the level of integration, the techniques to be adopted for a new plant, wage and incentive policies, the price system and bank policies, import and customs policies (tariffs, taxes), tax and labour policies, and control. Only a few of the allocative inefficiencies that have a direct effect on capacity utilisation of public enterprises are discussed below.

The final choice of plant location is made only after different proposed sites have been studied. Study of a site often does not take into account all the relevant factors. The study yields subjective results on which decisions are made. This practice does not allow for choice of the best site but only of the best proposed location. The proposed sites often take social considerations into account such as the equitable distribution of jobs and regional equilibrium. policy ? Most of the time social considerations outweigh economic considerations and factors. Thus, capacity utilisation may drastically be affected by these procedures.

The adoption of the most sophisticated technology is greatly encouraged and favoured by the government. The choice of technology, however, depends on its availability on the international market (22) and, consequently, does not take problems associated with production processes into account. The limited choice offered to managers often results in the acquisition, rarely justified, of the most sophisticated technology. Products are thus made according to techniques rigidly determined by the developed countries. Imported technology, which was not originally conceived for Algerian conditions, does not offer a real guarantee of success when transferred. The numerous problems encountered at the plant level (breakdowns, failures, incompatibilities of production processes, different scales of workshops or machines in the same production lines and faulty machines) are often the result of this situation.

The absence of standards and norms regarding the acquisition of equipment, which is the function assigned to INAPI, leads to stock management problems (spare parts, components and intermediate inputs) because of the large number of suppliers and origins. Furthermore, the high degree of integration advocated by the government leads to numerous problems. A highly integrated plant needs to be very large and involved in diversified activities. This often leads to the creation of gigantic plants which create management (production and labour) and organisational problems. Some of these activities do not justify the acquisition of large-scale workshops which are left idle most of the time. As a result, there is an inefficient use of capital.

The adoption of a turnkey contract or a product-in-hand contract (see Appendix C.1) which are used, in the majority of cases, to build new plants, leads to an inefficient use of production capacity. Under these two contractual arrangements the Algerian labour force does not participate in the study and construction of projects. Thus, no experience is accumulated in these particular skills. In addition, these two forms of contract do not allow the best choice of technology to be made since the contractor selects the technology without consulting the public enterprise' managers. Finally, the turnkey contract does not include the training of the work force (especially technicians for servicing and maintenance).

Enterprise targets are set in quantitative terms. This practice leads to poor quality outputs, waste of inputs and poor management. Managers do not possess the means and motivation to improve the situation. The poor quality of semi-finished outputs is especially important. Several plants and complexes encounter problems because the semi-finished outputs supplied by other plants do not meet the standards required by the production process. This practice does not encourage an efficient utilisation of inputs.

4.3.4.Demand conditions

Deficiency of demand and excess capacity are only found in a few plants. Economies of scale and import of Western technology generally designed and developed to cater for larger markets (e.g., EEC or USA) than the Algerian local market are the main causes of excess capacity. This is the case for a few plants belonging to SONATRACH, SNMC and SONIC. In some cases, excess capacity may be the result of underutilisation due to a decline in the international demand (e.g., crude oil) which initially created existing production capacities. The absence of inter-agency coordination and communication may also result in excess capacity. Some goods are imported although they are locally produced, for instance, telephone cables produced by SONELEC, valves by SNMETAL and textiles by SONITEX. Most of the time plants involved in the production of these goods suffer from excess capacity. Excess capacity may also be created by an imbalance in the development of different sectors. For example, the development of a few plants belonging to SNMC was not followed by the development of the housing and construction sector. This is also the case for some plants belonging to SONATRACH (petrochemicals) (23) and to SOGEDIA (food industries). Unbalanced development is aggravated by a deficient distribution network and an inadequate transportation system. With the rise in demand, excess capacity can be considered a transitory phenomenon.

Underutilisation of production capacity encountered in plants and public enterprises is influenced directly by supply and demand conditions and indirectly by factors such as economic factors and allocative inefficiencies. The factors discussed above are the main determinants of capacity utilisation in Algerian public industrial enterprises.

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6 See, for more details Lim, D.: On the Measurement of Capital Utilisation in Less Developed Countries, op cit. p 150, and Maris, R.: The Economics of Capital Utilisation, A Report on Multiple Shift Work, op cit. p 33.

7 Refer for more details to Winston, G.C.: The Theory of Capital Utilisation and Idleness, Journal of Economic Literature, Vol. 12, Dec. 1974, p 1310; Capital Utilisation in Manufacturing in Colombia, Israel, Malaysia and the Philippines by Bautista, R.M., Hughes, H., Lim, D., Morawetz, D. and Thoumi, F.E. (Oxford University Press, 1980) p 19; and Lim, D.: On the Measurement of Capital Utilisation in Less Developed Countries, op cit.

8 See Bautista, R.M., Hughes, H., Lim, D., Morawetz, D. and Thoumi, F.E.: Capital Utilisation in Manufacturing in Colombia, Israel, Malaysia and the Philippines, op cit. Chapter Two.

9 As argued by Lim, D.: On the measurement of capital utilisation in Less Developed Countries, op cit. pp 146-159.

10 As pointed out by Phillips, A. in Measuring Industrial Capacity and Capacity Utilisation in Less Developed Countries, Industrialisation and Production Bulletin, Vol. XV, U.N., New York, 1970.

11 Leibenstein, H.: Allocative Efficiency Vs X-Efficiency, Am. Econ. Rev., Vol. 56, June 1966, pp 392-415.

12 Ibid.

13 This was also pointed out by Deutsch Karl in Theories of Imperialism and Neocolonialism (Rosen and Kurth eds., Toronto Lexington Books, 1974) pp 30-31, quoted in Nellis, J.R.: Maladministration: Cause or Result of Underdevelopment ? The Algerian example, Canadian journal of African studies, Vol. 13 no. 3, 1980, p 411.

14 This problem was also brought about by President Boumediene in one of his speeches in July 1974, El-Moudjahid, Algiers.

15 Nellis, J.R.: Maladministration: Causes or Result of Underdevelopment ? The Algerian Case, op cit. p 416.

16 Ibid p 417.

17 Less than 5% of the rainfall is captured for use. Refer to The Economist Intelligence Unit: Quarterly Economic Review of Algeria, 3rd quarter, London, 1982, p 12 for more details.

18 35% of the water in Algeria is lost due to the age of the network. Refer to The Economist Intelligence Unit: Quarterly Economic Review of Algeria, op cit. p 15.

19 Bulletin Trimestriel Des Statistiques du Sector des Industries Legeres, 4th Trimester (MIL, 1980) p 23.

20 The lack of trained staff is also emphasized in several books and papers such as Nellis, J.R.: Maladministration: Cause or Result of Underdevelopment ? The Algerian Case, op cit. p 409 and La Synthese du Bilan Economique et Social de la Decemie 1967-78, op cit.

21 A case was reported by Nellis, J.R.: cited above p 408 where the managers did not know when the cheque was going to be cashed. Criticisms were also made in La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit.

22 See Steward, F.: Technology and Underdevelopment (MacMillan

Press, London, 1977).

23 The polyethylene SONATRACH plant was completed 2 years before the ethylene plant, although the two plants are complementary. The former did not produce for two years waiting for the latter to be built. Some of the equipment in the polyethylene plant had to be changed without having been used when production was planned to start. Refer to Schnetzler, J.: _Le Development Algerien_, op cit. pp 123-124.

# CHAPTER FIVE : SONIC PUBLIC ENTERPRISE

SONIC, which is involved in the production of pulp, wrapping, writing and printing paper, was founded on January 23rd, 1968 following the nationalisation of three plants. Since then three other plants have been nationalised and five new plants have been built. This enterprise is under the supervision of the Ministry of Light Industries. Besides production, which is its main activity, SONIC also undertakes finance, management of personnel, supply, marketing and international trade activities. In 1981, SONIC consisted of eleven plants in production and seven under construction. All SONIC plants are entirely owned by the state. SONIC's organisation is similar to the functional structure described in part 4.1.2. Its objectives, managerial environment, authority, autonomy and control are also similar to those described in part 4.1.

SONIC's development has not been as spectacular as that of SONATRACH or SNS, for instance. Its sales revenue, however, rose by a factor of 4.8 between 1973 and 1979, reaching 685.25 million AD in 1979. In 1980 SONIC employed 5,890 workers, three times more than in 1973. In addition, between 1973 and 1978, SONIC's fixed assets amounting to 1.22 billion AD, increased by a factor of 2.4 only reflecting the lack of investment made in this branch of industry (1). The slow development may be due to the nature of this branch of industry. SONIC plants are intensive users of water which is in short supply in most parts of Algeria (2). Other inputs such as wood and straw are not largely found either. In addition, it is well known that pulp and paper industry development can only be achieved with a large amount of investment which has not been the case with SONIC. Esparto (another input used in this branch of industry), on the other hand, is widely found in the Sahara (esparto forest: 3.5 million ha)(3), but obtaining an adequate supply is subject to many problems. As a result, SONIC's contribution to industrial sector value added was not very important.

Its plants and their respective outputs follow:

Plants in production: the Baba-Ali plant produces esparto pulp, printing and writing paper and chlorine; the El-Harrach, Saida and El-Arbaa plants produce ordinary paper bags; the Oued-Smar and Oran plants produce sack kraft paper; the El-Harrach plant produces wrapping, packaging paper and boards; the Mostaganem plant produces esparto pulp, printing and writing paper (except newsprint) and chlorine. This plant also has a modern assembly shop for the transformation of printing and writing paper into exercise books; the Souk-Ahras plant produces household and sanitary paper; the Saida plant produces straw pulp and packaging boards and the Bordj-Bou-Arreridj plant produces sack kraft paper and folding cardboard boxes. This plant also has a sophisticated printing workroom, a photo laboratory and some subsidiary equipment. Detailed figures for SONIC regarding the year of entry in production and production capacity by plant output are given in Table E.1 in the Appendix E.

Plants under construction: the Sedrata plant is planned to produce carbon paper, cigarette-paper and filters; the Sidi-Lakhdar plant is planned to produce scholastic goods such as copy-books and note-books; the Miliana plant is planned to produce sanitary paper; the El-kala plant is planned to produce sack kraft paper, wrapping paper and liner board and the Arbaa plant is planned to produce baby napkins, exercise books, several types of scholastic paper supplies, envelopes, foil and wrapping and packaging papers. The Saida plant is planned to produce sack kraft paper and the Rachgoun plant is planned to produce fibrane and cellulosic films. The Sidi-Lakhdar, Miliana and El-Kala plants were planned to start producing in 1979 while the El-Kala plant was foreseen to begin production in 1981. All were still under construction in December 1981 due to problems encountered in the execution and implementation of the investments.

In 1981, as indicated in Table E.1 in the Appendix E, the pulp production capacity of SONIC was 106,000 tons a year, its printing paper capacity was 54,000 tons a year, its capacity of manufacture exercise books was 15,300 units a year, its wrapping paper capacity was 100,000 tons a year and its cardboard capacity was 58,000 tons a year. The present production of pulp and paper does not meet local demand. On average, 33% of local demand is imported every year. SONIC monopolizes the production of pulp, cardboard and printing paper other than newsprint. The production of wrapping paper and exercise books is shared between a few private firms and SONIC. As far as international trade is concerned, SONIC holds the only monopoly on the import of semi-finished and finished cellulosic products with the exception of finished scholastic paper supplies such as writing paper, exercise books and looseleaf paper which are imported by either SNED or SNMGA.

As illustrated in Table E.1 in the Appendix E, SONIC plants can be divided into two different categories: the pre-independence plants and the post-independence plants. Pre-independence plants generally use a labour intensive technology. It is notable that one pre-independence plant, namely the Baba-Ali plant, uses a more capital intensive technology than the other pre-independence plants although it was built in the 1950's. The post-independence plants built since the mid-1970's use a capital intensive technology. The choice of technology is somewhat dictated by the Algerian development strategy and to a greater extent by the availability of the technology on the international market. The technology used in the pre-independence plants comes mainly from France while that used in the post-independence plants comes from Great Britain and Italy (see Table E.2 in the Appendix E). In this respect, the very difference between the technologies used raises different problems in SONIC's pre- and post-independence plants. Furthermore, all the pre- and post-independence plants are located in the Northern part of Algeria.

The pre-independence plants are small scale plants, except for one which is medium scale, while the post-independence plants are medium and large scale. In fact, all of the pre-independence plants had been built for the satisfaction of domestic demand, with the exception of the Baba-Ali plant (medium scale) which exported part of its production. All of them adopted a technology that existed at the time. The post-independence plants were built in response to present and anticipated future demands and also according to the technology available on the international market. The technology used in the pre-independence plants was developed in countries where labour is relatively scarce, thus most of the innovations are labour saving. This means that, although the factor endowment in Algeria might dictate a labour intensive technology, a capital intensive technology is used in the post-independence plants.

As indicated in Table E.1 in the Appendix E, about half the plants are multi-product plants and the remaining are mono-product plants. In addition, half of the multiproduct plants are highly integrated plants. Examples are the Mostaganem, Baba-Ali and Saida plants. These plants produce pulp paper as well as intermediate inputs used in the manufacture of their finished outputs from esparto and straw. The mono-product plants are less integrated since they do not produce their own intermediate inputs; they are either produced within SONIC or obtained from the international market.

30% of the plants worked with only one shift throughout the whole year, 20% worked with two shifts, 30% worked with three shifts and 20% with two or three shifts as illustrated in Table 5.1. Thus, a SONIC plant is used at an average of 16 hours a day. The number of shifts in post-independence plants is at least two shifts and in most cases three shifts. In contrast, the number of shifts in pre-independence plants is one, with the exception of two plants (Baba-Ali: three shifts, and Oran: two shifts). In SONIC plants, the number of shifts, which is the number of hours the fixed capital is used during the day and year, is related to the level of integration and the age of the plant. The impact of the number of shifts on the utilisation of fixed capital in a plant will be discussed later.

Table 5.1: Number of shifts in SONIC plants in 1981

| Hours of work per day | Number of plants | % of total plants |
|---|---|---|
| 8 | 3 | 30 |
| 16 | 2 | 20 |
| 24 | 3 | 30 |
| 16 & 24 | 2 | 20 |
| Total number of plants | 10 | 100 |

Source: Table E.1 in the Appendix E.

The adoption of one form of contracts or another for the construction of SONIC plants seems to have changed over the years. In fact, the decomposed contract was adopted between 1962 and late 1972, the turnkey contract was adopted between 1973 and 1976 and the product-in-hand contract has been adopted since 1977. It is interesting to note that so far no cost-plus-fee contract has been adopted by any SONIC plant. The description of each contract and the advantages and disadvantages of one contract with respect to the others are described in Appendix C.1. The impact on plant operation resulting from the adoption of one contract or another will be discussed later in this chapter.

The origin of the main inputs used by SONIC is illustrated in Table 5.2 which gives average figures only (4). The different inputs are either supplied by SONIC, or by the local or international markets (since the country of origin of the different inputs is of no relevance to this study, this aspect will not be analysed). The origin of raw materials and intermediate inputs depends on the output produced. For instance, all inputs which are used in the production of paper pulp are supplied almost completely by the local market while those used in the production of printing, writing and hard and soft papers are almost always imported. An interesting point to note is that both the non-integrated and the highly integrated plants rely on imported inputs. In fact, about two thirds of the pulp needed by the highly integrated plants is imported despite the fact that these plants are equipped with the necessary facilities to produce pulp. The non-integrated plants import between 50% and 95% of their requirements of pulp and recycled paper and cardboard. The rest is supplied

Table 5.2 : Origin of SONIC inputs

| INPUTS \ OUTPUTS | | Paper pulp | Printing & wri-ting paper | Chlorine & soda | School notebook | Hard & soft paper | Wrapping paper | Corrugated cardboard | Compact cardbo. | Folding boxes | Paper bags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RAW MATERIALS AND INTERMEDIATE INPUTS | WITHIN SONIC | | | | | | | | | | |
| | Esparto pulp | | 33% | | | 5% | | | | | |
| | Straw pulp | | | | | | * | * | * | | |
| | Chlorine | 100% | | | | | | | | | |
| | Soda | 100% | | | | | | | | | |
| | Wrapping paper | | | | | * | | | | | * |
| | Printing & writing paper | | | | * | | | | | | |
| | Cardboard | | | | | 15% | | | | * | |
| | Folding boxes | | | | * | 13% | | | | | |
| | LOCAL MARKET | | | | | | | | | | |
| | Esparto | 100% | | | | | | | | | |
| | Straw | 100% | | | | | | | | | |
| | Water | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100 | 100 | * |
| | Electricity | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100 | 100 | * |
| | Rolling stock | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100 | 100 | * |
| | Safety materials | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100 | 100 | * |
| | Chemical products | 33% | 33% | 33% | 33% | 33% | 33% | * | | | |
| | Waste cardboard | | | | | | * | * | * | * | * |
| | Old paper | | | | | | * | * | * | * | * |
| | Packaging products | | | | | 67% | | | | | |
| | Spare parts | 25% | 25% | 25% | 25% | 35% | 75% | * | * | * | * |
| | INTERNATIONAL MARKET | | | | | | | | | | |
| | Paper pulp | | 66% | | | 95% | | * | | * | |
| | Chemical products | 67% | 67% | 67% | 67% | 67% | 67% | * | * | | |
| | Waste cardboard &old paper | | | | | | * | | * | * | * |
| | Packaging products | | | | | 6% | | | | | |
| | Spare parts | 75% | 75% | 75% | 75% | 65% | 25% | * | * | * | * |
| FIXED CAPITAL | | 100% imported | | | | | | | | | |
| LABOUR | Local | 99.6% | | | | | | | | | |
| | Foreign | 0.4% | | | | | | | | | |

* indicates the origin without specifying the proportion which is not available.

Source : Survey data.

by SONIC or locally. It should be pointed out that 95% of the pulp used in the production of hard and soft paper is imported, although 50% of the pulp requirement is supposed to be supplied by the Mostaganem plant. Recycled paper and cardboard are imported because the present local collection system is not organised efficiently. In addition, some of the intermediate inputs are imported because of problems encountered in some plants. Furthermore, about two thirds of the chemical products used in SONIC plants and about 75% of the spare parts are imported. This reflects the low level of integration of the pulp and paper industry, chemical industry and capital goods industry. In fact, all the capital used in these plants was totally imported. In contrast, the labour force in SONIC is almost totally Algerian with only 0.3% of foreigners. As seen in part 3.4, foreign trade procedures may have an important effect on the supply of imported inputs and spare parts in SONIC plants which depend largely on imports.

The destination of the different outputs produced by SONIC is indicated in Table 5.3. SONIC produces semi-finished and finished outputs intended for the domestic market. SONIC is part of the consumer-oriented sector. Semi-finished outputs are transformed within SONIC plants and by the private sector into finished outputs. Finished outputs are then intended for intermediate or final use. Currently, SONIC production is absorbed totally by the local market. Initial plans, however, were for SONIC to export some of its finest quality paper. The Mostaganem plant, for example, was designed for this purpose (in fact, some of its outputs were exported between 1973 and 1976). Exports were stopped for quantity and quality reasons.

In order to give a complete profile of SONIC, the employed

Table 5.3 : Destination of SONIC outputs

| DESTINATION OF OUTPUTS / MAIN OUTPUTS | DOMESTIC MARKET | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INTERMEDIATE USE | | | | | | | | | | | | | |
| | SONIC | | | | | | | | | | | | | |
| | Within plant | Within SONIC | Energy | Materials contruc. | Trade | Electrical & electronic ind. | Chemicals ind. | Iron & steel ind. | Paper industry | Mineral & food industry | Pharmarcetical industry | Tobacco ind. | Textile & confe-ction industry | Consumers |
| Pulp of<br>-esparto<br>-straw | 95%<br>100% | 5% | | | | | | | | | | | | |
| Paper rolls | * | | | | | | | | * | | | | | |
| Printing & writing paper | * | | | | | | | | * | | | | | |
| Exercice-books | | | | | | | | | | | | | | * |
| Soft paper tissue | | | | | | | | | | | | | | * |
| Hard paper tissue | | * | | | * | | | | * | | | | | 55% |
| Kraft bags | | | | * | * | | | | | * | | | | |
| Wrapping paper | | | | * | * | | | | | | | * | * | |
| Corrogated paper | | * | | * | * | * | * | * | | * | * | * | * | |
| Folding boxes | | * | | * | * | * | * | * | * | * | * | * | * | |
| Compact cardboard | | * | | * | * | * | * | * | * | * | * | * | * | |
| Chlorine | * | | | | | | * | | | | | | | |
| Soda | 100% | | | | | | | | | | | | | |

* indicates the destination of the output without specifying the proportion.

Source : Survey data.

labour force, its qualifications and the rates of labour turnover and absenteeism are given for each SONIC plant and for SONIC's head office whenever possible. Labour force, which is described in detail in Table 5.4, can be divided into three main categories: managers, technicians and supervisors and semi-skilled and unskilled workers (5). As indicated in Figure 5.1, in 1980 74% of the SONIC labour force were unskilled and semi-skilled workers, only 19% were technicians and supervisors and 6% were managers. The proportion of skilled labour was very low when compared to that of unskilled and semi-skilled workers. This can be summarized as one manager for every three technicians or supervisors and one technician or supervisor for every four semi-skilled and unskilled workers. At the total plant level, the ratio of managers was even lower; it amounted to only 3.8% of the total labour force in the plants. Female participation was relatively low, only 7% of total labour force. Foreign manpower is insignificant, accounting for 5% of the total managers and 0.34% of the total labour force in SONIC.

In post-independence plants, the percentage of skilled labour was higher than that of pre-independence plants. This was probably due to the use of more advanced technology and a higher level of integration in the more recent plants. It appears that some attention has been paid to labour force training in the new plants. Regarding the distribution of the skilled labour force between plants and head office, the most striking feature is that only 67.3% of total SONIC skilled labour force was working in the plants. In fact, less than half of the managers worked in the plants (see Figure 5.2). The other half worked at the SONIC head office. In addition,

Table 5.4: SONIC personnel in 1980

| Skill category / Plants | Managers (1) | Managers (2) | Technicians/ supervisors (1) | Technicians/ supervisors (2) | Semi-skilled/ unskilled (1) | Semi-skilled/ unskilled (2) | Total (1) | Total (2) |
|---|---|---|---|---|---|---|---|---|
| Pulp and paper | | | | | | | | |
| Mostaganem compl. | 43 | 4.2 | 188 | 18.3 | 798 | 77.5 | 1,029 | |
| -Administration | 18 | | 40 | | 137 | | 195 | 19 |
| -Production | 14 | | 95 | | 378 | | 487 | 47 |
| -Maintenance | 11 | | 53 | | 283 | | 347 | 33 |
| Hous.& sani.paper | | | | | | | | |
| Souk Ahras plant | 24 | 5.1 | 68 | 14.5 | 374 | 80.2 | 466 | |
| -Administration | 15 | | 32 | | 109 | | 156 | 33.4 |
| -Production | 4 | | 22 | | 216 | | 242 | 52 |
| -Maintenance | 5 | | 14 | | 49 | | 68 | 14.6 |
| Wrapping & pack.b. | | | | | | | | |
| El Harrach plant | 24 | 3.4 | 107 | 15.2 | 572 | 81 | 703 | |
| Wrapping & pack.p. | | | | | | | | |
| board Saida plant | 36 | 2.5 | 124 | 8.8 | 1,249 | 88.6 | 1,409 | |
| Sack kraft paper | | | | | | | | |
| Oued Smar plant | 4 | 2.7 | 20 | 13.9 | 119 | 83 | 143 | |
| Paper grocery bag | | | | | | | | |
| Oran plant | 3 | 2.6 | 8 | 5.6 | 78 | 91 | 86 | |
| Pulp and paper | | | | | | | | |
| Baba Ali plant | 17 | 2.2 | 94 | 12.5 | 637 | 85 | 748 | |
| Kraft paper | | | | | | | | |
| El-Arba plant | - | - | - | - | - | - | 30 | |
| Kraft paper | | | | | | | | |
| Ain El Hadjar p. | - | - | - | - | - | - | 56 | |
| Packaging board | | | | | | | | |
| Bouarrerridj p. | - | - | - | - | - | - | 412 | |
| Total SONIC plants | 119 | 3.8 | 830 | 16 | 4,020 | 80 | 5,037 | 85.5 |
| Distribution | 12 | 5.4 | 52 | 23 | 157 | 71 | 221 | 3.7 |
| Head office | 133 | 31.5 | 130 | 30.5 | 162 | 38 | 425 | 7.2 |
| Others* | 56 | | 113 | | 38 | | 207 | 3.5 |
| Total SONIC | 392 | 6.6 | 1,125 | 19 | 4,377 | 74.3 | 5,890 | 100 |
| -Female workers | 19 | | 112 | | 289 | | 420 | 7 |
| -Foreigners | 19 | | 1 | | 0 | | 20 | 0.34 |
| Labour turnover | - | | - | | - | | - | 3.2 |
| Absenteeism rate | - | | - | | - | | - | 7.1 |

Source: Survey data.

* Training and attached to other functions.
1 Total by skill category in the plant, complex and Sonic as a whole.
2 % of the total by skill category or total in the plant, complex and SONIC as a whole.
\- Not available.

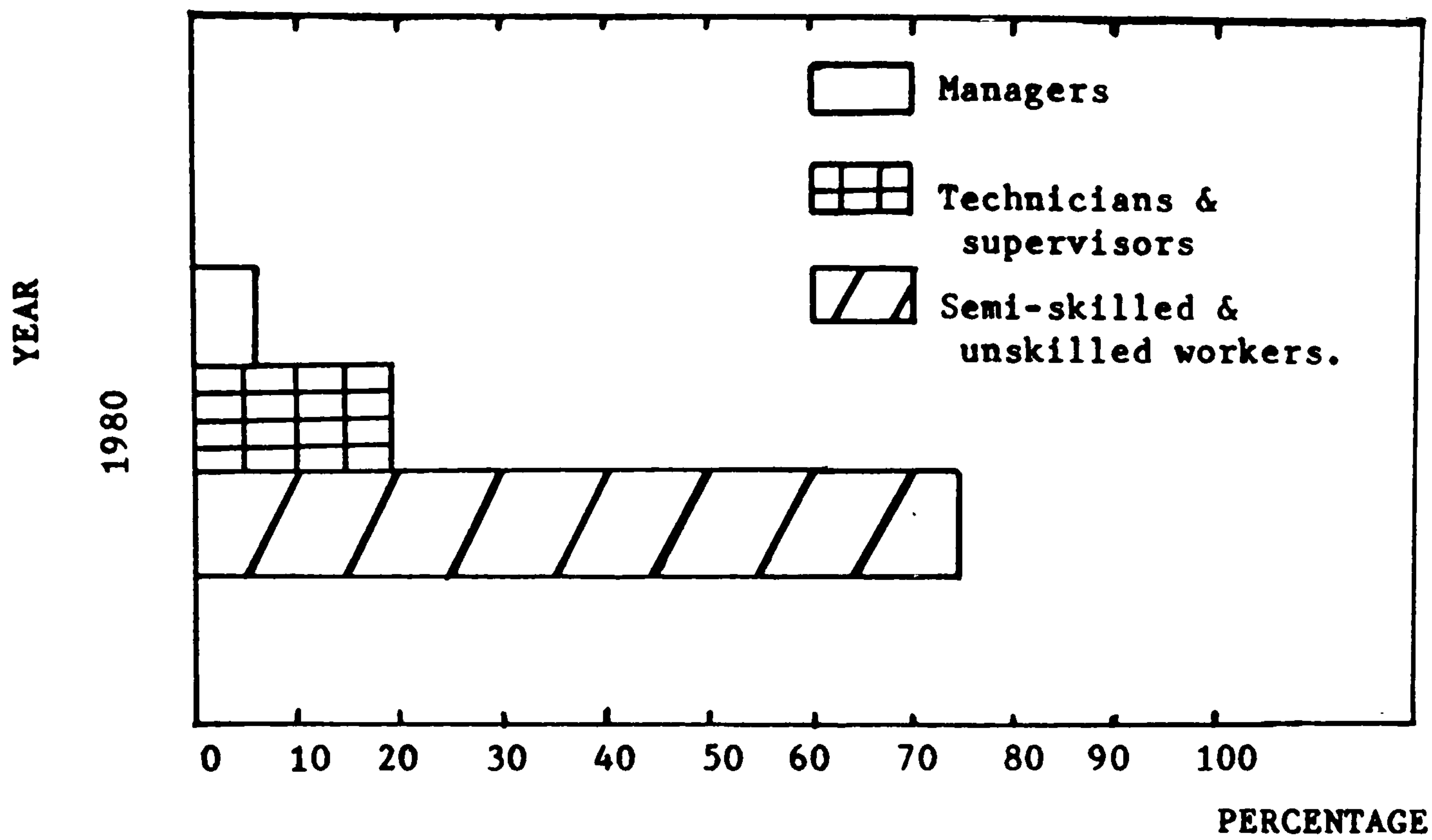


Figure 5.1 : Percentage of labour force by skill category in SONIC.

Source : Table 5.4.

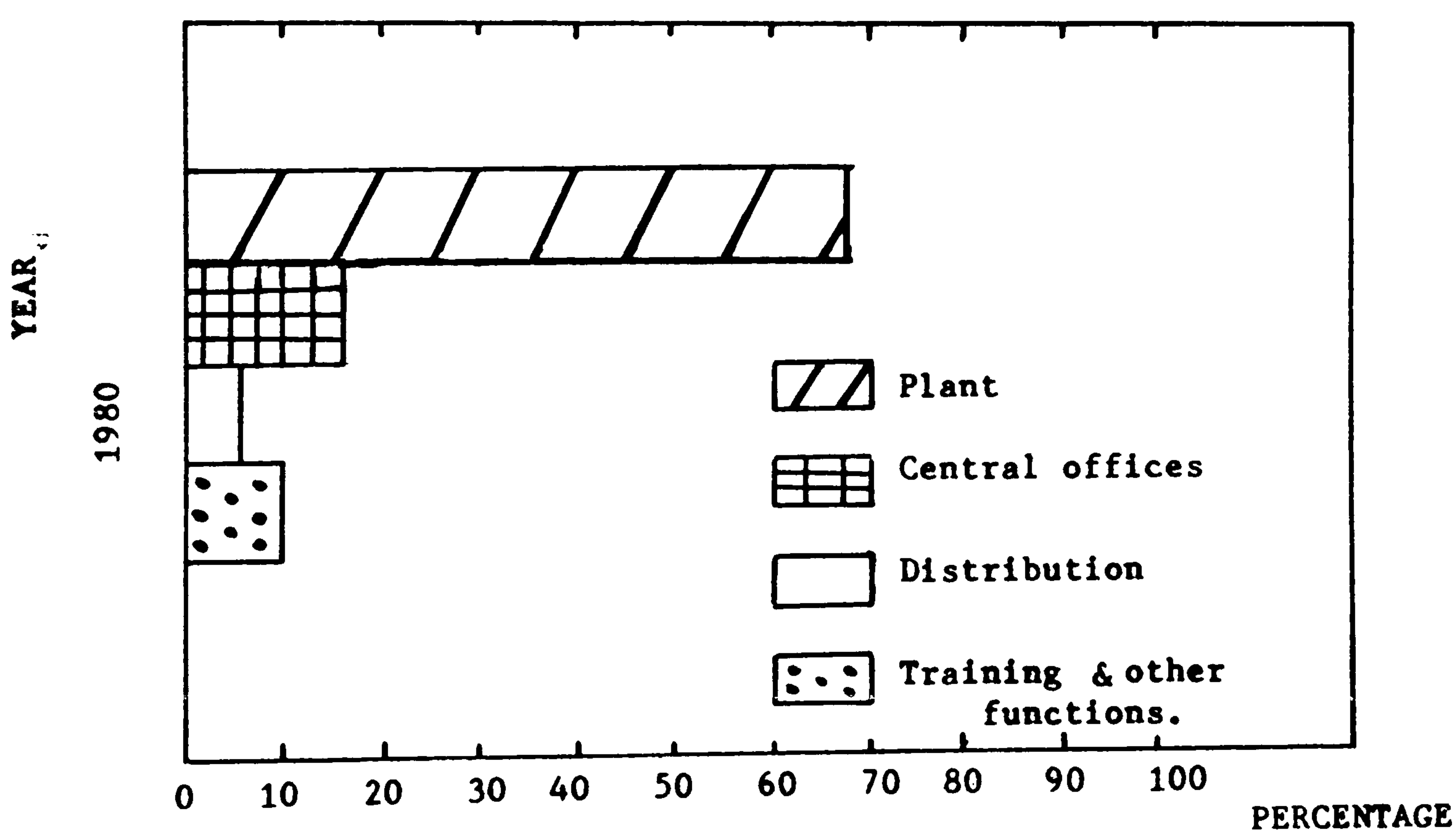


Figure 5.2 : Percentage of skilled labour force (1) by function in SONIC.

Source : Table 5.4.

(1) Skilled labour force includes the managers and technicians and supervisors.

11.2% of the skilled workers were undergoing some sort of training or were attached to the Ministry of Light Industries although paid by SONIC. According to the SONIC managers, the rate of absenteeism and labour turnover are very high in all plants and head office. For example, in 1980 the rate of absenteeism reached 7.14% and the rate of turnover was 3.2% for SONIC as a whole.

Now that the general profile of SONIC has been outlined, the remainder of the chapter will be concerned with the utilisation of the different inputs. Based on the theoretical background exposed in Chapter Four, the utilisation of raw materials and intermediate inputs will first be analysed. Fixed capital utilisation will be estimated in the second section followed by labour utilisation. More emphasis will be placed on fixed capital utilisation.

## 5.1.Utilisation of inputs in SONIC

### 5.1.1.Utilisation of raw materials and intermediate inputs

A comparison between the actual consumption of inputs and the contractor norm shows an overconsumption of these inputs. For instance, water is used inefficiently in all the SONIC plants and, in particular, in the Mostaganem plant. In the Mostaganem plant 487 cubic metres of water and 18 tons of steam are used to produce one ton of esparto pulp and of writing paper, respectively, whereas only 180 cubic metres and 10 tons should be used, respectively, according to the norms. The scarcity of water in Algeria, as already discussed, makes the problem more acute (see part 4.3.2). Consequently, the inefficient use of water results in a smaller quantity of output produced than planned. The wasteful use of water combined with a shortage of water lead to the underutilisation of production capacity.

A comparison of the consumption of electricity with the contractor norms shows that this input is inefficiently used in almost all SONIC plants. This is correlated with the fact that most plants use the planned quantity of electricity but do not produce the planned quantity of outputs. The inefficient use of electricity which is also in short supply prevents other plants or sectors of the economy from using it more efficiently.

Finally the comparison of the actual consumption of chemicals with the contractor norms also shows an overconsumption of these inputs in almost all SONIC plants. For instance, according to Souk-Ahras plant managers, chemicals such as oil and aluminum sulfate are overconsumed. This oil overconsumption leads to the oiling up of the machines. Aluminum sulfate overconsumption results in the spread of a saponified substance over the entire production line. The overconsumption of these chemicals leads to recurrent stoppages, to an increase in maintenance frequency and the requirements of spare parts and therefore, to a longer idle time of the assembly line than those advocated by the contractor. This overconsumption results in the underutilisation of these inputs. The inefficient use of these inputs has an effect on the capital and labour utilisation and results in a lower production of outputs than planned.

5.1.2.Utilisation of fixed capital

As indicated in Chapter Four, U1 (actual over planned capacity), U2 (planned over technical capacity) and U3 (actual over contractor number of shifts) are calculated for each SONIC plant output, for each SONIC plant, for each SONIC output and for SONIC as a whole for 1980 and 1981. As indicated in Table E.1 in the Appendix E regarding plant outputs for 1980 and 1981, the values of U1 ranged from 34% to 274% and from 9% to 159% and those of U2 varied between 9% and 100% and 36% and 107%, respectively. The highest rates of fixed capital utilisation by plant output, taking into account U1 and U2, were obtained for grocery bags in the Oran plant in 1980 (104%, 98%) and for hard tissue paper in the Souk Ahras plant in 1981 (118%, 107%). The lowest rates of fixed capital utilisation by plant output were obtained for esparto pulp (106%, 12%), chlorine (126%, 15%) and soda (125%, 16%) in the Mostaganem plant for 1980 and for esparto pulp (38%, 36%) and brown paper (9.4%, 78%) in the Mostaganem and El-Harrach plants, respectively in 1981.

As indicated in Table 5.5, the value of U1 calculated for 1980 for each plant varied between 70% and 137.8%. In contrast, the range of U2 values was much larger, varying between 20% and 98%. In 1980 the lowest rates of fixed capital utilisation, derived from the value of U1 and U2, were recorded for the Mostaganem (137.8%, 20%) and El-Harrach (70%, 79%) plants. On the other hand, the highest rates of fixed capital utilisation were reached by the Oran grocery bag plant (104%, 98%) and the El-Arba kraft paper plant (103%, 93%). In 1981 the values of U1 varied between 57% and 106%, a lower range of values than those for 1980. In addition, the calculated value of U2 fluctuated between 41% and 101%, a narrower range of values than for 1980. Analysis of the 1981 values of U1 and U2 for the Mostaganem and El-Harrach plants again shows that these two plants recorded the lowest rates of fixed capital utilisation. On the other hand, the highest rates of fixed capital utilisation were recorded for the Oran and Oued Smar plants. For the period 1980 and 1981, an increase in the

Table 5.5: SONIC fixed capital utilisation

in 1980 and 1981 (in percentages)

| SONIC complex/ plants | 1980 U1 | 1980 U2 | 1980 U3 | 1981 U1 | 1981 U2 | 1981 U3 |
|---|---|---|---|---|---|---|
| Pupl & paper Mostaganem complex | 137.8 | 20 | 85.2 | 82.2 | 41 | 90.48 |
| Pulp & paper Baba Ali plant | 80.7 | 83.75 | 100 | 82.75 | 79.25 | 100 |
| Household & sanitary paper Souk-Ahras plant | 77.55 | 84.95 | 76.2 | 93.35 | 87 | 100 |
| Wrapping & packg. paper Saida plant | 91.66 | 68.33 | 84.1 | 82.33 | 76.66 | 84.13 |
| Wrapping & packg. board El Harrach p. | 70.7 | 79 | 100 | 57.4 | 76.3 | 100 |
| Packaging board Bouarrerridj plant | 70.5 | 87.5 | 26.2 | 80 | 83 | 26.2 |
| Kraft paper El Arba plant | 103 | 93 | 26.2 | 69 | 93 | 52.4 |
| Grocery paper bags Oran plant | 104 | 98 | 100 | 106 | 101 | 100 |
| Sack kraft Oued Smar plant | 99 | 91 | 52.4 | 99 | 98 | 52.4 |
| Recovery plant | 94 | 80 | 100 | 77 | 96 | 100 |
| Total SONIC | 92.88 | 78.5 | 75.03 | 82.90 | 83.11 | 80.56 |

Source: Table E.1 in the Appendix E.

value of U1 is always accompanied by a decrease in the value of U2 and vice versa.

Regarding SONIC's outputs, the lowest rates of fixed capital utilisation were obtained for pulp, chlorine and soda for both years. The highest rate of fixed capital utilisation of a SONIC output was recorded for bags for the same period. For SONIC as a whole, fixed capital was inefficiently used (U1 was 92.88% in 1980 and 82.90% in 1981, while U2 was 78.5% and 83.11%, respectively). Pre-independence plants in general performed better than post-independence plants. From this, and information given earlier in the chapter, small and medium scale plants using labour intensive and French technology performed better than large scale plants using capital intensive and British or Italian technology.

The ratio U3 (actual over technical number of shifts) has also been calculated for 1980 and 1981 for each plant. The only plants which recorded a value of U3 less than one were the Mostaganem, Saida, Oued Smar, El-Arba and Bouarrerridj plants (see Table 5.5). This rate appears to be related to the age of the plant, the presence of female workers in the production lines and the utilisation of production capacity of the earlier stage of production lines manufacturing the semi-finished outputs. U3 for Sonic as a whole reached 75% in 1980 and 80.5% in 1981.

### 5.1.3. Utilisation of labour

The analysis of labour utilisation presents some difficulties because productivity norms are not available. As explained in Chapter Four, this analysis is based on overstaffing figures. Since the figures for only three SONIC plants are available (see Table 5.6), the analysis will be based on the SONIC managers' impressions. According to the SONIC managers, the number of employed workers is higher than the norm in almost all the plants. Thus, it appears that in all SONIC plants labour is not used efficiently. The inefficient utilisation of fixed capital leads to the inefficient utilisation of labour since when machines are not running, workers are not producing. The underutilisation of one input, therefore, leads to the inefficient use of another input. In conclusion, SONIC plants which use raw materials, intermediate inputs, fixed capital and labour inefficiently are characterised by underutilisation of their production capacities.

Table 5.6: Rate of overstaffing in SONIC plants in 1980

| Plants | Labour force 1980 | Contractor norm | Ratio of overstaffing |
|---|---|---|---|
| Mostaganem | 1,029 | 960 | 7.2% |
| El-Harrach | 703 | 665 | 5.7% |
| Saida | 1,409 | 1,009 | 39.6% |

Source: Survey data.

## 5.2. Common causes of inefficiency in SONIC

The purpose of this part is to give evidence and discuss the causes of inefficiency common to all SONIC plants which lead to the underutilisation of inputs discussed above. In many plants it was not possible to isolate a single cause because the effect was often simultaneously produced by several factors. Thus, the different factors are discussed in general terms. In the first part, organisational factors are investigated. In the second part, shortages of different inputs are described. Allocative inefficiencies will be analysed in the third part followed by demand shortages in the last part.

### 5.2.1. Organisational factors

The quality of inputs, especially in highly integrated plants and in plants producing intermediate inputs to be used by other public enterprises, has serious consequences on the level of outputs. This important factor is not, however, taken into account by SONIC's managers. The poor quality of raw materials and intermediate inputs leads to frequent breakdowns and a waste of resources. At the Mostaganem plant, for example, variations in the thickness of the esparto fiber affects the cellulosic production line by causing it to stop production for several days and sometimes weeks. The impurities contained in the esparto which block the feeder led, on several occasions, to the stoppage of the entire production line. The poor quality of the sulfuric acid supplied by a SONATRACH plant also led to stoppages (impurities blocked the conduit pipes and the exchangers). At the Souk-Ahras plant, the low quality of esparto pulp supplied by the Mostaganem plant resulted in severe damage of various machines. Imported pulp is generally of low quality as well, reflecting the attitude of the international trade department with respect to the quality factor. As a result apparatus are damaged, leading to recurrent maintenance and repairs and consequently, to fewer number of working hours than planned.

Due to the out-dated and often worn out equipment in the pre-independence plants, the number of shifts cannot be increased in order to increase the efficiency of these plants. In addition, some post-independence workshops and plants technically equipped to work with three shifts work with only two shifts. For instance, the exercise books production line in the Mostaganem plant and the corrugated cardboard workshop in the wrapping and packaging plant in Saida cannot operate with three shifts because of the shortage of semi-finished outputs. These are normally provided by production lines, that are at an earlier stage of the production process, which do not produce the necessary quantities of semi-finished outputs. This is often due to the fact that the production lines, that are at an earlier stage of the production process, are underutilised. Another reason for not having three shifts given by the managers of the El-Arba, Bouarrerridj and Oued-Smar plants, is the presence of a female labour force on the production lines, which due to social considerations, makes the night shift impossible. The lower number of shifts than advocated by the contractor norm has serious consequences since the Algerian economy is a capital-scarce economy and a labour-surplus economy.

The rates of absenteeism and labour turnover in SONIC plants, as outlined earlier, are high. These are due to factors which have been discussed in detail in part 4.3.1. In addition to these problems, SONIC plants are faced with organisational problems resulting from bureaucratic administration, a lack of labour incentives which would raise productivity and the absence of industrial habits and experience (refer to part 4.3.1).

### 5.2.2. Shortages of inputs

#### 5.2.2.1. Shortages of raw materials and intermediate inputs

The shortages of raw materials and intermediate inputs are due to internal and external factors which are of a different nature for each input. The two main raw materials used in SONIC plants are esparto and straw. Esparto, which is used by the Mostaganem and Baba-Ali plants, is supplied locally as indicated in Table 5.2. In 1980, the Mostaganem plant received only 18 tons of esparto per day instead of the 150 tons advocated by the contractor. The shortage of esparto is one of the main causes of underutilisation of capacity in the cellulosic production line (in 1981, U1 [actual over planned capacity] equalled 38% and U2 [planned over technical capacity] equalled 36%) at the Mostaganem plant. This, in turn, leads to the shortage of intermediate inputs (produced from esparto) and affects other production lines using these intermediate inputs in the plant. The shortage of esparto is not due to a lack of resources but to the lack of organisation of the branch and to the price of esparto. The low price of esparto fixed by the government does not encourage people to gather the esparto which grows naturally and cannot be gathered mechanically (at the present time). The supply of straw (used by the Saida plant, for instance) is also subject to irregularity and shortages. This shortage leads, in large part, to the underutilisation of the straw production line (in 1981, U1= 71% and U2= 64%). Supply problems are mainly due to an inefficient system of collection and insufficient local resources. The insufficient resources, in turn, may be attributed to the low price (fixed by the state) of straw. Its present price is so low that farmers do not see any advantages in selling it to SONIC Saida plant.

SONIC plants also encountered problems with the supply of consumable inputs such as water and electricity of different voltages. In the pulp and paper industry, water is a very important input and SONIC plants are intensive users of water. In addition, water purity is also very important since it determines in part the quality of the output produced. As already discussed in Chapter One, Algeria is short of water. Almost all SONIC plants are affected by the shortage of water but in different degrees depending on their geographical location. According to the managers, the plants which are most affected by the shortage of water are the Mostaganem and Souk-Ahras plants. In 1980 the ratio of the number of days of stoppage due to the shortage of water to the total was 30% and 10% for the two plants, respectively. The various causes of water shortages have already been described in part 4.3.2. There is no cheap solution to the shortage of water so in order to solve these problems, very large investments are needed.

The erratic power supply of different voltages also causes problems in some SONIC plants. Power shortages, however, do not lead to problems as acute as those resulting from the shortage of water. These shortages account for 9% and 8% of the total number of days of stoppage at the Mostaganem (6) and Souk-Ahras plants, respectively. The available energy supply is often lower than that recommended by contractor norms. Voltage fluctuations lead to high rates of breakdowns and frequent power supply cuts lead to the rapid deterioration of production lines and the subsequent underutilisation of fixed capital. The final result is a loss of output.

Shortages of intermediate inputs, such as pulp, chemical and spare parts supplied by the local market, are frequently experienced. For example, in 1980, as a result of shortages of chlorine produced at the Mostaganem plant and of caustic soda supplied by one of SONATRACH's plants, all of which are used in the production process of paper pulp, the cellulosic production line in the Mostaganem plant was not able to supply the production lines, that are at a later stage of the production process, with the necessary intermediate inputs. It was also unable to supply the Souk-Ahras plant with the required proportion of pulp. Consequently, the production process at the Souk-Ahras plant was interrupted several times. The exercise books production line in the Mostaganem plant was also underutilised since only two shifts were used instead of the three advocated by the contractor. This underutilisation was the result of a shortage of printing and writing paper produced by production lines, that are at an earlier stage of the production process. In 1980, as well, an average of 75% of the total spare parts supplied by the local market was lacking in most SONIC plants.

#### 5.2.2.2. Shortages of transport and infrastructure facilities and working capital

The shortage of means of transport and poor infrastructure are experienced by almost all SONIC plants. In 1980, 50% of the SONIC transport facilities were not operational (7). The different causes are similar to those described in part 4.3.2.2. SONIC working capital is also insufficient. In 1978, for example, the working capital was -756.4 million AD. The cash flow for the same year was -113.3 million AD. The working capital was negative because of high financial charges which accounted for 20% of the sales revenue and 12% of the total charges in 1978 (8). This resulted in problems similar to those discussed in Chapter Four.

#### 5.2.2.3. Shortages of skilled labour force

According to the managers, the lack of skilled labour is felt acutely in all SONIC plants. This is confirmed by the proportion of skilled labour force which was analysed at the beginning of this chapter. The lack of qualified labour has had a greater impact on the post-independence plants than on the pre-independence plants (the former use modern, capital intensive technology as opposed to the latter, which use traditional labour intensive technology). No figures are available to estimate the exact number of employees lacking in the different plants. In some plants, for example, the second or third shifts cannot be undertaken because of the lack of supervisors. In 1980, at the Mostaganem plant, only 46% of the total requests for maintenance (3,610 requests) were met. In addition, labour shortages are felt in the various positions discussed in part 4.3.2.

5.2.2.4.Shortages of imported inputs and spare parts

SONIC plants import about 95% of their intermediate inputs and 75% of their spare parts. Even in highly integrated plants such as the Mostaganem plant, which is supposed to produce all its intermediate inputs and supply about 50% of the paper pulp requirement of the Souk-Ahras plant, intermediate inputs are imported. In fact, about 66% of the needed pulp was imported for the Mostaganem plant. These imports were planned in order to avoid the inefficient utilisation of the production lines, which use pulp as an intermediate input. The main reason for the low rate of fixed capital utilisation of the printing and writing paper production line in the Mostaganem plant was the shortage of imported long and short fiber pulp over a period of 104 days. The management estimated that 53% of the underutilisation of this production line was due to the shortage of imported inputs. At the El-Harrach plant, the main reason for the low rate of fixed capital utilisation was the shortage of imported kraft paper. This input was deficient for an overall period of four months resulting from five different stock ruptures. According to the managers, this provoked 10% of the total work stoppages in the hard tissue paper production line and 16% in the soft tissue paper production line in the Souk-Ahras plant. The shortage of imported inputs is more acute in the non-integrated plants since they are more dependent on imports. The shortage of spare parts is difficult to estimate but it appears that this shortage affects the post-independence plants much more than the pre-independence plants. This is partly because the pre-independence plants use a less sophisticated technology than the post-independence plants.

The shortage of imported inputs is due to reasons described in parts 3.4 and 4.3.2. In 1980 SONIC was only allocated 55% of the requested authorisation of imports which were necessary to fulfill its planned outputs. Consequently, some plants were not allocated the necessary funds for smooth running. In addition, the requested AGI was obtained at the end of March instead of the first of January. As a result, no imports of intermediate inputs or spare parts could be obtained for the first three months. The Mostaganem plant, for example, was only allowed to import 50 tons of iron chloride out of the 300 tons it required and, consequently, was short of this input for three months.

### 5.2.3. Allocative inefficiencies

The development of the pulp and paper industry was arbitrarily decided by the planning authorities without taking into account all of the relevant factors involved such as the supplies of water and esparto which are intensively used by the plants. The planning commission saw in the development of this branch of industry, a source of foreign currencies and a development of import substitution plants. In fact, according to the plan, the Mostaganem plant was intended to export 2/3 of its finished output. Water shortages are so acute in all SONIC plants, however, that the development of the pulp and paper industry may not be the best possible choice for

Algeria. To alleviate the grave problems encountered by the Mostaganem plant resulting from the shortage of water, large investments had to be made. Despite these efforts, the lack of water is still acutely felt. In addition, the shortage of esparto is also a serious problem for this plant, as was discussed earlier.

Geographical location is also another reason for the under-utilisation of production capacity in the Mostaganem, Souk-Ahras, Saida and El-Harrach plants. Relevant factors, such as water and storage space, were not considered to be important criteria of site selection by the planning commission. For instance, the Saida plant is subject to floods due to its proximity to the river. The Mostaganem plant would have encountered less problems if it had been located 50 km east of Mostaganem near the Chelif oued (river). External diseconomies were not taken into consideration. Social considerations, such as the creation of jobs and regional equilibrium, outweighed economic factors. Water is very important to this industry and a large number of problems encountered by all the SONIC plants could have been avoided by a more judicious choice of geographical location of the plants.

Choice of technique and contracts also influence capacity utilisation. For example, the post-independence plants have all experienced technical problems. These were often the result of inadequate imported technology responding to the Algerian environment as well as technical misconceptions. In a decomposed or turnkey contract, the contractor is required to deliver a plant in working order but not one that will necessarily produce output according to technical specifications. In these contracts the contractor is not responsible for the training of the work force (see Appendix C.1). For instance, the Mostaganem plant (see Table E.2 in the Appendix E) was built under decomposed and turnkey contracts. It encounters problems related to the technical design of some of its machines: the generator and auxiliary machines and equipments were under-scaled with respect to the rest of the production lines. Consequently, in the cellulosic production line, the production of pulp was only 2.75 tons/hour whereas the norm advocates 9 tons/hour. Similarly, the casing of the clutch and tank of the Saida plant were under-scaled. This plant also encountered problems due to straw dust in the processing operation. This led to more difficulties which were related to the lack of skilled labour force.

5.2.4. Demand shortages

Deficiency of demand for industrial outputs is only encountered by the Souk-Ahras plant. This plant, which was constructed to meet the requirements of anticipated future demand, suffers from excess capacity. Had the promotional networks been developed in order to adopt an aggressive attitude on the international market or production capacities been efficiently used, the excess production could have been exported. In any case, this situation can be considered transitory since local demand is expected to greatly increase in the near future.

Table 5.7 summarizes the causes of underutilisation of capacity by SONIC plants. These indications are derived from the interviews. It can clearly be seen that the post-independence plants have a larger number of problems than the pre-independence plants. The number of shifts used is also related to the age of the plants. Social, cultural and institutional factors are also important causes of the underutilisation of inputs in all the plants. Organisational

Table 5.7 : The causes of inefficient utilisation of inputs in SONIC plants.

| SONIC complexes and plants / Causes of inefficient utilisation of inputs | Mostaganem complex | Baba Ali plant | Souk-Ahras plant | Saida plant | El-Harrach plant | Bordj-Bouarreridj plant | El-Arba plant (Blida) | Oran plant | Oued-Smar plant | Algiers recovery plant |
|---|---|---|---|---|---|---|---|---|---|---|
| ORGANISATIONAL FACTORS | | | | | | | | | | |
| -Lack of organisation of work | * | * | * | * | * | * | * | * | * | * |
| -Problems with WA | * | | | | * | | | | | |
| -Age of the plant | | * | | | * | * | * | * | * | * |
| -Lack of industrial habits & traditions | * | * | * | * | * | * | * | * | * | * |
| -High labour turnover | * | | | | * | | | | | |
| -High rate of absenteeism | * | | * | | * | | | | | |
| -Female personnel | | | * | | | | | | | |
| -Lack of quality | * | | | * | | | | | | |
| -Cumbersome bureaucracy | * | * | * | * | * | * | * | * | * | * |
| SHORTAGES OF INPUTS | | | | | | | | | | |
| -Local | | | | | | | | | | |
| -Raw materials | * | | * | * | * | | | | | * |
| -Intermediate inputs | * | * | * | * | * | | | | * | |
| -Electricity | * | | * | * | * | | | | | |
| -Water | * | * | * | * | | | | | | |
| -Transport | * | | | * | * | | | | * | |
| -Infrastructure | * | | * | * | * | | | | | |
| -Skilled workers | * | * | * | * | * | * | * | * | * | * |
| -Maintenance | * | * | * | * | * | * | * | * | * | * |
| -Supervision | * | | | | | | | | * | |
| -Management stock | * | | * | * | * | | | | | |
| -Imported inputs & spare parts | * | * | * | * | * | * | * | * | * | * |
| ALLOCATIVE INEFFICIENCIES | | | | | | | | | | |
| -Choice of output | * | | * | * | * | | | | | |
| -Choice of location | * | | * | * | * | | | | | |
| -Import policies | * | * | * | * | * | * | * | * | * | * |
| -Financial policies | * | * | * | * | * | * | * | * | * | * |
| -Choice of techniques | * | | * | * | * | | | | | |
| -Choice of contracts | * | | * | * | * | | | | | |
| DEMAND SHORTAGES | | | * | | | | | | | |

Source : Survey data.

problems are equally important in the post- and pre-independence plants. The post-independence plants, which rely heavily on imported inputs, are more concerned with the shortage of inputs obtained from the international market. The lack of skilled labour force is also more deeply felt in the post-independence plants. Government policies have had a greater impact on the post-independence plants than on the pre-independence plants (location, scale, level of integration and technology used). The post-independence plants are also more exposed to the inadequacies of foreign trade policies. Demand shortages are only felt in one plant, but this can be considered transitory.

References

1 Refer to Les Industries Legeres en 1980, op cit. p 40 and La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 277.

2 See part 1.4 for more details.

3 Refer to L'Economie Algerienne in Afrique Noire, Paris, 1981, p 182.

4 The average figures were calculated approximately from the figures available.

5 These were translated for "cadres", "agents de maitrise"and "agents d'execution", respectively.

6 21 tension drops were reported in only four months. Each drop led to 5 hours of production stoppages and an additional 22 hours to start the production process again: Survey data.

7 Bulletin Trimestriel Des Statistiques du Sector Des Industries Legeres, 4th Trimester 1980, op cit. p 23.

8 La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. pp 277-280.

# CHAPTER SIX: SNMC PUBLIC ENTERPRISE

SNMC, which is involved in the production of construction materials, was created on the 20th of December, 1967 following the nationalisation of 25 plants. It is under the supervision of the Ministry of Light Industries. SNMC is a medium-sized public enterprise, which in 1980 consisted of 74 plants, 30 distribution centres, 3 transport units and one engineering unit, totally owned by the state. SNMC has experienced rapid development and is still expanding (8 plants going on stream and 45 planned in the 1980-1984 five year development plan). These plants are widely spread throughout the Northern part of Algeria. In 1980, as a result of recent large investments, SNMC employed 25,416 workers, 2.3 times the number for 1973, and its sales revenue amounted to 2.4 billion AD, 5.2 times that of 1973 (1). In addition, between 1973 and 1980, its fixed assets increased by a factor of 7.66, amounting to 8.6 billion AD in 1980. This development can only be expected in a developing country like Algeria which is undergoing an economic boom (see Chapter Two). SNMC is in charge of the production, distribution and a few engineering activities related to construction materials as well as planning, finance and management of the labour force of SNMC. Its activities also extend to international trade (mainly imports). SNMC is a divisionalised organisation similar to that described in Chapter Four (see Figure 6.1). Its objectives, decision making and control are comparable to those of other Algerian public enterprises (see Chapter Four).

SNMC produces a variety of construction materials ranging from cement and cement asbestos to "red products"(i.e., red bricks and tiles), ceramic tiles and plastic products (for

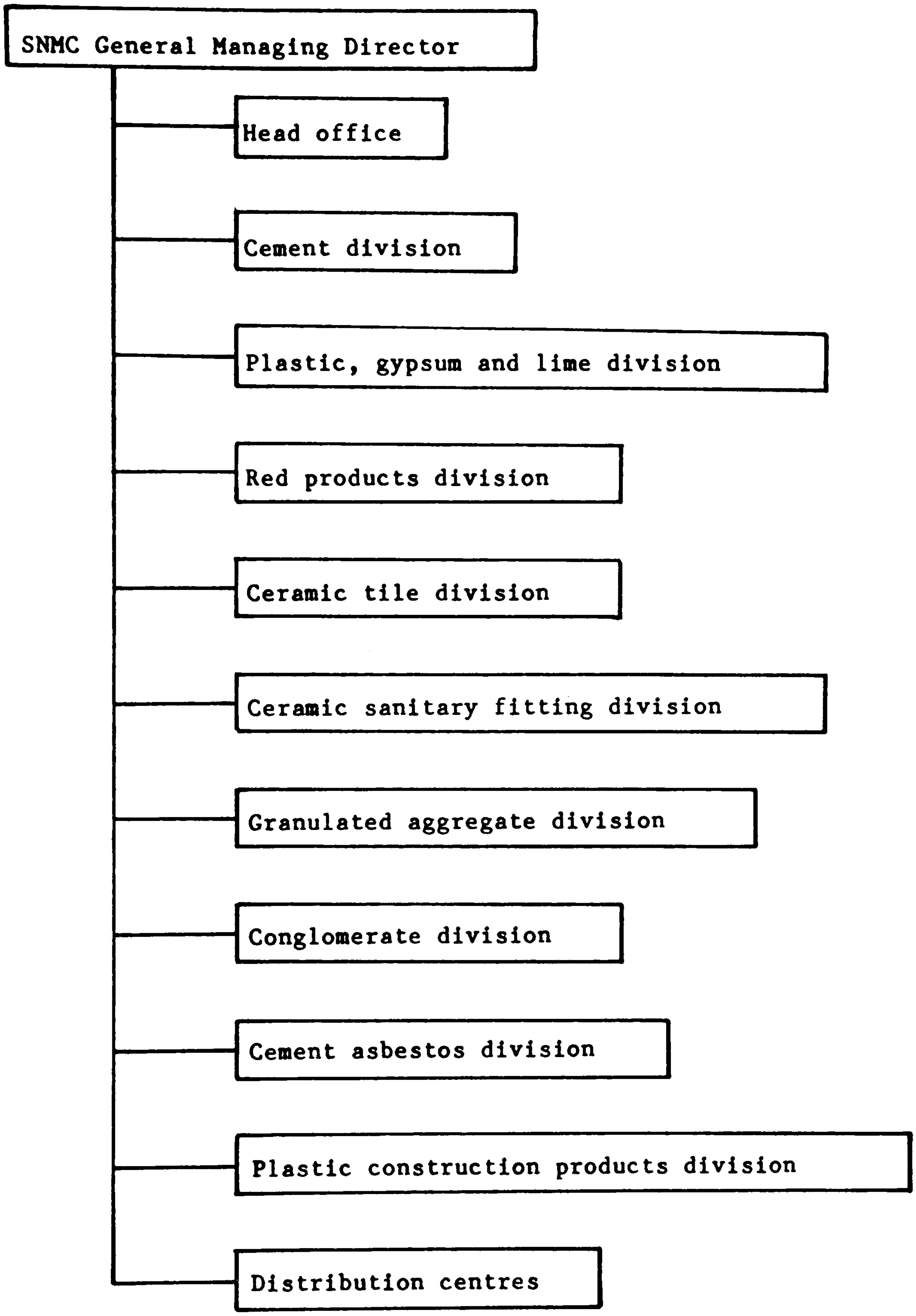


Figure 6.1 : SNMC organisational structure in 1980.

Source : Survey data.

construction)(see Table F.1 in the Appendix F). As indicated in Table F.1, in 1980 SNMC's annual production capacity was 8.3 million tons of cement, 1.89 million tons of red products, 2.65 million units of ceramic tiles, 1.7 million units of ceramic sanitary fittings and 7.5 million tons of granulated aggregates. Furthermore, SNMC's annual production capacity of plastic products (tubes) was 164,400 tons, its annual capacity of plastic floor tiles was 1.6 million square metres, its annual capacity of conglomerates was 1.545 million tons (cement pipes, small beams and concrete blocks and bridges) and its annual capacity of tilling was 918,000 square metres. SNMC also had large plaster, gypsum, lime and asbestos cement capacities. Its production capacity by plant output and by plant is indicated in Table F.1 in the Appendix F.

SNMC is a larger public enterprise than SONIC (employing more workers and achieving a higher sales revenue). In addition, SNMC has a much larger number of plants which produce a wider range of outputs and is more geographically dispersed than SONIC. Factors which account for its more diverse plant locations are that raw materials for the construction materials industry can easily be found everywhere in the country, the transport cost of inputs and outputs is very high and the range of output is intended for far more geographically dispersed consumers than those of the pulp and paper branch.

SNMC monopolizes only the production of cement, asbestos cement and ceramic sanitary fittings. The private sector in the construction materials branch consists of 779 private firms (see Chapter Two). The existence of a large private sector, involved in the production of output for which SNMC does not hold the monopoly, stimulates a competitive atmosphere since local production for those outputs exceeds local demand. SNMC holds the foreign trade monopoly in construction materials products. Despite the substantial growth experienced by SNMC and the private firms, a large volume of imports is still required to meet local demand. A portion of these imports supplement outputs produced by SNMC, while the remainder consist of products that are not manufactured by local firms (public and private), such as fire-bricks and fire-clay. On the other hand, exports are not developed and promoted.

In terms of the local market situation, SNMC plants are faced with problems which are different from those of SONIC. In fact, as discussed in Chapter Five, SONIC holds the production monopoly in pulp, cardboard and printing paper other than newsprint. Local pulp and paper production does not exceed local demand. SONIC shares the local market with only a few private firms. SNMC, on the other hand, holds the monopoly in several types of construction materials and shares the local market with a large private sector for which local production is higher than local demand.

As illustrated in Table F.1 in the Appendix F, almost all the plants, except the conglomerate plants and the two gypsum and plaster plants, are monoproduct plants. This is due to the nature of the output produced. Moreover, all the plants, with the exception of the asbestos cement and plastic (for construction) plants, are highly integrated. The SNMC plants are highly integrated because of their technological production process. The cement asbestos and plastic plants are less integrated because most of their inputs are supplied by other SNMC plants or by SONATRACH plants, respectively. SNMC is characterised by a larger number of monoproduct and highly integrated plants than SONIC. SNMC is also more integrated than SONIC.

Similar to SONIC, the SNMC plants can be divided into two categories: pre-independence and post-independence plants. More than 69% of SNMC plants were built after 1962 but, in fact, have been producing only since 1975. In comparison, only 45% of the SONIC plants were built after 1962. Also, pre-independence plants use traditional labour intensive technology and post-independence plants use capital intensive technology. Since the age of the plant is related to the choice of technology, one may say that SNMC uses mainly capital intensive technology (2) despite the large supply of human resources which would seem to dictate the use of labour intensive technology. The causes are similar to those described in Chapter Five. The techniques used in the production of construction materials are somewhat simpler than those used in the pulp and paper industry. Consequently, the SNMC plants are less subject to problems arising from technical constraints than the SONIC plants. The technology used in the post-independence cement or ceramic tiles plants, however, is as complex as that used in the post-independence pulp and paper plants. Thus, some similarities exist between SONIC and SNMC. As far as the use of traditional labour and capital intensive technology is concerned, the two public enterprises are faced with identical problems. Post-independence plants, as opposed to the small-scale pre-independence plants, are large-scale. In this respect, the SNMC situation is comparable to that of SONIC for the reasons already given in Chapter Five.

In 1980, as indicated in Table 6.1, over 35% of the total SNMC plants operated with only one shift, 46.5% operated with two shifts and 18% operated with three shifts. On average, a SNMC plant operated 14.70 hours per day. An analysis of the data indicates that the number of shifts is related to the age of the plant and the nature of the output. This can be contrasted with the case of SONIC where the number of shifts is only related to the age of the plant. In addition, although the two public enterprises concerned have almost the same proportion of plants operating with one shift, SONIC has a higher proportion of plants operating with three shifts than SNMC does.

Table 6.1: Number of shifts in SNMC plants in 1980

| Hours of work per day | Number of plants | Percentage of total plants |
|---|---|---|
| 8 | 25 | 33.8 |
| 16 | 36 | 48.6 |
| 24 | 13 | 17.6 |
| Total number of plants | 74 | 100.0 |

Source : Table F.1. in the Appendix F.

The origin of the different inputs used by SNMC plants is indicated in Table 6.2. Most of the raw materials and intermediate inputs used in SNMC plants are either supplied within SNMC or by the local market. Only small quantities of chemicals and about 75% of the spare parts are imported. The ratio of imported to total spare parts is high because the entire capital stock is imported and the local industrial sector is not integrated. Meanwhile, the small proportion of imported inputs is due to the fact that SNMC uses raw materials and intermediate inputs that are locally abundant and/or produced. The degree of dependency vis-a-vis the imports of raw materials and intermediate inputs is much lower

Table 6.2 :Origin of SNMC inputs

| | INPUTS \ OUTPUTS | Cement | Plaster | Gypsum | Lime | Red products | Ceramic tiles | Aggregates | Cement bridges | Cement products | Small beams | Cement asbestos | Plastic construct-ion products |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RAW METERIALS AND INTERMEDIATE INPUTS | **WITHIN SNMC** | | | | | | | | | | | | |
| | Cement | | | | | | | | * | * | * | * | |
| | Gypsum | * | | | | | | | | | | | |
| | Aggregate | | | | | | | | * | * | * | | |
| | **LOCAL MARKET** | | | | | | | | | | | | |
| | Calcaleous materials | * | | | | | | | | | | | |
| | Argillaceous materials | * | | | | | | | | | | | |
| | Clay | | | | | * | * | * | | | | | |
| | Asbestos fiber | | | | | | | | | | | * | |
| | Kaolin | | | | | | * | | | | | | |
| | Silica | | | | | | * | * | | | | | |
| | Sand | | | | | | | * | * | * | * | | |
| | PVC | | | | | | | | | | | | * |
| | Stones | | | | | | | * | | | | | |
| | Alum powder | * | | | | | * | | | | | | |
| | Carbonate powder | * | | | | | | | | | | | |
| | Calcium mabre | * | | | * | | * | | | | | | |
| | Lubricant | * | * | * | * | * | * | * | * | * | * | * | * |
| | Electricity | * | * | * | * | * | * | * | * | * | * | * | * |
| | Water | * | * | * | * | * | * | * | * | * | * | * | * |
| | Other chemic. prod. | | | | | | * | | | | | | |
| | Colorants | | | | | | * | | | | | | |
| | Spare parts | * | * | * | * | * | * | * | * | * | * | * | * |
| | **INTERNATIONAL MARKET** | | | | | | | | | | | | |
| | Colorants | | | | | | * | | | | | | |
| | Quartz | | | | | | * | | | | | | |
| | Other chemic. prod. | * | * | * | * | * | * | * | * | * | * | * | * |
| | Pure argillaceous mat. | | | | | | * | | | | | | |
| | Spare parts | * | * | * | * | * | * | * | * | * | * | * | * |
| FIXED CAPITAL | | 100% imported | | | | | | | | | | | |
| LABOUR | Foreign | 0.2% | | | | | | | | | | | |
| | Local | 99.8% | | | | | | | | | | | |

* indicates the origin of the input without specifying the proportion.

Source : Survey data.

in SNMC plants than in SONIC plants. The SNMC plants are as dependent on imported spare parts as the SONIC plants. Such dependence does not lead, however, to a similar need for technical and maintenance staff. This may be attributed to the simpler technological process of production in the SNMC plants than in the SONIC plants. As far as capital goods and labour are concerned, SNMC plants import almost all of their capital goods and employ an insignificant proportion of foreign manpower, as in SONIC plants.

SNMC outputs, as illustrated in Table 6.3, consist of semi-finished outputs used within SNMC and by private firms and finished outputs intended for an intermediate use. SNMC also is part of the consumer-oriented sector. The finished outputs are used for the construction industry (including housing), hydraulic and public works. Cement, gypsum and aggregates in particular, are used as semi-finished outputs within SNMC and by local private firms. Similar to SONIC outputs, SNMC outputs are intended to satisfy local demand. These outputs are oriented towards different sectors and uses: SNMC outputs are oriented mainly towards the industrial and social sectors for intermediate use and SONIC outputs mainly towards the consumer sector for final use.

In 1980, SNMC had 26,000 workers -a much larger number than in SONIC. Table F.1 in the Appendix F shows the number of workers by plant without giving details of their qualifications since the distribution by skill category for each plant is unfortunately not available. Table 6.4 indicates the total labour force working by group of similar products by skill category. In 1980, as indicated in Figure 6.2, 5.8% of the SNMC labour force had the qualifications of managers, 9.3% of

Table 6. 3 : Destination of SNMC outputs

| SECTORS OF UTILISATION / OUTPUTS | DOMESTIC MARKET | | | | | | | EXPORTS |
|---|---|---|---|---|---|---|---|---|
| | INTERMEDIATE USE | | | | | | | |
| | SNMC | | | | | | | |
| | Within plant | Within SNMC | Housing | Other building construction industries | Public works | Hydraulic | Private /consumers sector | |
| Cement | | * | * | * | * | * | * | *(1) |
| Plaster | | | * | * | | | | |
| Gypsum | | * | * | | | | | |
| Lime | | | * | * | | | | |
| Red products | | | * | * | | | | |
| Ceramic tiles | | | * | * | | | | |
| Ceramic sanitary tiles | | | * | * | | | | |
| Aggregates | | * | * | * | * | * | * | |
| Cement bridge | | | | | * | * | | |
| Concrete blocks | | | * | * | | | | |
| Cement pipes | | | * | * | * | * | | |
| Small concrete beams | | | * | * | | | | |
| Cement asbestos | | | * | * | | | | |
| Plastic tubes | | | * | * | | | | |
| Plastic tile floor | | | * | * | | | | |
| Other plastic products | | | * | * | | | | |

* indicates the destination of the outputs without specifying the proportion.

1 Exceptional exports.

Source : Survey data.

technicians and supervisors and as much as 84.8% of semi-skilled and unskilled workers (without any qualifications). Female participation and foreign manpower were as low as 4.7% and 0.2% of the total labour force, respectively. Foreign manpower, which mainly consisted of managers (73% of the total foreign manpower), amounted to 2.5% of the total SNMC managers.

The percentage of skilled workers was particularly low in the SNMC plants since only 11.4% of the total labour force of the plants had the qualifications of managers (3.4%) or technicians and supervisors (8%). The cement, lime and plaster plants are better furnished with skilled workers than the other SNMC plants. The low ratios of skilled workers show the lack of a skilled labour force in SNMC in general and in the SNMC plants, in particular. As shown in Figure 6.3, only 49% of the total skilled labour force worked at the plants, with 29% at the head office and the remaining 22% either at the marketing units, at the projects, undergoing some training or attached to the Ministry of Light Industries. In general, one would expect more of the skilled labour force deployed to the management of the plants than to the head office as is the case in SNMC. SNMC as a whole is also characterised by a high rate of absenteeism, which amounted to 5.2% in 1980. In conclusion, the SNMC labour force is characterised by a small percentage of skilled workers in the SNMC plants, a large proportion of skilled workers at the head office compared to the plants and a high rate of absenteeism.

In 1980, SNMC, with only 15.1% skilled workers, was in a less favourable situation than SONIC (see Figure 6.2). The proportion of skilled workers in the head office was higher in SNMC than in SONIC (see Figure 6.3). The reason lies in the fact that the number of technicians and supervisors in the

Table 6.4: Distribution of personnel

by skill category in SNMC in 1980

| Skill category Labour force by functions | Managers (1) | Managers (2) | Technicians/ supervisors (1) | Technicians/ supervisors (2) | Total skill (3) | semiskilled/ unskilled (1) | semiskilled/ unskilled (2) | Total (1) | Total (2) |
|---|---|---|---|---|---|---|---|---|---|
| Head office | 656 | 44.4 | 456 | 19.2 | 29 | 1,431 | 6.6 | 2,543 | 10.0 |
| Distribution | 73 | 5 | 262 | 11 | 8 | 2,125 | 9.9 | 2,460 | 9.6 |
| Transport | 8 | | 31 | | 0.1 | 222 | | 261 | |
| Execution unit | 87 | | 140 | | 5.8 | 1,972 | | 2,099 | |
| Printing plant | 6 | | 6 | | 0.3 | 37 | | 49 | |
| Project | 51 | | 101 | | 3.9 | 696 | | 848 | |
| Sub total | 881 | 59.6 | 996 | 41.9 | 48.7 | 6,483 | 30 | 8,261 | 32.5 |
| Plants | | | | | | | | | |
| Cement, plaster lime & gypsum | 268 | | 505 | | | 4,485 | | 5,258 | 20.6 |
| Ceramic & red products | 172 | | 457 | | | 6,029 | | 6,658 | 26.2 |
| Plastic, asbes. cement, aggreg. & conglomerate | 155 | | 416 | | | 4,669 | | 5,240 | 20.6 |
| Sub total | 595 | 40 | 1,378 | 58.0 | 51.2 | 15,183 | 70 | 17,156 | 67.5 |
| Total SNMC | 1,476 | 100 | 2,374 | 100 | 100 | 21,666 | 100 | 25,416 | 100.0 |
| % of total labour force | | 5.8 | | 9.4 | 15.2 | | 84.8 | | 100.0 |
| Female | 109 | 7.3 | 233 | 9.8 | | 821 | 3.7 | 1,196 | 4.7 |
| Foreigners | 38 | 2.5 | 2 | | | 12 | 0.5 | 52 | 0.2 |

Source: Survey data.

1 Total by skill category in the administrative functions, group of plants & SNMC as a whole.
2 % of the total managers, technicians and supervisors, semi-skilled and unskilled workers and in SNMC as a whole in the administrative functions & group of plants.
3 % of the total skilled labour force in SNMC in the administrative functions & group of plants.

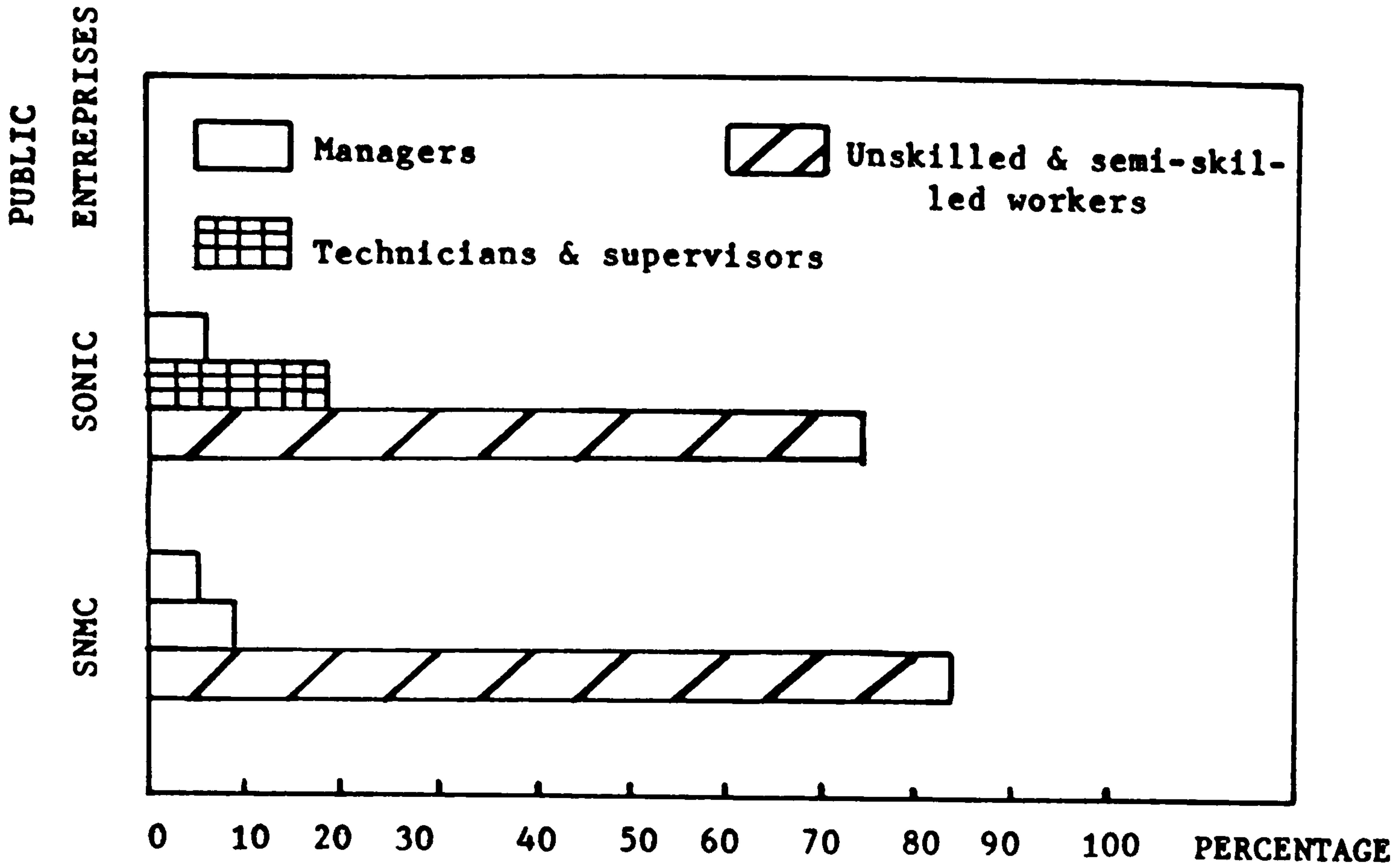


Figure 6.2 : Percentage of labour force by skill category in SONIC and SNMC.

Sources : Tables 5.4 & 6.4.

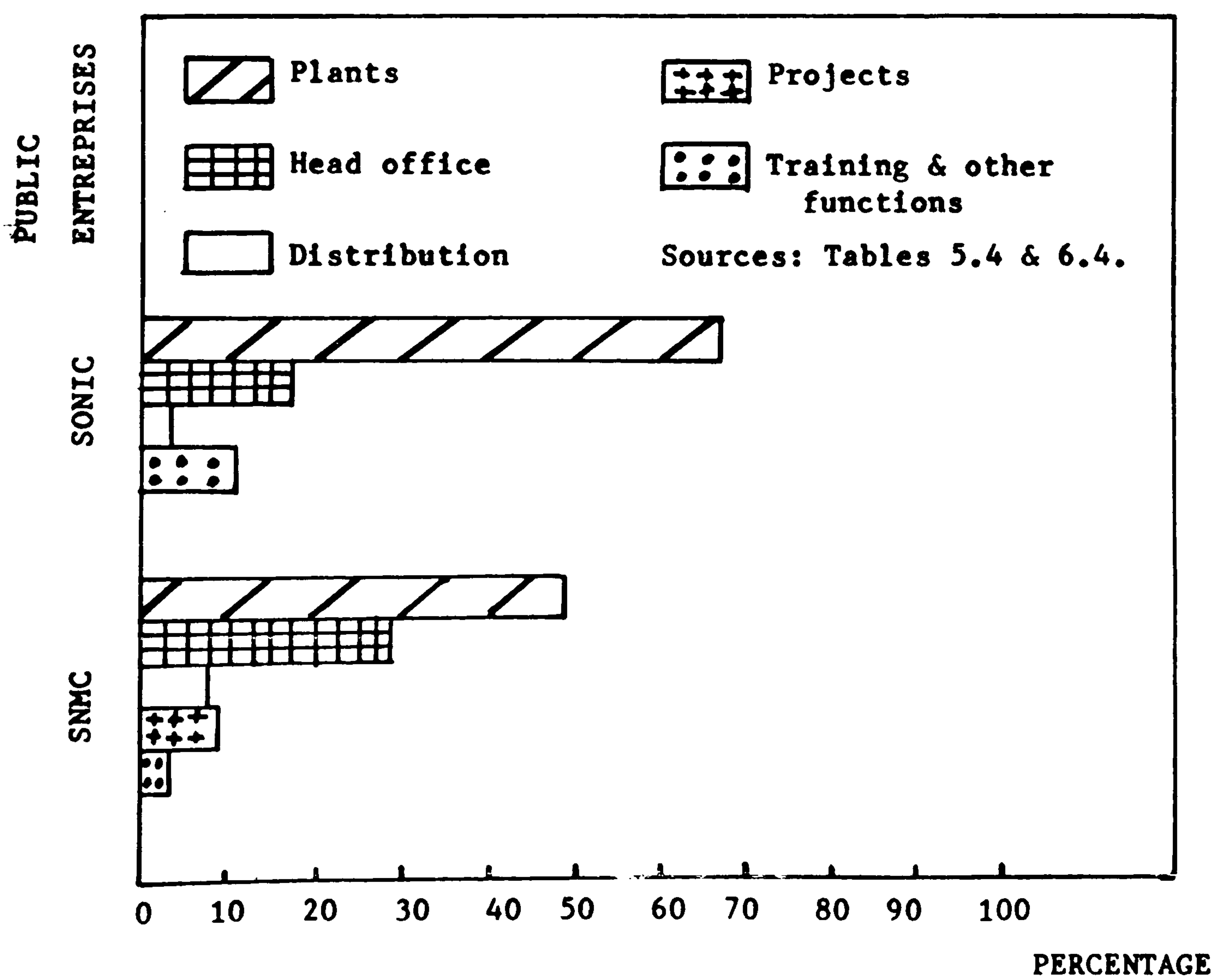


Figure 6.3 : Percentage of skilled labour force by function in SONIC and SNMC.

SONIC plants is twice as large as in the SNMC plants. Consequently, there is a higher percentage of skilled workers in the SONIC plants than in the SNMC plants. In addition, the two public enterprises are characterised by high rates of absenteeism, though it is slightly lower in SNMC. We now turn to the discussion of the utilisation of inputs in SNMC plants.

### 6.1.Utilisation of inputs in SNMC

#### 6.1.1.Utilisation of raw materials and intermediate inputs

It is difficult to assess whether locally supplied raw materials are inefficiently used since these are not in short supply and consequently do not affect the utilisation of production capacity. No data are recorded to compare to the norms. The inefficient use of these inputs, however, would have an effect on production cost if it was calculated (no calculation of production cost is carried out in any SNMC plants). Moreover, according to the managers, SNMC uses some of its intermediate inputs inefficiently. These are mainly electricity and chemical products. Electricity and some chemical products are considered to be overconsumed, since according to the quantities used, actual production should be higher. This is confirmed by the following examples: electricity is inefficiently used in all the red products, ceramic tile and ceramic sanitary tile plants because the ovens, which must be left on 24 hours per day, seven days per week, are only used 16 hours a day and five days a week (during two shifts).

#### 6.1.2.Utilisation of fixed capital

U1 (ratio of actual over planned capacity), U2 (ratio of planned over technical capacity) and U3 (ratio of actual over technical number of shifts) by plant output, by plant, by

SNMC's output and for SNMC as a whole are calculated as indicated in Chapter Four. These rates are calculated using the data given by the SNMC's managers (see Chapter Four). One supplementary clarification, however, has to be made concerning SNMC's planned outputs. According to the managers, the proposed planned outputs were calculated taking into account the technical norms given by the contractor, Algerian conditions and the conclusions of a World Bank study (3). These proposed planned outputs were also approved by the supervisory ministries.

In 1980, as indicated in Table F.1 in the Appendix F, U1 by plant output varied between 22% and 126% while U2 ranged from 49% to 150%. Analysis of the value of U1 and U2 shows that the highest rates of fixed capital utilisation by plant output were obtained for plastic tubs in the Setif plastic tub plant, cement pipe in the Annaba conglomerates plant and red products in the Colonel Amirouch plant. The lowest rates of fixed capital utilisation were obtained for granulated aggregates in the Sidi Ali Benyoucef and El-Khroub plants. Almost identical results were obtained for the rates of fixed capital utilisation by plant since most are monoproduct plants. U1 by plant varied between 22% and 114% while U2 was between 49% and 150%. The highest rates of fixed capital utilisation were obtained for the plastic tub plant of Setif, the Colonel Amirouch red products plant and the Oran conglomerates plant. The lowest rates of fixed capital utilisation were obtained for the granulated aggregates Sidi Ali Benyoucef and El-Khroub plants.

As indicated in Table 6.5, U1 by SNMC's output varied between 43% and 93% while U2 ranged from 75% to 116%. The highest rates of fixed capital utilisation by SNMC's output

Table 6.5: Rates of fixed capital utilisation in various SNMC plants in 1980 (in percentage)

| Number of plants | Type of output | U1 | U2 | U3 |
|---|---|---|---|---|
| 8 | Cement | 69.4 | 75.32 | 100 |
| ) | Plaster | 63.66 | 88.13 ) | |
| 5 ) | Gypsum | 84 | 100 ) | 85.24(1) |
| ) | Lime | 78 | 88.8 ) | |
| 27 | red products | 72.33 | 93.4 | 68.26 |
| 3 | Ceramic tiles | 68.33 | 100 | 52.4 |
| 3 | Cera. sanit. fitting | 62 | 96 | 52.4 |
| 10 | Granulated aggregates | 43.5 | 82.3 | 48.34 |
| 7 | Conglomerates | 80.46 | 99.75 | 68.37 |
| 5 | Cement asbestos | 49.2 | 96.76 | 100 |
| 3 | Plastic products | 69.33 | 116.66 | 26.2 |
| 71 | Total SNMC | 66.67 | 91.97 | 69.35 |

Source: Table F.1 in the Appendix F.

(1) U3 corresponds to the plaster, gypsum and lime.

Table 6.6: Rates of fixed capital utilisation in SNMC post- and pre-independence plants in 1980 (in percentages)

| SNMC Outputs | Post-independence plants | | Pre-independence plants | |
|---|---|---|---|---|
| | U1 | U2 | U1 | U2 |
| Cement | 66.14 | 75.22 | 92.3 | 76 |
| Lime | - | - | 78 | 88.8 |
| Plastic and gypsum | 72.5 | 90 | 77.33 | 94.8 |
| Red products | 69.22 | 90.44 | 78.55 | 99.34 |
| Ceramic tiles | 68.33 | 100 | - | - |
| Cer. ti. sani.fitting | 62 | 96 | - | - |
| Granulated aggregates | 36 | 74.28 | 61 | 101.16 |
| Conglomerates | 68.48 | 100 | 89.45 | 99.57 |
| Cement asbestos | 45.66 | 100 | 55 | 92 |
| Plastic products | 69.33 | 116.66 | - | - |
| Total | 61.97 | 89.63 | 76.52 | 96.91 |

Source: Table F.1 in the Appendix F.

- not applicable.

were obtained for cement pipe and small beams, respectively. The lowest rate of fixed capital utilisation by SNMC's output was recorded for granulated aggregates. For SNMC, a low value of U1 generally corresponds to a low value of U2. Fixed capital is not efficiently utilised in SNMC as a whole. U1 for SNMC as a whole was 66% and U2 was 92%.

When the rates of fixed capital utilisation of pre-independence and post-independence plants are compared, several conclusions can be drawn. As indicated in Table 6.6, the pre-independence plants make better use of their fixed capital than the post-independence plants. Thus, according to the information given earlier in this chapter, plants using labour intensive technology were performing better than those using capital intensive technology. Furthermore, small and medium-scale plants were used more efficiently than large-scale plants. It is also noteworthy that U2 in average is slightly higher for the pre-independence than for the post-independence plants.

Another set of interesting conclusions is drawn when the rates of fixed capital utilisation of the post-independence plants are compared. The post-independence plants, which became operational after 1976, perform better than those which began producing between 1962 and 1975. For example, the Mefta cement plant (which started producing in 1975) performed better than the Benisaf cement plant (which started producing in 1979). From these facts, one can conclude that the newer the plant, the higher its rate of fixed capital utilisation. Location, the endowment of skilled workers and organisational factors have also had an influence on rates of fixed capital utilisation. This can be seen, for instance, in the differences in the rates of fixed capital utilisation among plants in both red products and conglomerates divisions even though they were built during the same year and use an identical technology. In addition, three large-scale ceramic tile plants using similar capital intensive technology performed at different rates. Newer plants using capital intensive technology also performed at different rates. In this case one can argue, however, that the origin of the technology and the complexity of the production process may partly explain the difference in performance. In fact, the mastery of imported technology has a great influence on the rates of fixed capital utilisation. The scale of the adopted technology may also affect the rates of fixed capital utilisation due to the requirement of a large skilled labour force which is scarce in Algeria.

Another interesting analysis is that of U2. U2 (ratio of planned over technical capacity) for the SNMC plants is high. In fact, as indicated in Tables 6.5 and F.1 in the Appendix F, U2 is equal to one for about half of the plants. In 1980, for SNMC as a whole, U2 was equal to 92%. This ratio is higher than that for SONIC (U2= 78.5% in 1980 and 83% in 1981). One may expect U2 to increase with the age of the plant. A value of U2 less than one for the newly built plants is to be expected since these plants are not planned to produce at 100% capacity when they start to be operational. It is more difficult to understand why the SNMC plants built earlier show lower values of U2 than the newer built plants. For example, in 1980 the H-Soud cement plant, operational since 1975, was planned to produce 72% of its technical norm, while the Saida cement plant, operational since 1979, was planned to produce as much as 80% of its technical norm. In this particular case, U2, which is influenced by the age of the plant, yields a value contrary to what is expected. Moreover, in some cases U2 is greater than one and, therefore, confirms the fact that planned outputs may be higher than the technical norm.

The analysis of U3 (ratio of actual over technical number of shifts) indicates that SNMC fixed capital was left idle for almost one third of the time. Less than half of the plants worked with three shifts. In fact, U3 is less than one in all post-independence plants except the post-independence cement and cement asbestos plants. U3 is related to the age of the plant and correlated with the lack of skilled workers, the presence of female workers in the production lines and the nature of the output.

A comparison of SNMC and SONIC fixed capital utilisation rates leads to the conclusion that the SONIC fixed capital was more efficiently used than that of SNMC. In 1980, for example, U1 was 93% and 66% and U2 was 78% and 92%, in SONIC and SNMC, respectively. An analysis of U3 shows that the time utilisation of fixed capital is higher in SONIC (75%) than SNMC (69%).

6.1.3.Utilisation of labour

As stressed in Chapter Four, it is difficult to accurately evaluate labour utilisation since only a few figures are available. In fact, the only figure available -the wage productivity ratio, which in 1980 was 92,539 AD compared to that given by the norm, 176,000 AD- shows an inefficient utilisation of labour. As in the SONIC Chapter, therefore, the present analysis is based on overstaffing figures. As indicated in Table F.1 in the Appendix F, the actual figures for 1980 and the employment norm given by the contractor are available for each plant. A comparison of these figures shows an overstaffing situation in almost all SNMC plants. The overstaffing ratios varied from one plant to another. The highest ratios of overstaffing, 96% and 89%, were obtained for the Batna no. 1 red products and A.E. Kebera cement plant, respectively. The overstaffing ratio calculated in Table 6.7 show significant differences from one group of plants to another. The highest overstaffing ratio was obtained for the cement plants. These figures indicate clearly that labour is not used efficiently. One can conclude that SNMC plants are overstaffed because of governmental policies and social problems (see Chapter Four and Five for more details). According to the overstaffing ratios, the various factors influencing these ratios are correlated to geographical location. Analysis of the data clearly indicates that the various SNMC inputs are not efficiently used.

Table 6.7: Rate of overstaffing in SNMC plants in 1980

| Total plants producing the same output. | Ratio of overstaffing in % |
|---|---|
| Cement plants | 33.66 |
| Plaster, gypsum and lime plants | 3.52 |
| Red products plants. | 16.37 |
| Ceramic tile plants | 21 |
| Ceramic tile sani.fitting plants | 20.50 |
| Cement asbestos plants | 6.9 |
| Plastic products plants | 2.3 |
| Rate of absenteeism in SNMC (1) | 11.22 |

Source: Table F.1 in the Appendix F.

(1)The total is calculated from the figures given in Table F.1.

## 6.2. Common causes of inefficiency in SNMC

Now that the evidence regarding the underutilisation of the different inputs have been given, causes of inefficiency common to all SNMC plants are analysed. First, organisational factors will be discussed. Shortages of inputs will be described in the second section which will be followed by allocative inefficiencies. Demand shortages will be analysed in the fourth section.

### 6.2.1. Organisational factors

One of the obvious causes of underutilisation of inputs in SNMC is the high rate of absenteeism. In 1980, the rate of absenteeism for SNMC was 5.2%. An analysis of this ratio with respect to skill qualifications, shows that this ratio was higher for technicians and supervisors and semi-skilled and unskilled workers than for managers (see Table 6.8.). The highest ratio was obtained for technicians and supervisors. According to SNMC managers, the rate of absenteeism is much higher during night shifts. This high rate of absenteeism is attributed to noneconomic causes (social, cultural and institutional), as discussed earlier in Chapter Four.

Table 6.8: Rate of absenteeism in SNMC by employee skill categories for 1980

| Skill category | Rate of absenteeism |
|---|---|
| Managers | 3.59 |
| Technicians and supervisors | 5.76 |
| Semi-skilled and unskilled workers | 5.17 |
| Total SNMC | 5.2 |

Source: Survey data.

In almost all SNMC plants and, in particular, in the cement plants, the major concern was the inefficient management of spare parts. The volume of spare parts is very often enormous, especially in plants using capital intensive technology and those built by different contractors (as in decomposed contracts). Accurate records of the references for the different spare parts are often not kept. Spare parts are often left outdoors and are thus subject to severe damage. This is the result of a shortage of stocking areas, the lack of skilled workers and inefficient spare parts stock management.

In addition to the organisational factors mentioned above, other factors already discussed in Chapter Four are also encountered in SNMC plants (e.g., bureaucratic administration). In conclusion, SNMC and SONIC are faced with similar organisational problems leading to identical inefficiencies.

6.2.2.Shortages of inputs

6.2.2.1.Shortages of raw materials and intermediate inputs

The raw materials used in the production process in SNMC plants are supplied locally and are not subject to a lack of transport and road infrastructure since, in most cases, these plants are located in the vicinity of the supply point. Thus, in contrast to SONIC, SNMC does not suffer from a shortage of raw materials. Shortages of raw materials, however, sometimes occur due to difficulties in gaining access to these inputs, such as in the Hama Bouziane cement plant or due to the lack of spare parts, as in the Meftah cement plant.

SNMC plants also suffer from water shortages. The consequences, however, have minor effects when compared to the SONIC case since SNMC plants are not extensive users of water. In contrast, the shortage of electricity had drastic consequences on the utilisation of inputs in SNMC plants. This is particularly true of plants which do not possess their own electricity generator such as the ceramic tile plants of Rhemchi, El-Achour and Ibn-Ziad and the ceramic sanitary fitting plants of Tenes, El-Milia and Ghazaouet. Power supply cuts often led to several days of work stoppage because of the amount of time involved in maintaining the oven (e.g., cleaning) and in reaching the required temperature. Cement plants, which all own electricity generators, were much less affected by power cuts. Variations in electricity supply led to both an increase in capital goods maintenance and a decrease in their life expectancy. One can conclude, therefore, that similar to the SONIC case, shortages of electricity led to the underutilisation of fixed capital and labour in the SNMC plants. The extent of electricity shortages which resulted from reasons already discussed in the previous Chapter depends also on the geographical location of the plants.

Plants also suffer from shortages of other inputs such as bags for cement packaging in all the cement plants or folding boxes for tile packaging in all the tile plants. These inputs are usually supplied by the SONIC plants which, from earlier discussion, are faced with inefficiencies that affect their production capacity. This fact stresses the importance of input utilisation in interactive sectors or branches of industry.

6.2.2.2. Shortages of means of transport, infrastructure facilities and working capital

Shortages of means of transportation and the nonexistence of an efficient distribution network have greater consequences for the SNMC plants than the SONIC plants. In 1980, 26% (4) of the SNMC transport capacities were, on average, not operational during the year due to the lack of maintenance and spare parts and their poor state (old age). The shortage of transport is the result of insufficient capacity (i.e., railways and lorries) which is correlated to the nature of the output transported. These outputs are heavy and, therefore, require large transport capacity. In addition, the actual transport capacities are worn out and have not been replaced due to the lack of funds. This situation is sometimes worsened by the geographical location of the plants. Consequently, some plants overstock outputs when there is a shortage of these outputs in other regions. The shortage of means of transport also results in shortages of imports with minor effects. The shortage of infrastructure facilities also deeply affects SNMC plants. For instance, the Saida cement plant has a lot of problems because of the shortage of social infrastructure in the area.

The price of SNMC outputs increased on average by 26% between 1978 and 1979 and by 4.7% between 1979 and 1980. Despite this increase, production costs, which are subject to high personnel charges (36% of the sales revenue in 1978) and frequent increases of imported spare parts prices, are not covered. Subsidies are planned to be distributed to SNMC to alleviate its critical financial situation. Unfortunately, bureaucratic and organisational problems prevent the distribution of these subsidies on time. Consequently, SNMC is faced with enormous financial difficulties which is clearly illustrated by a negative working capital and cash flow of 385.81 million AD and 133.035 million AD in 1978 , respectively, and a bank overdraft of 1,850 million AD (5). SNMC was obliged to take recourse in short term loans carrying high financial charges which heightened its financial charges to 10% of its total charges in 1980. In addition, almost all the newly built plants encountered financial difficulties since they were expected to begin repaying their credit although they were not fully operational. Insufficient working capital leads to inefficiencies which, in turn, may cause underutilisation of inputs (see part 4.3.2).

6.2.2.3.Shortages of skilled labour

According to its managers, SNMC is also faced with a lack of skilled workers, particularly in plants using capital intensive technology. A few foreigners (technical assistants) are hired to make up for the lack of Algerian skilled labour (2.5% of the total managers). This shortage is confirmed by the figures discussed earlier in this chapter. The lack of skilled labour is particularly acute in the maintenance, technical and managerial positions at the plant level. SNMC experiences the same problems in this area as SONIC and the consequences are identical to those described in Chapter Four.

6.2.2.4.Shortages of imported inputs

According to SNMC managers, the shortage of imported inputs was one of the important causes of underutilisation of inputs. Such a shortage especially concerned the spare parts of machinery and means of transport. The rigidity of import regulations also affects the supply of imported spare parts. For example, when the conveyor belt of the Mefta cement plant broke down in 1976, it took several months to get the necessary AGI and once the conveyor belt arrived at the port, it took several weeks for it to clear customs. In the meantime, the plant was struggling to transport the necessary raw materials by any means possible to keep the plant working. The managers also reported that imported spare parts were often rusted, lost (empty boxes were delivered) and sometimes arrived without their reference numbers. In 1980, the AGI for the first semester was allocated three months later than the presumed date just as in SONIC. The shortage of spare parts is due to reasons mentioned above and leads to underutilisation of inputs as already discussed. The shortage of imported spare parts has effects similar to those of the SONIC plants, but the shortage of imported raw materials and intermediate inputs has only a minor effect on SNMC as the degree of dependency on imported inputs (other than capital goods) is lower in SNMC plants than in SONIC plants.

6.2.2.5.Shortages of stocking areas

Stocking areas are insufficient to efficiently stock all the spare parts and outputs in almost all SNMC plants. In addition, the present stocking areas are insufficient to prevent stock ruptures of output during the maintenance period (SNMC plants are often stopped for a whole month for maintenance). For instance, in 1980, the cement safety stock consisted of only 7 days' production for the entire number of cement plants during the maintenance period (one month). Such situations lead to shortages and a climate of insecurity that gives rise to black market activities. The lack of stocking areas is often due to space restrictions resulting from the inappropriate geographical location of the plant. Most SNMC plants have excess capacity and one may argue that available stockage areas would produce an incentive for using such excess capacity (this inefficiency will be discussed later in this chapter in more detail).

6.2.3.Allocative inefficiencies

As explained under investment policy, the decision regarding the location of a plant is taken by the planning committee. A large number of SNMC plants encounter problems because of their location. For instance, the Hama Bouziane cement plant is faced with raw materials supply problems. The Saida cement plant also has problems because of the inadequate infrastructure around the plant. The Saida industrial zone is, in addition, located in an area which is subject to frequent flooding (see previous chapter). Another example is the greater concentration of cement plants in the Western part of the country, although the demand for cement is greater in the Eastern part. This leads to overstocking and demand shortages in the West and cement shortages in the East. The overstocking of cement is also caused by a deficient transportation network and a shortage of means of transport. In an attempt to alleviate this situation, the overstocked cement was shipped in bulk to the Eastern regions. The cost of transport was so high that the cost of cement produced by SNMC was twice as expensive as imported cement. Moreover, a number of plants were located in small villages away from the large urban and industrial centres in response to the regional imbalance. These plants were faced with a lack of both skilled and unskilled workers. In fact, workers have to travel from the large cities to the villages to work. The lack of adequate housing for workers means that workers get to the plant already tired after a one or two hour journey. This problem is considered transitory as people are expected to move to the area where they work. Unfortunately, the building process appears to be inefficient in solving this problem. No housing have yet been built in these villages to accommodate all these workers and their families. Although some of these problems may be transitory, some of them could have been avoided if the right choice of location was made and the development of the expected and/or complementory sector achieved.

Production stoppages sometimes occurred because of defects in technical design. The Mefta cement plant, for example, had to shut down for two months in 1976 to prevent further pollution problems (i.e., cement dust from a faulty filter). The filter had to be redesigned by the Japanese contractor, a process which took several months. The new design still presents problems.

6.2.4. Demand shortages

Some SNMC plants have been built in anticipation of future demand because of the advantages arising from economies of scale and available technology. Technology is bought on the international market where only a restricted choice is available. The plants, which have an excess capacity, produce ceramic sanitary fittings, aggregates, floor coverings (6) and cement asbestos. In addition, deficient demand also occurred because of sectoral development imbalances. This is the case of the housing programs and some SNMC constructed plants. These plants were built to produce construction materials which corresponded to planned construction programs. Implementation of the construction programs achieved only about one quarter of their planned objectives. Consequently, the newly constructed plants do not have potential users. Excess capacity also arises in plants producing new products which are unknown by potential consumers. A good example is the construction plastic product plants. This may be attributed to the lack of an advertising campaign which would present the new products to the general public. SNMC also has more plants which have excess capacity than SONIC (it has only one).

Demand shortages and excess capacity can be considered transitory since they are expected to disappear when local demand increases. The outputs can also be easily stocked provided stocking capacities exist (because of the nature of the output). Exports could also be promoted to neighbouring countries.

Except for demand shortages, which are a transitory concern, one can conclude that SNMC and SONIC encounter similar inefficiencies leading to an underutilisation of raw material, intermediate inputs, fixed capital and labour. These include organisational inefficiencies, shortages of inputs and allocative inefficiencies, all of which are integral to the Algerian economy.

References

1 Refer to Les Industrie Legeres en 1980, op cit. p 22 and La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 277.

2 This occurs in spite of the fact that the construction materials technology is quite a labour intensive technology.

3 This study was undertaken by the World Bank and is not particular to Algerian plants, according to SNMC managers.

4 Bulletin Trimestriel des Statistiques du Sector des Industries Legeres, 4th Trimester 1980, op cit. p 23.

5 The negative cash flow accounted for 8.6% of the sales revenue in 1978: quoted in La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. pp 280, 277 & 280.

6 The floor covering excess capacity output might also be attributed to local private firms' competition.

# CHAPTER SEVEN : SNIC PUBLIC ENTERPRISE

SNIC, which is in charge of the production of light chemicals, was founded on the 14th of December, 1967. On the 25th of July, 1973, its activity was extended to the glass industry after the public enterprise of the glass industry (SNIV) was dissolved and its patrimony transferred to SNIC (1). SNIC, like SONIC and SNMC, is under the supervision of the Ministry of Light Industries and is mainly oriented towards the production of consumer goods. SNIC's development has not been as rapid as that of SNMC but it has been more rapid than that of SONIC. In 1980, SNIC consisted of sixteen plants in production and thirty plants under construction, all totally owned by the state. Of the sixteen plants in production, ten plants were built before independence while the other six were built after 1972. Between 1973 and 1979, SNIC sales revenue increased by a factor of 4.15 to 0.92 billion AD (2). In 1980, SNIC employed about 8,600 workers, only 1.57 times more than in 1973. SNIC's sales revenue and labour force are slightly larger than those of SONIC, but much lower than those of SNMC. SNIC development was made possible by a few investments made in this branch (see Chapter Two). The different plants are all located in the Northern part of the country with most of them concentrated in the central part of Algeria (i.e., two thirds of the plants are located in Algiers, Rouiba and Lakhdaria).

SNIC's plants in production and under construction and their respective outputs are shown in Tables 7.1 and 7.2, respectively. The work on the plants under construction has been delayed since half of them were planned to start between 1978 and 1979 but did not do so due to numerous problems (see

Table 7.1: SNIC plants and respective outputs in 1980

| Plants in production/ outputs | Year of entry | Unit | Production 1980 Techni. | planned | actual |
|---|---|---|---|---|---|
| Paint sector | | Tons | 73,441 | 81,615 | 82,444 |
| -The Oued-Smar paint p. | Nat. | Tons | 25,831 | 26,763 | 25,727 |
| -Building paint | | Tons | - | 15,506 | 16,304 |
| -Industrial paint | | Tons | - | 4,947 | 4,249 |
| -Auto. body paint | | Tons | - | 2,720 | 1,850 |
| -Varnish | | Tons | - | 1,147 | 942 |
| -Solvent | | Tons | - | 2,443 | 2,382 |
| -PVC | | Tons | - | 4,592 | 3,847 |
| -Glue | | Tons | - | 902 | 529 |
| -The Lakhdaria paint p. | 1975 | Tons | 23,859 | 23,928 | 25,194 |
| -Building paint | | Tons | - | 18,860 | 21,242 |
| -Industrial paint | | Tons | - | 2,575 | 1,874 |
| -Auto. body paint | | Tons | - | 1,270 | 1,250 |
| -Varnish | | Tons | - | 293 | 86 |
| -Solvent | | Tons | - | 930 | 777 |
| -The Cheraga paint plant | Nat. | Tons | 13,714 | 13,852 | 15,595 |
| -Building paint | | Tons | - | 13,852 | 15,595 |
| -The Oran paint plant | Nat. | Tons | 10,037 | 11,578 | 11,752 |
| -building paint | | Tons | - | 11,468 | 11,685 |
| -solvent | | Tons | - | 110 | 67 |
| Large consumption sector | | | | | |
| -Household cleaning prod. | | $10^3$ AD | - | 46,996 | 37,004 |
| -The Lakhdaria h.cl.p.p. | 1979 | " " | - | 31,930 | 28,911 |
| -The Hussain-Dey h.c.p.p. | Nat. | " " | - | 11,427 | 7,285 |
| -The Oran h.cl.p.plant | Nat. | " " | - | 3,639 | 808 |
| -The detergent plants | | Tons | 51,845 | 56,000 | 33,750 |
| -The Rouiba plant | 1980 | | - | - | - |
| -The Reghaia plant | Nat. | | - | - | - |
| For both plants | | | | | |
| -"Isis" detergent | | Tons | - | 49,850 | 29,949 |
| -"Teldj" detergent | | Tons | - | 3,450 | 3,099 |
| -"Nada" scourer powder | | | - | 2,700 | 702 |
| -The Guelma earthenware p. | 1972 | Tons | 3,100 | 3,100 | 2,430 |
| -The Rouiba blade plant | Nat.* | $10^3$ U | 84,296 | 80,775 | 80,322 |
| -The Belcourt cosmetic p. | Nat. | $10^3$ AD | - | 77,833 | 68,277 |
| -Shampo | | " " | - | 21,565 | 17,997 |
| -Alcohol for perfums | | " " | - | 34,017 | 38,740 |
| -Sundry items | | " " | - | 22,251 | 11,540 |
| -The Algiers insecticides p | - | Tons | - | 73,600 | 61,888 |

(Table continues on the following page.)

Table 7.1 (Continued)

| Plants in production/ outputs | Year of entry | Unit | Production 1980 Techni. | planned | actual |
|---|---|---|---|---|---|
| Glass and maize sector | | | | | |
| -The glass plant of Oran | 1962 | Tons | 92,060 | 58,777 | 36,791 |
| -Hollow glass | 1962* | Tons | 76,800 | 44,480 | 26,995 |
| -Bottle | | Tons | - | 38,075 | 25,291 |
| -Case-bottle | | Tons | - | 0 | 239 |
| -Tumbler | | Tons | - | 6,305 | 1,392 |
| -Crystal glass | | Tons | - | 51 | 73 |
| -Flat glass | 1976/77 | Tons | 15,260 | 14,297 | 9,796 |
| -3 mm | | Tons | - | 6,156 | 2,569 |
| -4 mm | | Tons | - | 2,564 | 5,876 |
| -6 mm | | Tons | - | 1,540 | 1,353 |
| -Polished glass | | Tons | - | 4,037 | 0 |
| -The Thenia mirror plant | 1977 | $m^2$ | 578,000 | 549,216 | 218,781 |
| -Cutting up & shaping | | " | | 462,830 | 166,524 |
| -Silvering | | " | | 95,451 | 52,257 |
| -The Maghnia maize plant | 1980 | Tons | 65,100 | 32,550 | 15,027 |
| -Starch | | Tons | - | 7,800 | 3,347 |
| -Glucose | | Tons | - | 10,500 | 5,083 |
| -White & wellow dextrin | | Tons | 0 | 935 | |
| -Germ-oil | | Tons | - | 750 | 96 |
| -Glutin | | Tons | - | 1,800 | 368 |
| -Breeding food | | Tons | - | 6,000 | 2,706 |
| -cracked maize | | Tons | - | 4,500 | 2,178 |
| -Maize germs | | Tons | - | - | 308 |

Source: Table G.1 in the Appendix G.

* Extended.
U Unit.

Chapter Three). In 1980, the SNIC annual paint production capacity was 73,000 tons, its glassware products capacity was 92,000 tons, its detergent capacity was 52,000 tons and its earthenware products capacity was 3,100 tons. Details of output capacities and the year of entry in production are given for each SNIC plant in Table 7.1.

SNIC, like SNMC, is a divisionalized organisation consisting of three different sectors: the paint sector, the glass and maize sector and the large consumption products sector (see Figure 7.1). Each sector is headed by a managing director. This organisational structure was intended for use during the transitional period prior to the general reorganisation of SNIC. SNIC objectives, functions, authority and managerial environment are very similar to those of SONIC and SNMC, which have already been described in Chapter Four.

SNIC, which produces about the same number of outputs as SONIC, possesses a slightly higher number of plants than SONIC. A comparison between these two public enterprises shows that SNIC and SONIC have experienced relatively similar development. As opposed to SONIC, however, SNIC still receives large investments, which are indicated by the number of plants under construction (30 in SNIC compared to 7 in SONIC). The similarities between SNIC and SONIC extend to the geographical location of their respective plants. Some similarities between SNIC and SNMC can also be found. For instance, the number of outputs each produces is about the same and in both cases the plants are located in the northern part of Algeria. SNIC, however, is a smaller public enterprise than SNMC (SNIC has only one fifth the number of SNMC plants).

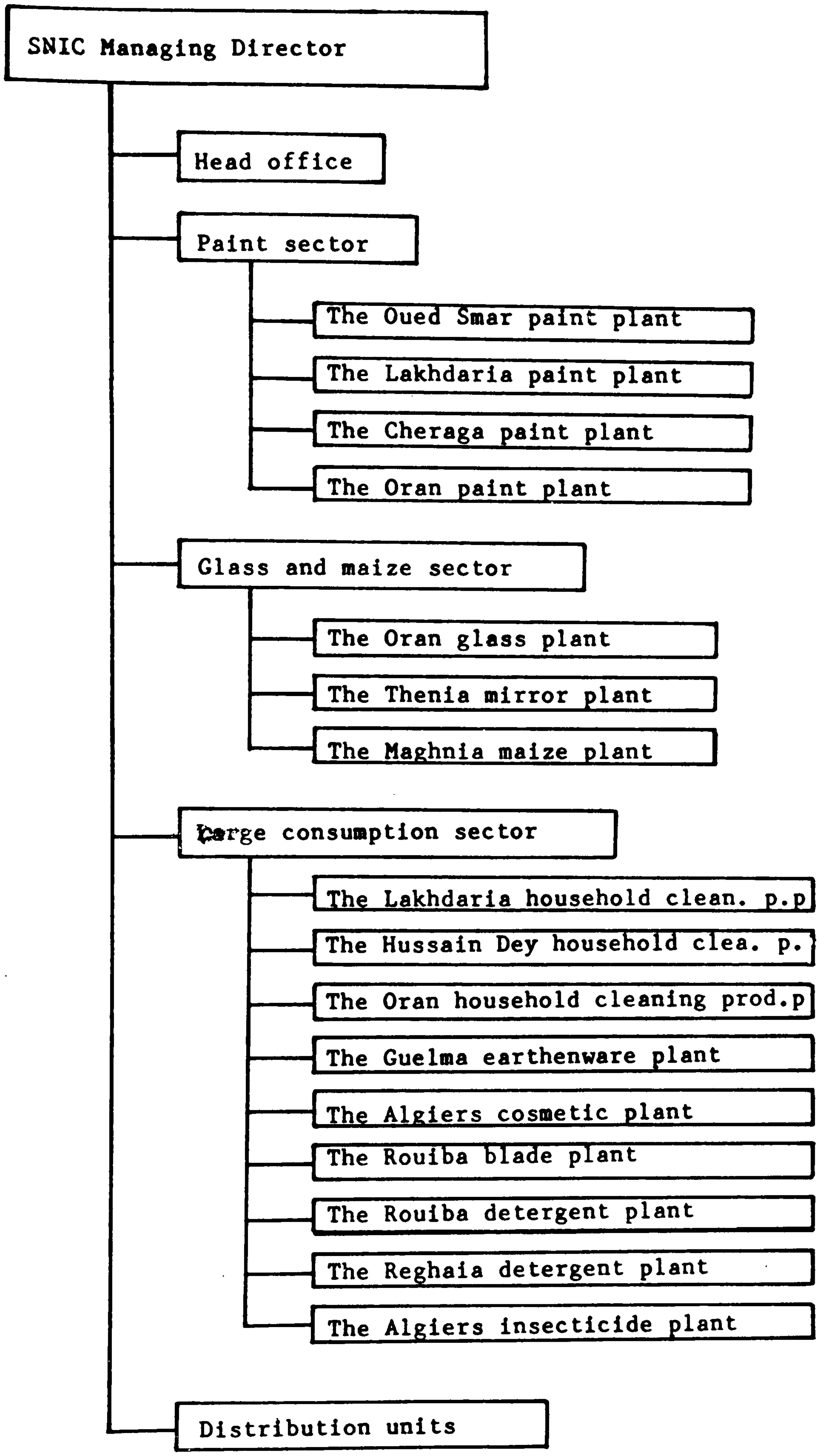


Figure 7.1 : SNIC organisational structure in 1980.

Source : Survey data.

Table 7.2: SNIC's plants under construction and their respective outputs in 1980

| Plant / location | Outputs |
|---|---|
| Ain-Temouchent | Detergent |
| Sour-El-Ghozlane | Detergent |
| Chelghoum-Laid | Detergent |
| Sig | Paint |
| Souk-Ahras | Paint |
| Saida | Household cleaning products |
| Saida | Abrasives |
| El-Aouinet | Household cleaning products |
| Menaceur | Glassware products |
| El-Aouina | Glassware products |
| Bougara | Glassware products |
| Maghnia | Earthenware products |
| Mila (two) | Earthenware products |
| Lakhdaria (five) | Ink, varnish, synthetic glue, solvent and household cleaning products |
| Akbou | Tints |
| El-Oued | Blades |
| Ouadhia | Cosmetic products |
| Other plants | Special light chemicals |
| A research centre | |

Source: Survey data.

In SNIC as in SONIC and SNMC, one can differentiate between pre- and post-independence plants. The latter were built after 1972 with the implementation of the various development plans while the former were built prior to 1962 and subsequently nationalised. There is evidence that the pre-independence plants use a traditional labour intensive technology as opposed to the post-independence plants which use a capital intensive technology. The reasons for these differences have already been discussed in Chapter Five. The adopted technology has also had, in SNIC's case, an influence on plant scale and consequently, the scale of the pre- and post-independence plants is different. The former are small and medium-scale while the latter are large-scale. The relationship between choice of technology and plant size was already discussed in Chapter Five. With regard to the use of capital intensive technology in large-scale plants and traditional labour intensive technology in small or medium-scale plants (post- and pre-independence plants, respectively), SNIC and SONIC face similar problems.

All SNIC plants, with the exception of the Rouiba blade plant, are multiproduct plants. SNIC's plants are also highly integrated. The latter characteristic may be attributed to the relatively straightforward production processes used in the light chemical industries. The level of integration is very high in some plants since these plants manufacture their own packaging products (e.g., detergent plants). In this respect, SNIC's plants and SNIC as a whole are comparable to SNMC's plants and SNMC as a whole, respectively.

Similar to the construction materials branch, the light chemical branch is characterised by a large private sector. In fact, SNIC only contributes about half of the local production in the light chemical industries. SNIC monopolizes the production of earthenware products, blades, maize, mirrors, hollow and flat glass, and powder detergents (not liquid). This situation is in contrast with that of SONIC but is comparable to that of SNMC. One common point is that these three public enterprises hold the absolute monopoly regarding international trade in their respective branches. Imports, rather than exports, are important activities of these three public enterprises.

As seen in Chapter Two, the light chemical branch is characterised by a large private sector. In 1978, for example, 303 firms belonged to private investors with one employing more than 500 workers (3). The private firms are mainly involved in the production of household cleaning products such as bleaching liquid (52% of total local production), washing soda (86% of local production), the total production of liquid detergent, paint and cosmetic products. The development of the light chemical branch was left intentionally to the private sector. Some investments considered vital, however, were made by the public sector through SNIC.

The development of private firms in this branch is different from that in the pulp and paper branch, for example. This reflects, to some extent, different attitudes of the government with regard to the existence and development of a private sector in these two branches of industry. The different approaches arise as well from the fact that development of the light chemical branch, as opposed to that of the pulp and paper branch, does not require large investments. In addition, the production processes in the light chemical industry, similar to those in the construction materials industry, seem to be technologically easier to master than those in the pulp and paper industry. This is confirmed to a certain extent by the fact that 80% of the private light chemical firms employed less than 20 workers (4). In view of what has been said earlier, some similarities exist between the development of the construction materials and the light chemical private firms. The importance of the private sector in the light chemical branch, however, does not lead to fierce competition between public and private sectors. This is due to the fact that the nature of the outputs produced and the local market situation in the two branches are different. The SNIC local market situation is somewhat comparable to that of SONIC but different from that of SNMC.

The number of shifts in SNIC plants is given in Table 7.3. In 1980, over 37.5% (6 plants) of the plants operated with only one shift, 12.5% with two shifts and 25% with three shifts. On average, a SNIC plant operates for 12 hours per day (one and one half shifts). The average operating time for pre- and post-independence plants is 17.3 and 12.3 hours per day, respectively. From this, it appears that the number of shifts of a SNIC plant is related to the age of the plant. This conclusion is similar to that drawn for SONIC, but contrasts with that of SNMC where the number of shifts is related to not only the age of the plant but also the nature of the output produced.

Table 7.3: Number of shifts in SNIC plants in 1980

| Hours of work per day | Number of shifts | Number of plants | Percentage of total plants | Pre-ind. plants | | Post-ind. plants | |
|---|---|---|---|---|---|---|---|
| | | | | (1) | (2) | (1) | (2) |
| 8 | 1 | 6 | 37.5 | 5 | 31.25 | 1 | 6.25 |
| 11 | 1.37 | 1 | 0.6 | 1 | 6.25 | - | - |
| 12 | 1.5 | 2 | 12.5 | 1 | 6.25 | 1 | 6.25 |
| 16 | 2 | 2 | 12.5 | 1 | 6.25 | 1 | 6.25 |
| 16-24 | 2-3 | 1 | 0.6 | - | - | 1 | 6.25 |
| 24 | 3 | 4 | 25 | 2 | 12.5 | 2 | 12.5 |
| Total | | 16 | 100 | 10 | | 6 | |

Source: Table G.1 in the Appendix G.

1 Number of plants
2 percentage of total plants
- Not applicable

The origin of the different main inputs used by SNIC is shown in Table 7.4. Most of the raw materials and intermediate inputs are available either from the local market or within SNIC. Only a small proportion of raw materials and intermediate inputs, mainly chemicals, are imported. In contrast, a large proportion of the spare parts used by SNIC is imported, just as for SONIC and SNMC. This tends to occur

Table 7.4 : Origin of SNIC inputs

| | MAIN INPUTS \ OUTPUTS | Paint | Cosmetic products | Glass products | Detergent | Bleaching water | Blade | Mirrors | Household cleaning prod. | Earthenware | Packaging products |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RAW MATERIALS AND INTERMEDIATE INPUTS | WITHIN SNIC | | | | | | | | | | |
| | Glass bottles | | * | | | * | | | | | |
| | Solvent | * | | | | | | | | | |
| | Alcohol | | * | | | | | | | | |
| | Packaging products | | | | * | | * | | * | * | |
| | LOCAL MARKET | | | | | | | | | | |
| | Silica | | | 100% | | | | * | | | |
| | Water | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | Electricity | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | Clay | | | | | | | | | * | |
| | Barita sulphate | | | * | | | | * | | | |
| | Cans | * | | | | | | | | | |
| | Ethylene | | | | * | | | | | | |
| | Marbre powder | * | | | | | | | | | |
| | Chlorine | | | | | * | | | | | |
| | Henne grass | | * | | | | | | | | |
| | Lime | | | * | | | | * | | | |
| | Cardboard | | | | | | | | | * | * |
| | Hydrochlor.acid | | | | | | | | * | | |
| | Plastic bottles | | * | | | * | | | * | | |
| | Spare parts | * | * | * | * | * | * | * | * | * | * |
| | INTERNATIONAL MARKET | | | | | | | | | | |
| | Sodium sulphate | | | * | | | | * | | | |
| | Alum | | | * | | | | * | | | |
| | Dolomite | | | * | | | | * | | | |
| | Carbonate of soda | | | * | | | | * | | | |
| | Thin special iron sheets | | | | | | * | | | | |
| | Lithopone | * | | | | | | | | | |
| | Titanium oxide | * | | | | | | | | | |
| | Marbre powder | * | | | | | | | | | |
| | "Nansa & oleum" | | | | * | | | | | | |
| | Feldspar | | | | | | | | | * | |
| | Spare parts | * | * | * | * | * | * | * | * | * | * |
| | Total imports | About 20% | | | | | | | | | |
| FIXED CAPITAL | | 100% imported | | | | | | | | | |
| LABOUR | Foreign | 0.23% | | | | | | | | | |
| | Local | 99.77% | | | | | | | | | |

* indicates the origin of the input without specifying the proportion.

because fixed capital is imported and local firms are not geared for the production of these particular inputs. The SNIC labour force is mainly Algerian, with the foreign labour force representing only about 0.2% of the total SNIC labour force. On the other hand, fixed capital was totally imported. The degree of dependency on the requisite imported inputs is similar to that for SNMC but lower than that for SONIC.

The destination of SNIC outputs, as indicated in Table 7.5, is oriented mainly towards the domestic market. SNIC outputs consist principally of finished outputs and a few semi-finished outputs used directly by consumers and the industrial sector. SNIC is, in fact, specialised in the consumer sector with a relatively small proportion of its output oriented toward the industrial sector, in particular, paint, solvent and bottles. The destination of SNIC outputs is more like that of SONIC than that of SNMC. As indicated earlier, no SNIC outputs are exported. In fact, some products, especially detergent and soap, are imported in order to keep pace with local demand. Local supply falls short of demand due to the lack of price competitiveness with regard to the international market and insufficient domestic production.

The SNIC labour force, which is shown in Table 7.6 and Figure 7.2, can be divided into three main categories: managers, technicians and supervisors, and semi-skilled and unskilled workers. In 1980, 80 per cent of the total SNIC labour force consisted of semi-skilled or unskilled workers, 16.1% were technicians or supervisors and 3.9% were managers. Female labour force participation was low, accounting for only 8.1% of the total labour force. As mentioned earlier, foreign labour force participation was not very important, amounting to only 0.2% of total SNIC labour force and 1.4% of total SNIC

Table 7.5 : Destination of SNIC outputs

| SECTORS OF UTILISATION / MAIN OUTPUTS | DOMESTIC MARKET | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SNIC | | INTERMEDIATE USE | | | | | | | | | | | | FINAL USE |
| | Within plant | Within SNIC | Agriculture | Natural water ind. | Food industry | Preserve industry | Building const. I | Wine industry | Machinery indust. | Iron & steel ind. | Metal equipment I | Electrical ind. | Paper industry | Electronic ind. | Consumers |
| Building paint | | | | | | | * | | | | | | | | * |
| Industrial paint | | | | | | | | | * | * | * | * | | * | |
| Auto body paint | | | | | | | | | * | | * | | | | |
| Varnish | | | | | | | | | * | * | * | | | | |
| Solvent | * | | | | | | * | | * | * | * | | | | |
| Glue | | | | * | * | * | * | | * | * | * | * | * | * | * |
| Powder detergent | | | | | | | | | | | | | | | 100% |
| Bleaching water | | | | | | | | | | | | | * | | 100% |
| Cresyl | | | | | | | | | | | | | | | 100% |
| Washing soda | | | | | | | | | | | | | | | 100% |
| Disinfectant products | | | | | | | | | | | | | | | 100% |
| Powder scourer | | | | | | | | | | | | | | | 100% |
| Shampoo | | | | | | | | | | | | | | | 100% |
| Henne | | | | | | | | | | | | | | | 100% |
| Alcohol (perfums) | * | | | | | | | | | | | | | | |
| Hygienic products | | | | | | | | | | | | | | | 100% |
| Tooth-paste | | | | | | | | | | | | | | | 100% |
| Talc | | | | | | | | | | | | | | | 100% |
| Cosmetic products | | | | | | | | | | | | | | | 100% |
| Blades | | | | | | | | | | | | | | | 100% |
| Mirror | | | | | | | | | | | | | | | 100% |
| Glass window | | | | | | | | | | | | | | | 100% |
| Bottle | | * | | * | * | | | * | | | | | | | |
| Tumber | | | | | | | | | | | | | | | 100% |
| Crystal glass | | | | | | | | | | | | | | | 100% |
| Earthenware | | | | | | | | | | | | | | | 100% |
| Starch | * | | | | * | | | | | | | | | | |
| Glucose | | | | | * | | | | | | | | | | |
| Dextrin | | * | | | * | | | | | | | | * | | |
| Germ-oil | | * | | | | | | | | | | | | | |
| Breeding food | | | * | | | | | | | | | | | | |
| Cracked maize | | * | | | | | | | | | | | | | |
| Maize germ | | * | | | | | | | | | | | | | |
| Packaging products | * | * | | | | | | | | | | | | | |

* indicates the destination of the output without specifying the proportion.

Source: Survey data.

managers. Figures concerning labour force qualifications in the various plants indicate that some of the plants greatly suffer from the lack of skilled workers. This is the case, for example, of the blade plant of Rouiba which had only 24 per cent of its work force qualified as technicians and supervisors and none qualified as managers. The glass plant of Oran was faced with a similar situation since only 1% of the total labour force of the plant were qualified as managers. An interesting finding along these same lines is that there appears to be no correlation between the proportion of skilled workers employed in a given plant and the type of technology employed by that plant (either labour intensive or capital intensive).

The proportion of skilled workers in SNIC plants was lower than for SNIC as a whole, since only 1.7% of the total labour force in the plants were managers and 13.3% were technicians and supervisors. The proportion of managers at the head office and projects was 11.9% and that at the distribution units, 11%. As indicated in Figure 7.3, 46% of the the total managers were employed in the head office, 23% in the projects and only 27% in the different plants. Of the technicians and supervisors employed by SNIC, only half worked in plants while 20 per cent worked in the head office.

In 1980, SNIC plants were characterised by a high rate of absenteeism, amounting to 4.92% for SNIC as a whole (see Table 7.6). Within SNIC, this rate varied between 2.17% and 7.9%. A comparison between the rates of absenteeism for the different plants indicates that this rate was higher in plants located around Algiers and in the Eastern regions than those around Oran. In contrast to the high rate of absenteeism in

Table 7.6: SNIC personnel in 1980

| Skill category<br>Plants/head office | Managers (1) | Managers (2) | Technicians/ supervisors (1) | Technicians/ supervisors (2) | Unskilled/ semiskilled (1) | Unskilled/ semiskilled (2) | Total (1) | Rate of overstaffing |
|---|---|---|---|---|---|---|---|---|
| Algiers paint p. | 5 | 1 | 70 | 14.3 | 414 | 84 | 489 | 7.56 |
| Lakhdaria paint p. | 7 | 2 | 58 | 16 | 298 | 82 | 363 | 7.90 |
| Oran paint p.* | 10 | 2.7 | 58 | 12 | 399 | 85 | 467 | 4 |
| Cheraga paint p. | 5 | 2.7 | 30 | 16 | 148 | 80 | 183 | 4.85 |
| Reghaia detergent p. | 6 | 1 | 71 | 17 | 336 | 81 | 413 | 6.22 |
| Rouiba detergent p. | 4 | 2 | 33 | 16.7 | 160 | 81 | 197 | 5.56 |
| Algiers cosmetic p. | 10 | 3 | 50 | 15 | 272 | 82 | 332 | 5.5 |
| Rouiba blade p. | 0 | 0 | 30 | 24 | 95 | 76 | 125 | 5.14 |
| Lakhdaria h. c. p. | 4 | 2.4 | 34 | 20.7 | 126 | 77 | 164 | 2.45 |
| Hussain-Dey h. c. p. | 1 | 1.6 | 7 | 11.8 | 51 | 86 | 59 | 4 |
| Guelma eartenwa.p.** | 10 | 1.1 | 50 | 5.6 | 831 | 93 | 891 | 7.48 |
| Oran glass p. | 14 | 1 | 158 | 13 | 1,029 | 85 | 1,201 | 4.57 |
| Thenia mirror p. | 3 | 1.3 | 33 | 14.7 | 187 | 84 | 223 | 5.56 |
| Maghnia maize p. | 13 | 4.4 | 37 | 12.7 | 241 | 83 | 291 | 5.24 |
| Total SNIC plants | 92 | 1.7 | 719 | 13.3 | 4,587 | 85 | 5,398 | 5.4 |
| Head office | 157 | 17.4 | 285 | 31.7 | 457 | 51 | 899 | |
| Projects | 78 | | 249 | | 746 | | 1,073 | |
| Distribution units | 14 | 1.1 | 154 | 12 | 1,079 | 86 | 1,247 | |
| -Annaba distrib. u. | 5 | | 27 | | 166 | | 198 | 2.79 |
| -Algiers distrib.u. | 6 | | 86 | | 515 | | 607 | 2.69 |
| -Constantine distrib. | 3 | | 41 | | 398 | | 442 | 2.17 |
| Total SNIC | 341 | 3.9 | 1,407 | 16.1 | 6,869 | 80 | 8,617 | 4.92 |
| Foreign labour for. | 5 | 1.4 | 6 | | 9 | | 0.23% | |
| Rate of absenteeism | | - | | - | | - | 4.92% | |
| Rate of turnover | | - | | - | | - | 0.08% | |

Source: Survey data.

* The figure includes the labour force working in the Oran paint plant and Oran household cleaning products.

** The figure includes the labour force employed in the Guelma earthenware plant and Guelma distribution unit.

1 Total by skill category in the plant & SNIC as a whole.

2 % of the total labour force by skill category in the plant, total SNIC plant, head office, distribution units and SNIC as a whole.

\- Not available.

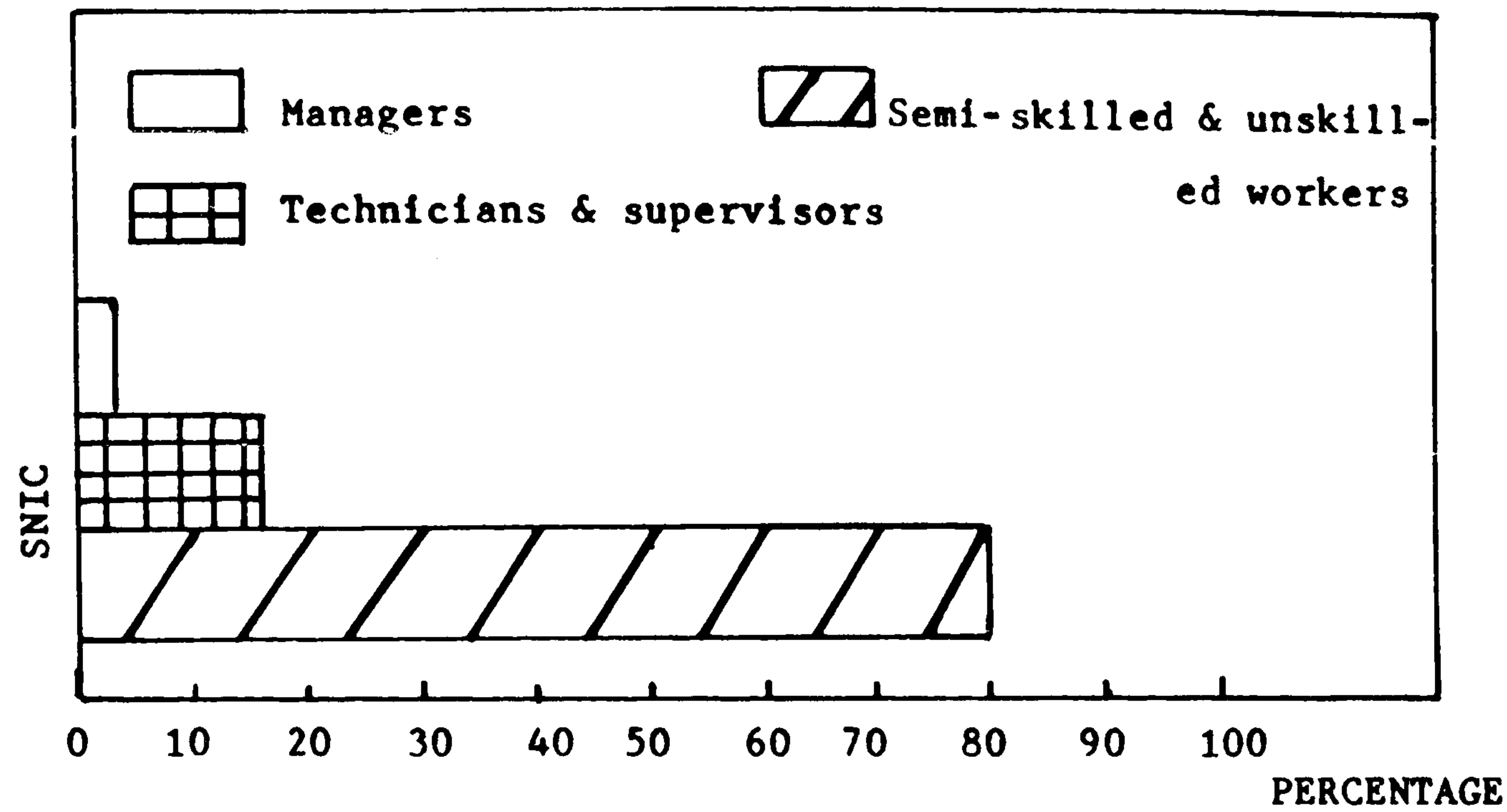


Figure 7.2 : Percentage of labour force by skill category in SNIC.

Source : Table 7.5.

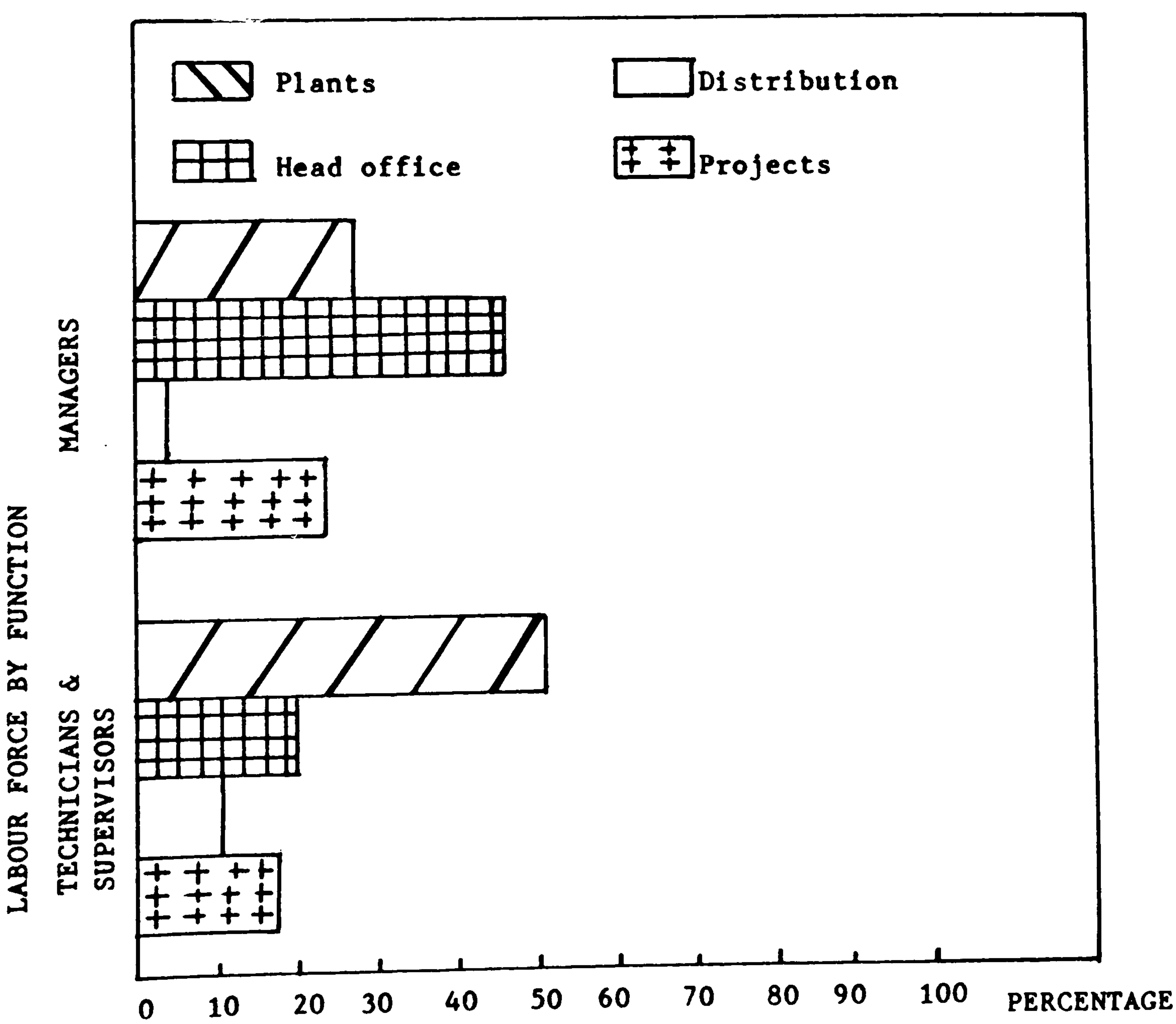


Figure 7.3 : Percentage of labour force by function in SNIC.

SNIC as a whole, the rate of labour turnover of the total labour force was only 0.08%.

The SNIC labour force is as important as that of SONIC but much less important than that of SNMC. As indicated in Figure 7.4, the proportion of skilled workers in SNIC is lower than for SONIC but higher than for SNMC. With respect to the proportion of their skilled labour force working in plants as compared with the head office, the three public enterprises concerned face similar situations. The skilled labour force is concentrated at the head office. SNIC is characterised by a lower rate of absenteeism than SONIC or SNMC (4.92%, 7.14% and 5.2%, respectively). Similarly, the rate of turnover of the labour force for SNIC is lower than that for SONIC. This rate shows a certain stability and lack of mobility of the SNIC labour force which may be explained by the high average cost and seniority of the SNIC labour force in contrast to that of SONIC. The low labour turnover has an effect on the training cost, the experience gain, the morale of the labour force and finally, on labour productivity.

Now that the general profile of SNIC has been drawn, the following will concentrate on the analysis of the utilisation of different inputs. Subsequently, the main causes of underutilisation of the different inputs will be investigated.

### 7.1.Utilisation of inputs in SNIC

#### 7.1.1.Utilisation of raw materials and intermediate inputs

According to SNIC's managers, the different plants do not make inefficient use of raw materials and intermediate inputs. The available figures do not show overconsumption of these inputs when compared to norms in the different plants, with the exception of the Oran glass plant. In the Oran glass plant, the proportion of broken glass is higher than that

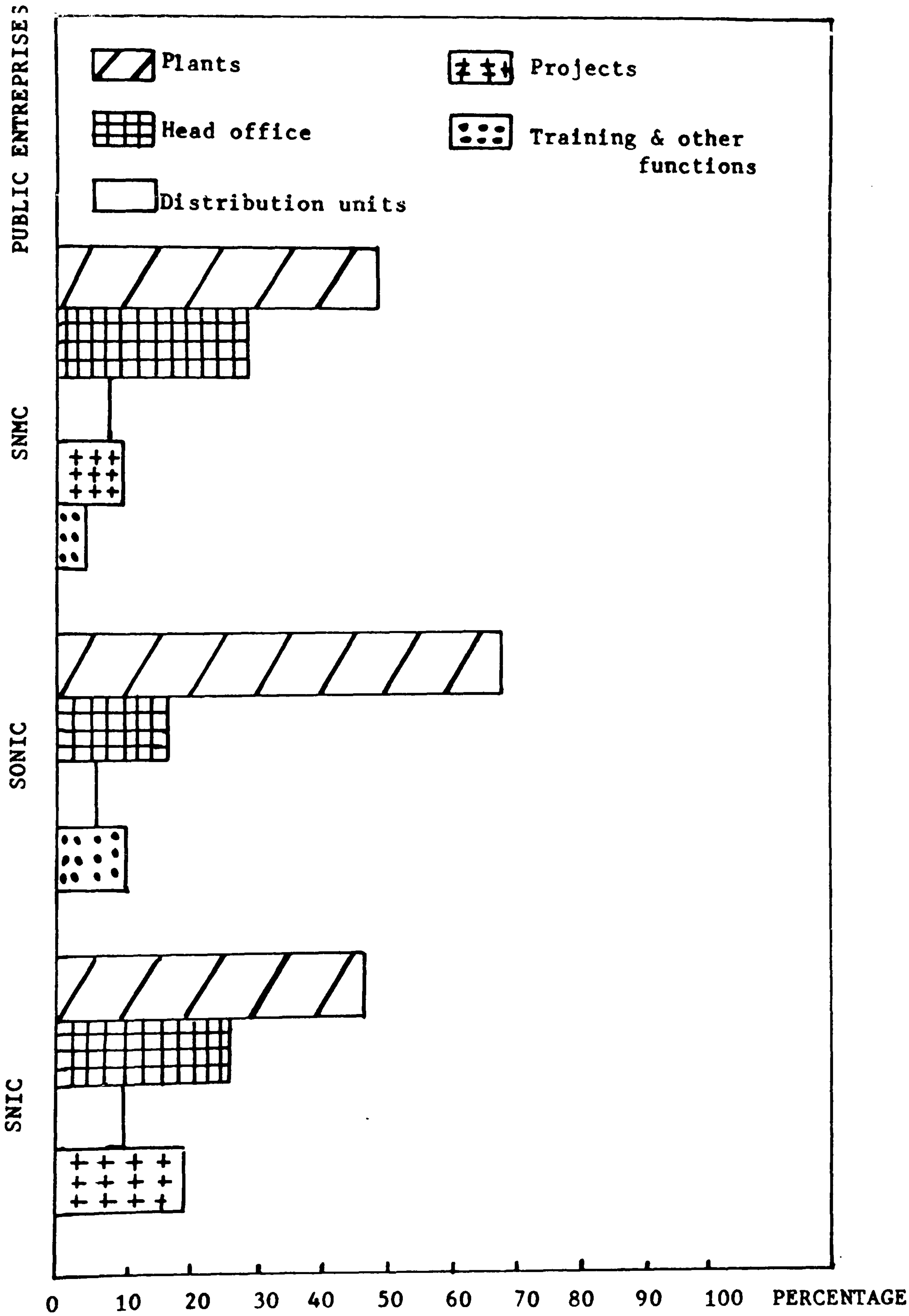


Figure 7.4 : Percentage of skilled labour force in SNIC, SONIC and SNMC for 1980.

Sources : Tables 5.4, 6.4 and 7.5.

specified by the norm and the quality of the outputs is not up to the standard given by the norm. In addition, the actual quantities of consumable inputs used, such as water and electricity, are higher than the norms. Raw materials and intermediate inputs such as sand and chemical products, on the other hand, are not overconsumed, since they can be used again. In glass processing in particular, outputs which are not up to the quality standard can be reprocessed. Similar to the SNMC case, no other evidence of overconsumption of raw materials and intermediate inputs can be found.

7.1.2.Utilisation of fixed capital

1980 figures for U1 (ratio of actual over planned capacity), U2 (ratio of planned over technical capacity) and U3 (ratio of actual over technical number of shifts) have been calculated for each plant's outputs (whenever possible), for each plant, for each SNIC output and for SNIC as a whole. As indicated in Table G.1 in the Appendix G, U1 by plant output ranges from 0% to 229%. The lowest and highest values of U1 (0% and 229%) were recorded for polished glass (5) and 4mm flat glass, respectively, at the Oran glass plant (6). As indicated in Table 7.7, the value of U1 and U2 for each plant varied between 22% and 112% and between 50% and 115%, respectively. The maize plant of Maghnia recorded the lowest rate of capacity utilisation (U1=36%, U2=50%) while the paint plant of Cheraga was characterised by the highest rate of capacity utilisation (U1=112%, U2=101%). The value of U1 and U2 for SNIC output varied between 36% and 99% and between 50% and 108%, respectively. The lowest rate of capacity utilisation was recorded for SNIC maize output (U1=36%, U2=50%) while SNIC blade output corresponded to the highest rate of capacity utilisation (U1=99%, U2=95%). Consequently, for SNIC as a whole, fixed capital was inefficiently used (U1= 72.5%, U2= 95%).

Table 7.8 indicates that, the rate of fixed capital utilisation is higher in the pre-independence than in the post-independence plants. The rate of fixed capital utilisation in SNIC is, therefore, correlated to the age of the plant. None of the figures indicated a direct relationship between the proportion of skilled workers in a plant and its rate of fixed capital utilisation. Similarly, there is no obvious relationship between the scale of a plant and its rate of fixed capital utilisation.

The calculated values of U3 (ratio of actual over technical number of shifts) indicate that fixed capital is not used for all the available time. The fixed capital in SNIC plants is used only three quarters of the time (see Table 7.7). During the remaining time, fixed capital is left idle. U3 is lower in the paint sector than in the other two sectors. U3 is also lower in the post-independence plants than in the pre-independence plants.

SNIC fixed capital is used at a similar rate than that of SONIC but more efficiently than that of SNMC. The comparison of U3 shows, that the time utilisation of fixed capital was higher in SONIC and SNIC (in that order) than SNMC.

### 7.1.3.Utilisation of labour

In view of the unavailability of certain data, the only way to assess labour utilisation is to analyse overstaffing rates (as in SONIC and SNMC). According to SNIC's managers and to the few available figures, SNIC plants are overstaffed. The maize plant of Maghnia, for example, shows an overstaffing rate of 16% and the Oran glass plant a rate of 20%. According

Table 7.7: SNIC plants' fixed capital utilisation in 1980
(in percentages)

| SNIC plants | U1 | U2 | U3 |
|---|---|---|---|
| Paint sector | 88.91 | 104.75 | 72.07 |
| -Paint plant of Oued-smar | 83.14 | 103 | 35.89 |
| -Paint plant of Lakhdaria | 79 | 100 | 52.40 |
| -Paint plant of Cheraga | 112 | 101 | 100 |
| -Paint plant of Oran | 81.5 | 115 | 100 |
| Large consumption prod.sect. | 70.96 | - | 78.57 |
| Household cleaning products | 59 | - | 92.06 |
| -House. cl. p.of Lakhdaria | 91 | - | 76.20 |
| -House. cl. p. of Hussain dey | 64 | - | 100 |
| -House. cl. p. of Oran | 22 | - | 100 |
| Detergent products | 58.66 | 108 | 100 |
| -Detergent plants of Rouiba and Reghaia | 58.66 | 108 | 100 |
| Earthenware plant of Guelma | 78 | 100 | 39.30 |
| Insecticide plant | 84 | - | 100 |
| Blade plant of Rouiba | 99 | 95 | 52.40 |
| Cosmetic plant of Algiers | 83.33 | 88 | 39.30 |
| Glass and maize sector | 55.42 | 73.61 | 75.40 |
| -Mirror plant of Thenia | 46 | 95 | 26.20 |
| -Glass plant of Oran | 84.28 | 75.85 | 100 |
| -Maize plant of Maghnia | 36 | 50 | 100 |
| Total SNIC | 72.53 | 94.90(1) | 76.35 |

Source: Table G.1 in the Appendix G.

- Not available
(1) Calculated from the available figures only.

Table 7.8: Average fixed capital utilisation in SNIC p
and post-independence plants by sector in 1980
(in percentages)

| Plants | Pre-independence | | Post-independence | |
|---|---|---|---|---|
| | U1 | U2 | U1 | U2 |
| Paint sector | 92.21 | 106 | 79 | 100 |
| Large consumption prod.sect. | 68.49 | - | 75.88 | - |
| Glass and Maize plants | 84.28 | 75.85 | 41 | 72.5 |
| Total | 77.18 | 98.46(1) | 77.72 | 81.66(1) |

Source: Table 7.7.

- not available
(1) Calculated from the available figures only.

to the Oran glass plant's managers, only 70% of the employed unskilled and semi-skilled labour force would be sufficient to produce the planned production. These two figures give some indication on the overstaffing situation encountered in SNIC plants. Such a situation clearly indicates that SNIC, like SONIC and SNMC, also uses its labour force inefficiently. One interesting conclusion is the difference in the rate of absenteeism in the pre- and post-independence plants. The former has a lower rate of absenteeism compared to the latter. This indicates the direct relation that exists between the age of the labour force and the rate of absenteeism.

Given the lower rate of absenteeism, labour turnover and overstaffing in SNIC plants and in SNIC as a whole, one may conclude that the labour is used more efficiently in SNIC than in SONIC and SNMC. This situation has obvious effects on productivity rates. The higher labour utilisation may be the result of actions taken following technical and organisational recommendations made by two consultancy firms (MCKENSEY and INPED) (7).

In conclusion, it appears that in SNIC, as in SONIC and SNMC, inputs such as raw materials, intermediate inputs, fixed capital and labour are not used efficiently. Now that evidence has been given on the underutilisation of inputs in SNIC, which influences the overall performance of each plant as well as SNIC as a whole, the different causes of inefficiency are investigated.

## 7.2. Common causes of inefficiency in SNIC

### 7.2.1. Organisational factors

Although the rate of absenteeism and labour turnover were lower in SNIC than in SONIC or SNMC, SNIC is also faced with social constraints. As a consequence of the high rate of absenteeism, the SNIC production lines could not operate efficiently, in other words, machines were often idle. Its low labour turnover rate in contrast to SONIC, however, does not give rise to inefficiencies. Organisational inefficiencies were mainly due to the shortage of social infrastructure (labour transport and housing facilities for example), inappropriate wage and incentive systems and inefficient personnel management methods. Overstaffing was due mainly to the implementation of social and governmental objectives.

Pre-independence plants suffer from the old age of their machines which, in most cases, were acquired before independence. Spare parts for these machines are difficult to obtain. This, combined with their frequent maintenance, result in repeated stoppages of the production lines. Another consequence is the reduced number of shifts which prevents an efficient use of fixed capital. In addition, some post-independence plants technically equipped to operate with three shifts, worked with one or one and one half shifts, specifically, the Thenia mirror and the Lakhdaria paint plants. These plants were using their fixed capital inefficiently mainly because of organisational problems (i.e., the presence of a female labour force).

In addition to these problems, organisational problems similar to those mentioned in Chapter Four, such as the effects of cumbersome administrative control and government policies, also lead to organisational inefficiencies in SNIC.

### 7.2.2. Shortages of inputs

#### 7.2.2.1. Shortages of raw materials and intermediate inputs

The supply of raw materials is not subject to problems in SNIC. The reason is because raw materials are obtained locally and are not in short supply in the local market. Shortages, however, sometimes occur either as a result of insufficient means of transport which lead to delays in deliveries and/or because of inefficiencies encountered in the supplier plant. The Lakhdaria household cleaning products plant, for instance, was short of hydrochloric acid, soda and folding boxes due to delays in delivery and/or underutilisation of inputs in the Baba Ali and Saida SONIC plants.

Shortages of water and electricity of different voltages are encountered in all SNIC plants but their effect is felt to be less important than that in the SONIC plants. The Oran glass and Guelma earthenware plants, however, suffer greatly from reductions in voltage and shortages of electricity supply, resulting in an inefficient use of their furnaces.

#### 7.2.2.2. Shortages of transport, infrastructure and working capital

All the plants suffer from deficient means of transport necessary to collect inputs and deliver outputs. In 1980, for example, 26% of the SNIC transport capacity was unusable (8). Besides the problem of transport, SNIC lacked the infrastructure facilities such as ports, roads and housing. This resulted in delays in deliveries of imported goods and may lead, more importantly in the long term, to social problems. Reasons for the shortage of means of transport and infrastructure facilities are similar to those already described in Chapter Four.

Despite its indirect contributions, the price system has a large influence on overall efficiency. The prices of most of the outputs sold by SNIC, (which represent part of the staple products) had been frozen for several years. The actual price did not even cover production cost. For example, the price of detergent amounted to only half the production cost. SNIC received hardly any subsidies to make up for the loss. Consequently, several plants were in serious financial difficulties lacking the required working capital. The required cash-flow has to be borrowed at a high interest rate, burdening the already shaken financial situation. As already stressed, plant managers do not have any real incentive to decrease production cost and, as explained in Chapter Four, this has a direct effect on the utilisation of the different inputs.

7.2.2.3.Shortages of skilled labour

According to SNIC's managers, the lack of skilled labour in plants was also deeply felt. The positions which suffer from the lack of a skilled labour force are the technical and, to a lesser extent, the managerial positions (see Chapter Four). The inefficient use of fixed capital is also the result of the lack of a skilled work force. For instance, due to the lack of supervisory and technical back up, the Thenia mirror and Guelma earthenware plants which were built to operate with three shifts, work with less than one and one half shifts. Despite this situation, the foreign labour force was insignificant, amounting to 0.2% of the total SNIC labour force and 1.5% of total SNIC managers. The problems resulting from the lack of a skilled labour force were more important in the SNIC plants than in the SONIC plants because the proportion of total skilled workers and the ratio of skilled workers in plants were lower in the case of SNIC than in that of SONIC. The reasons for such shortages have already been discussed in Chapter Four.

### 7.2.2.4. Shortages of imported inputs

In addition to these shortages, SNIC also suffers from shortages of imported inputs, primarily feldspar (an intermediate input used in the glass industry) and spare parts. In 1980, SNIC's AGI was delivered at the end of March, resulting in delays of deliveries and, eventually production stoppages. Delays and work stoppages in SNIC are due to the same causes and lead to the same inefficiencies as those encountered in SONIC.

### 7.2.3. Allocative inefficiencies

Allocative inefficiencies are encountered in almost all plants. For instance, the Oran glass plant is faced with technical constraints due to the characteristics of the production process. In summer 1981, one of the furnaces which had a life expectancy of 3 to 4 years had to be rebuilt. The inadequate import and customs procedures, together with the lack of a skilled labour force, led to long delays in the construction and operation of the furnace. In fact, it took 6 months for the furnace to be operational. The two detergent plants were also faced with technical constraints because the management did not master the sophisticated technology. These inefficiencies occurred mainly as a result of the inexperience of the Algerian skilled labour force and government policies. SNIC also encountered other problems related to government policies. These were mainly the result of inappropriate wage and incentive systems.

### 7.2.4. Demand shortages

The only excess capacity encountered in any SNIC plants occurred due to seasonal variations in the demand for paint. The demand for building paint, for example, increases greatly during spring and summer. The paint plants which are equipped with the necessary capacity to handle these seasonal orders suffer from excess capacity in winter. The excess capacity, however, is not severe since some of the equipment is used to produce other outputs that use a similar capital stock. Except for this almost insignificant excess capacity, SNIC plants are not faced with demand shortages.

The main causes of underutilisation of the different inputs in SONIC, SNMC and SNIC are quite similar, to a certain extent. Organisational factors, shortages of inputs and allocative inefficiencies are present in the three public enterprises studied up to now. SNIC, on the other hand, is not faced with demand shortages except in its paint plants while SONIC and SNMC in particular, encountered large inefficiencies due to demand shortages.

References

1 See Les Industries Legeres en 1980, op cit. p 38 for more details.

2 Ibid.

3 Ibid p 48.

4 Ibid.

5 The figure 0% may not be very representative since this planned output was not produced in 1980. This may explain the high value of U1 obtained for the 4mm flat glass output.

6 More representative values of U1 are 12% for germ oil output and 114% for alcohol output in the Maghnia maize plant.

7 This can be sustained by the ILO studies reported in International Labour Review:ILO productivity missions to underdeveloped countries, July 1957 Vol. 76 pp 1-29 and August 1957 Vol. 76 pp 139-166.

8 Refer to Bulletin Trimestriel des Statistiques du sector des industries legeres, 4th Trimester, 1980, op cit. p 23.

# CHAPTER EIGHT: SONATRACH PUBLIC ENTERPRISE

Hydrocarbons have played an increasingly dominant role in Algeria's economy since the early 1960's (see parts 1.4 and 2.2.2.1.). SONATRACH, which was created on the 31st of December, 1963, is the only public enterprise in charge of the production, transport and commercialisation of hydrocarbons. SONATRACH is one of two public enterprises under the Ministry of Energy and Hydrocarbons (1). The nationalisation of existing petroleum companies combined with the construction of new plants have contributed to the tremendous expansion that SONATRACH has experienced. SONATRACH is now one of the largest public enterprises in Algeria, contributing, in 1980, 98% of total export revenues (i.e., most of its production is exported) and 63% of total tax revenues (the greatest share of which is petroleum taxes) (2). Its main exports are crude oil, liquefied petroleum gas (LPG), liquefied natural gas (LNG) and petroleum products (such as motorfuel, gasoil and kerosene). SONATRACH's exports constitute the country's main source of foreign exchange. In addition, its potential export earnings represent security for the overseas loans which make the execution of economic development plans possible. SONATRACH received one of the largest shares of public investment partly because the depth of petroleum sheets and natural gas layers and the transport from the remote extraction fields to ports required larger investments than in the average oil producing country. As a result, in 1980, SONATRACH sales revenue were 53.5 billion AD, 24 times that of 1970, and its labour force was about 94,000 workers. SONATRACH is at the centre of the Algerian economy and plays a driving role in economic development. It is the perfect example of an industrialising industry.

In 1963, SONATRACH was in charge of the transport and commercialisation of hydrocarbons. At that time, SONATRACH assets consisted of only the 800 km pipeline joining Haoud-Hamra-Arzew actually built by SONATRACH. From the time President Boumediene came to power in 1965, the concern of the Algerian authorities has been to establish state control over oil and gas resources. The SONATRACH contribution to this sub-sector has become gradually more important. Between 1967-68, the government bought all existing local means of transport (distribution, stockage and transport) of all foreign companies (including BP, ESSO, MOBIL, SHELL, BERYL and TOTAL (3)) and put SONATRACH in charge of their management. Early on, the Algerian government showed its intention to participate in the exploitation of hydrocarbons. This put an end to the system of concessions (payment of royalties) which was an international practice at the time. In fact, in July 1965 SONATRACH signed a cooperation contract with ELF in which each party held 50% of the shares. A contract was also signed between SONATRACH and GETTY Petroleum Company in 1968 on a 51-49% basis, respectively (4).

By 1971, natural gas was totally controlled by SONATRACH, reducing foreign companies' participation to the mere role of industrial operators. On the 24th of February, 1971, the hydrocarbon sub-sector experienced its most important modification. The nationalisation of crude oil fields and concessions were undertaken as a chief strategy. In contrast to SONATRACH's other activities, substantial foreign capital is involved in the extraction of crude oil. The participation of foreign companies averages about 20% of total Algerian crude oil production. In every case, however, SONATRACH participation is at least 51%. The nationalisation process of foreign-owned production capacity was progressive. By 1980, with the exception of the Hassi Messaoud refinery of which SONATRACH held only a 51% share, all the plants were totally owned by the state and controlled by SONATRACH. Since 1976, the transport of hydrocarbons and main and secondary pipelines have been totally controlled and owned by the state. This includes not only the injection, reinjection, separation, treatment and pumping units but also the petrol stations. Exploration, however, is controlled by foreign firms with SONATRACH as a partner. Such cooperation between foreign firms and SONATRACH, regarding exploration, is felt to be the only way to retain control while attracting foreign capital and know-how.

SONATRACH is a divisionalised organisation similar to that described in Chapter Four. It is composed of four divisions and a head office as described in Figure 8.1. The current organisation into four divisions was necessitated by the nature of SONATRACH's activities. Its objectives, functions, managerial environment and authority as well as autonomy are similar to all other public enterprises described in Chapter Four. Since 1980, there has been a project to restructure SONATRACH into 13 different public enterprises (see Appendix B.2).

SONATRACH is in charge of the exploration, production, pipeline transport and distribution of hydrocarbons, as well as international trade. Following large investments, which amounted to more than 47% of total public industrial investment during the 1967-79 period (see part 2.1), SONATRACH acquired large production capacities which are characterised

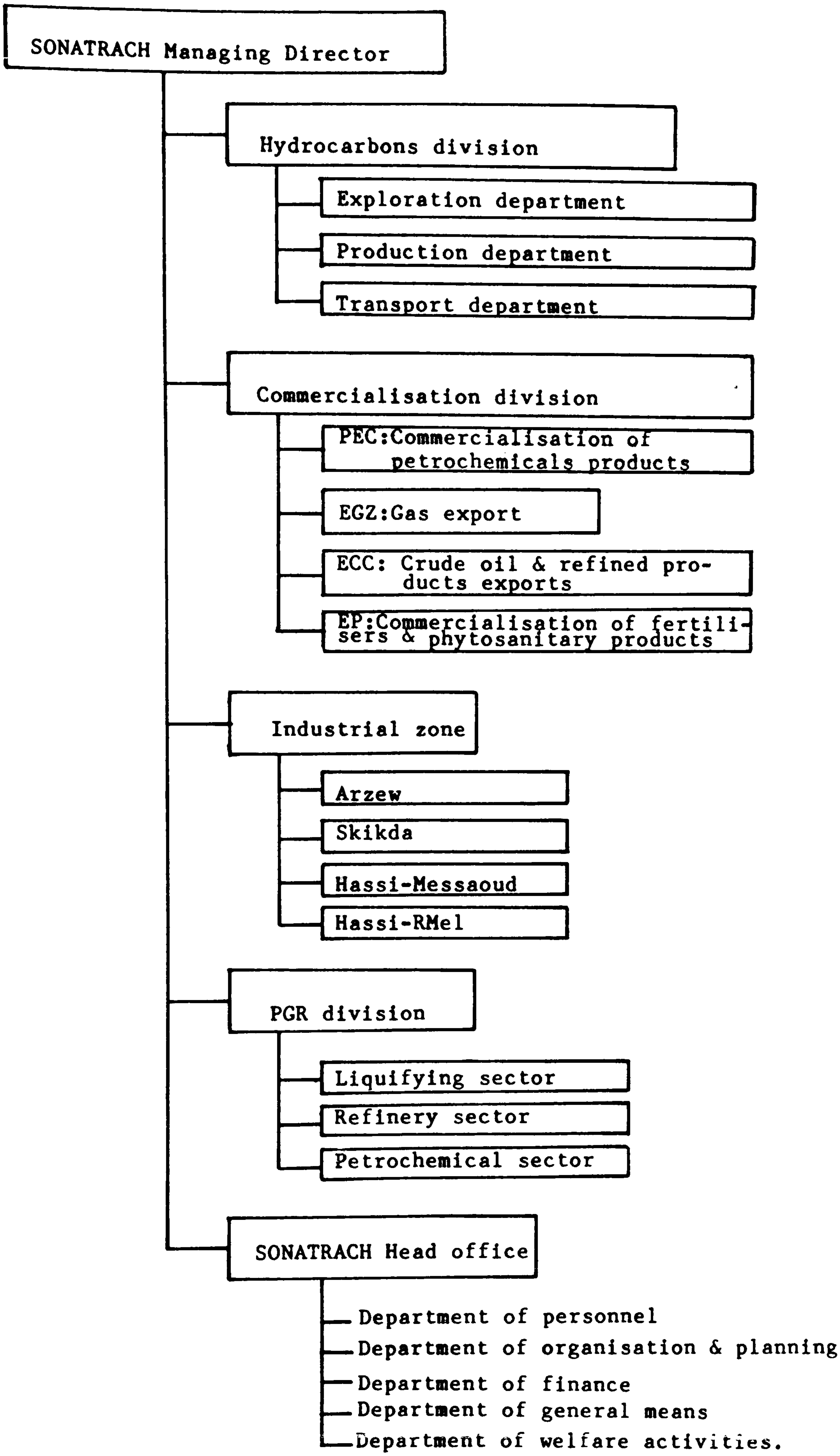


Figure 8.1 : SONATRACH organisational structure in 1980.

Source : Survey data.

by capital intensive and, therefore, financially demanding technology. In contrast to the petroleum industry in developed countries, SONATRACH does not produce a very wide range of products. As illustrated in Table 8.1, the refining and processing capacity for hydrocarbon resources are substantial. In 1982, the refining capacity was 23.5 million tons per annum while the liquefied natural gas (LNG) capacity was 47 million cubic metres. The refinery and LNG plants produce crude oil, natural gas, LNG, LPG, condensates, motorfuel, lubricants and bitumen. In addition to its refining and liquefying capacities, SONATRACH is in charge of several petrochemical and fertiliser plants. In 1980, some SONATRACH plants and complexes were involved in the production of methanol, ethylene, chloride, resin, plastic polymers (polyethylene, polyvinyl chloride (PVC)), low density polyvinyl (Pebd), plastic products such as pipes, bags, pens and films and nitrate and phosphatic fertilisers (ammonia, amonitrate, urea, nitric acid, TSP and NPK).

Substantial investments have been made for the installation of separation, treatment, injection, reinjection and pumping capacities for the production and transport of crude oil and natural gas. SONATRACH is also in charge of an extensive pipeline-network which conveys crude oil and natural gas to processing and refining centres, as seen in Figure 2.7. In 1980, existing crude oil lines had the capacity to transport 81 to 97.8 million tons per annum to the sea, condensate lines had the capacity to transport 20 million tons and natural gas lines 39 billion cubic metres (5). In addition, a gas line linking the Hassi-Rmel field with Mazzara Del Vallo in Sicily was opened in 1982 with a capacity of 12.5 billion cubic metres. Transport of crude oil, LNG and petroleum products, which involves several specialised methanol and crude oil carriers, is carried out by the state shipping company, CNAN. SONATRACH, with the construction of several plants and pipelines, continues to expand.

SONATRACH is a much larger public enterprise than SONIC, SNMC or SNIC, employing a larger labour force and contributing to both higher value added and tax revenue. The range of products commercialised by SONATRACH is more varied than that produced by SONIC, for instance. Dissimilarities between these two public enterprises extend to their development. As seen in Chapter Two, SONATRACH, in contrast to SONIC, has received the largest share of industrial investments and consequently has experienced faster development. Furthermore, while the future development of SONIC seems bleak, SONATRACH still benefits from large investments used in the transformation of final outputs. The objective is to make SONATRACH a more integrated enterprise, comparable to SNMC.

Most SONATRACH manufacturing plants are located on the coast, but most of the intergas and interpetroleum units are located in southern Algeria near the oil and gas fields and along the pipelines. In terms of location, SONATRACH is an exception. The location of its plants on the coast was dictated by the destination of outputs since a large part of its production is exported. The petrochemical and fertiliser plants are also located on the coast to be near their supplier and, to some extent, because part of their output is intended for export. The plastic plants are located throughout northern Algeria. Their location, like that of SONIC, SNMC and SNIC, has been dictated by policies advocating regional development equilibrium and an equitable share of jobs among the different regions.

As can be seen from Table 8.1, most of the plants are multiproduct plants, specialised in the production of interrelated outputs. This occurs because of the nature of the inputs and the technology involved. SONATRACH as a whole is rapidly becoming a highly integrated enterprise. This does not automatically mean that all the plants are highly integrated (e.g., the plastic plants are not highly integrated). SONATRACH, however, is not as vertically integrated as the petrochemical industry in developed countries. The fact that SONATRACH still exports large quantities of crude oil instead of the finished outputs which are produced from crude oil is evidence of this. SONATRACH also imports light petroleum products and exports heavy petroleum products, further corroboration of the lack of high integration. Light products are currently not produced at all by SONATRACH refineries. In conclusion, SONATRACH's integration level is comparable to that of SONIC, SNMC or SNIC public enterprises. Regarding the level of integration of the different plants, SONATRACH's plants compares very well with SNMC's plants.

As shown in Table 8.1, SONATRACH's plants are relatively recent and use sophisticated capital intensive technology. The technology used is entirely imported since the material and human capacities required to develop it do not exist at the national level. Such capacities not only consist of the skills involved in the implementation of projects (design, construction and setting up, knowledge of the technological process, maintenance, and repairs and operation of equipments or industrial complexes) but also includes the intergas and interpetroleum projects' definitions, technological-economic studies of reliability and technical assistance for the reso-

Table 8.1: SONATRACH (1) plants and their respective outputs in 1980

| SONATRACH Plants/outputs | Year of entry | Unit | Production 1980 Technical | planned | actual |
|---|---|---|---|---|---|
| **LNG plants** | | | | | |
| Arzew LNG no. 1 | 1978 | $10^3 m^3$ | 10,500 | ) 17,531 | ) 5,081 |
| Arzew LNG no. 2 | 1979 | " | 10,500 | ) | ) |
| -LPG | | Tons | - | 17,980 | 17,980 |
| Arzew LNG no. 4 | 1964 | $10^3 m^3$ | 2,400 | 2,718.6 | 2,338 |
| Skikda LNG no. 1 | 1972 | $10^3 m^3$ | 16,500 | | |
| -LNG | | " | - | 14,444 | 5,200 |
| -LPG | | $10^3$ tons | - | 556 | 355.84 |
| Total LNG output | | $10^3 m^3$ | 52,100 | 34,693 | 12,636 |
| Total LPG output | | $10^3$ tons | – | 574 | 375 |
| **Refineries** | | | | | |
| Arzew RA no.1 | 1972 | $10^3$tons | 2,500 | | |
| -LPG | | " | – | 105.4 | 89.6 |
| -Motorfuel | | " | – | 2,458 | 2,451 |
| -Lubricant | | tons | 60,000 | 77,650 | ) 52,800 |
| -Conditionnement of lubricant | | " | | 16,000 | ) |
| -Road bitumen | | " | 101,310 | 112,000 | ) 59,000 |
| -Oxide bitumen | | " | 20,130 | 20,000 | ) |
| Algiers RA | 1964 | $10^3$ tons | 2,700 | | |
| -LPG | | " | – | 90.4 | 80.5 |
| -Motorfuel | | " | – | 2,618 | 2,487 |
| Skikda RA | 1976 | $10^3$ tons | 15,000 | | |
| -LPG | | " | - | 558 | 0 |
| -Motorfuel | | " | - | 14,007 | 5,603 |
| -Road bitumen | | " | 120 ) | 110 ) | 3 |
| -Oxide bitumen | | " | 25 ) | ) | |
| Hassi Messaoud RA | 1974 | $10^3$ tons | 1,000 | | |
| -LPG | | tons | - | 6,550 | 1,965 |
| -Separation unit | | " | - | 166,600 | 49,980 |
| -Motorfuel | | $10^3$ tons | - | 653 | 503 |
| In Amenas RA | | | | | |
| -Motorfuel | | " | 300 | 181 | 60 |
| Arzew RA no. 2 | | | | | |
| -Separation unit | | " | 1,000 | 994.9 | 646.6 |
| **Fertiliser plants** | | | | | |
| Arzew nitrate fertiliser no.1 | 1970/71 | | | | |
| -Ammoniac | 1971 | $10^3$ Tons | 330 | - | 0 |
| -Ammonitrate | 1971 | " " | 165 | 165 | 33 |
| -Urea | 1970 | " " | 132 | - | 0 |
| -Nitrate acid | 1970 | " " | 132 | - | 0 |
| Arzew nitrate fertiliser no.2 | * | | | | |
| -Ammonitrate | | | – | – | 0 |
| Annaba nitrate fertiliser | 1981 | $10^3$ tons | 550 | | - |
| -Ammonitrate | | | | | |
| -Ammoniac | | | | | |
| Annaba phosphatic fertiliser | 1970 | $10^3$tons | 350 | - | - |
| -TSP | | " " | 290.4 | 300 | 19.8 |
| -NPK | | " " | 603.9 | 314.8 | 157.4 |

(Table continues on the following page.)

Table 8.1. (Continued)

| SONATRACH Plants/outputs | Year of entry | Unit | Production 1980 Technical | planned | actual |
|---|---|---|---|---|---|
| Petrochemical plants | | | | | |
| Arzew petrochemical | | | | | |
| -Methanol | 1974 | $10^3$ tons | 115 | 100 | 49 |
| -Resin | 1976 | " " | 14 | 13.8 | 4 |
| Skikda petrochemic. | 1975 | | | | |
| -Ethylene | 1978 | " " | 120 | 118.8 | 26 |
| -PVC | 1976 | " " | 35 | 34.9 | 15 |
| -Pebd | | " " | 48 | | 0 |
| -Chlorine | | " " | 36 | - | 0 |
| Plastic plants | | | | | |
| -Algiers plants | | $10^3$ tons | 30 | 30 | 17.4 |
| -Setif plants. | 1973 | " " | 26.7 | 1.17 | 0.7 |
| -El Asnam plants | 1981 | " " | 18.6 | – | – |
| -Dra Elmizen s.g.p. | 1981 | " " | 1 | – | – |
| -Medea films plant | 1981 | " " | 2 | – | – |

Source: Table H.1 in the Appendix H.

1 Without interpetroleum and intergas units.
* In reweval process.
- Not available or applicable.

lution of technological problems. The different plants are all medium or large-scale. One of the main reasons is that this industry is developed by multinational corporations and, therefore, built to satisfy an enormous demand such as that of the EEC, US or USSR markets. Furthermore, almost all the plants, as indicated in Table H.1 in the Appendix H, operate for 330 days per year with the remaining days of the year for maintenance stoppages. The only two plants working 250 days per year are the plastic plants of Setif.

SONATRACH, like SONIC, has the monopoly of all hydrocarbon production with the exception of plastic goods production and totally controls the international trade of hydrocarbon products. As mentioned above, exporting is one of the main functions of SONATRACH. In 1980, for example, 82% of the production of crude oil (and condensates) and 75% of the production of natural gas were exported (6). This is in contrast to the SONIC, SNMC and SNIC cases. SONATRACH does not face local private competition. Imports still made up for the lack of local production.

The degree of dependency on imported inputs is shown in Table 8.2, which lists input origins. As indicated, almost all inputs, except for a few consumable imported inputs and the majority of spare parts, are supplied within SONATRACH and by the local market. Unfortunately, in view of the lack of some figures, determination of all the ratios was not possible. Similar to the cases of SONIC, SNMC and SNIC, the large proportion of imported spare parts can be explained by the fact that the totality of SONATRACH's fixed capital is imported. This indicates a high degree of dependency vis-a-vis foreign suppliers of spare parts. As far as the

## Table 8.2 : Origin of SONATRACH inputs

| MAIN INPUTS \ OUTPUTS | Liquified oil | Propane | Butane | Condensates | All fuel | Lubricants | Bitumen | LNG | Nitrate fertiliser | Phosphatic fertiliser | Methanol & resine | Plastic films | Schoolar goods | Polystylene | Plastic leaves | Plastic furniture | Plastic tubs | Plastic bags |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **RAW MATERIALS AND INTERMEDIATE INPUTS** | | | | | | | | | | | | | | | | | | |
| WITHIN SONATRACH | | | | | | | | | | | | | | | | | | |
| Crude oil | | | | * | * | * | * | | | | | | | | | | | |
| Crude gas | | | | | | | | * | * | | * | | | * | | | | |
| Compressed air | * | | | | | | | * | | | | | | | | | | |
| Pression | * | | | | | | | * | | | | | | | | | | |
| Liquified oil | | * | * | | | | | | | | | | | | | | | |
| Pebd polythylene | | | | | | | | | | | | * | * | * | * | * | * | * |
| Petrochemical prod. | | | | | | | | | | | | * | * | * | * | * | * | * |
| Urea | | | | | | | | | | | * | | | | | | | |
| LOCAL MARKET | | | | | | | | | | | | | | | | | | |
| Ammonia | | | | | | | | | * | | | | | | | | | |
| Phosphate | | | | | | | | | | * | | | | | | | | |
| Water | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Electricity | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Gas bottle | | | * | | | | | | | | | | | | | | | |
| Cans | | | | | | * | | | | | | | | | | | | |
| INTERNATIONAL MARKET | | | | | | | | | | | | | | | | | | |
| Spare parts | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Atmospheric residue | | * | * | | * | * | | | | | | | | | | | | |
| Sulphuric acid(1) | | | | | | | | | | * | | | | | | | | |
| Sulphur | | | | | | | | | | * | | | | | | | | |
| Potassium sulphur | | | | | | | | | | * | | | | | | | | |
| Ammoniac (1) | | | | | | | | | | * | | | | | | | | |
| Phenol ) Melamine) Urea | | | | | | | | | | | * | | | | | | | |
| FIXED CAPITAL | 100% imported | | | | | | | | | | | | | | | | | |
| LABOUR — Foreign | 6% | | | | | | | | | | | | | | | | | |
| LABOUR — Local | 94% | | | | | | | | | | | | | | | | | |

* indicates that a certain amount is supplied within SONATRACH, within the local market and from the international market without specifying the amount which is not available. The table gives only the origin of the main inputs as the list will be too long to state them all.

1 Exceptional imports due to technical contraints.

Source : Survey data.

importation of capital goods is concerned, the situation is common to all the public enterprises reviewed here. The foreign labour force, in contrast to SONIC, SNMC and SNIC, represents a substantial fraction of the total labour force in SONATRACH. This will be discussed in detail later.

The different outputs produced by SONATRACH plants consist of raw materials, semi-finished outputs and finished outputs destined for use within SONATRACH, by the industrial sector and by consumers, as shown in Table 8.3. A large proportion of the production of hydrocarbon outputs is destined for the international market. Only a small amount goes to the local market for intermediate and final use. In 1980, 75% of the natural gas production and 82% of the crude oil production (7) (and condensates) were exported. In addition, about 37% of the production of liquefied petroleum gas and 43% of the production of petroleum products such as motorfuel, naphtha, lubricants, gasoil, fuel oil and kerosene were exported (8). Exports of ammonia, which started in 1980, have since stopped because of technical problems (which will be seen later). Fertilisers are exclusively produced for intermediate use in the domestic market although part of the production was supposed to be exported. No exports of fertiliser are made because of technical problems experienced in the plants. Petrochemicals are used as intermediate inputs within SONATRACH and by the private sector and as finished outputs for final use. Part of the methanol production was exported in 1979 but the increasing local demand (the opening of new plants which use methanol as an intermediate input, for example) put an end to these exports.

As indicated in Table 8.4, the nature of exported outputs have changed over the years. In the late 1960's, SONATRACH's

Table 8.3 : Destination of SONATRACH outputs

| SECTORS OF UTILISATION / MAIN OUTPUTS | | DOMESTIC MARKET: SONATRACH | | DOMESTIC MARKET: INTERMEDIATE USE | | | | | | | | | | | | | | DOMESTIC MARKET: FINAL USE | EXPORT in 1979 in % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Within the plant | Within SONATRACH | Agriculture | Hydraulic | Preserves ind. | Build.cons.ind | Transport | Paper ind. | Energy | Machinery ind. | Metal equip. I | Electrical ind | Chemical ind. | Public works | Public health | Electronic in. | Consumers | |
| OIL AND GAS | LPG | * | * | | | | | | | | | | | | | | | | 37 |
| | Propane | | | | | | | | | | | | | | | * | | * | * |
| | Butane | | | | | | | | | | | | | | | * | | * | * |
| | Crude oil | | * | | | | | | | | | | | | | | | | ) |
| | Condensate | | * | | | | | | | | | | | | | | | | ) 82 |
| | Residual fuel oil | | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | 86 |
| | Gas diesel oil | | | | | | | * | | | | | | | | | | * | 25 |
| | Kerosene | | | | | | | * | | | | | | | | | | | 66 |
| | Motoroil | | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | 17 |
| | Lubricant | | | | | | | * | | | | | | | | | | | |
| | Naphtha | | | | | | | * | | | | | | | | | | | * |
| | High quality oil | | | | | | | | | | | | | | | | | | * |
| | Grease | | | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | |
| | Natural gas | | | | | | | | | * | | | | | | | | * | * |
| | Bitumen | | | | | | | | | | | | | | * | * | | | |
| | LNG | | | | | | | | | | | | | | | | | | 99.5 |
| FERTILISER | Nitrate fert. : | | | | | | | | | | | | | | | | | | |
| | Ammonia | | | * | | | | | | | | | | | | | | | * |
| | Ammonitrate | | | * | | | | | | | | | | | | | | | |
| | Urea | | | * | | | | | | | | | | | | | | | |
| | Nitrate acid | | | * | | | | | | | | | | | | | | | |
| | Phosphatic fert.: | | | | | | | | | | | | | | | | | | |
| | TSP | | | * | | | | | | | | | | | | | | | |
| | NPK | | | * | | | | | | | | | | | | | | | |
| | OAP | | | * | | | | | | | | | | | | | | | |
| | NP | | | * | | | | | | | | | | | | | | | |
| PETROCHEMICAL | PVC | | * | | | | * | | | | | | | | | | | | |
| | Ethylene | | * | | | | | | | | | | | * | | | | | |
| | Pebd | | * | | | | | | | | | | | | | | | | |
| | Methanol | | * | | | | | | | | | | | | | | | | * |
| | Resin | | | | | | | | * | | | | | * | | * | | | |
| | Chlorine | * | | | | | | | * | | | | | | | | | | |
| PLASTIC | Schoolar goods | | | | | | | | | | | | | | | | | * | |
| | Polystylene | * | * | | | | | | | | | | | | | | | | |
| | Furniture | | | | | | | | | | | | | | | | | * | |
| | Leaves | * | * | | | | | | | | | | | | | | | | |
| | Tubs | | | * | * | | * | | | * | | | | | | | | | |
| | Films | * | * | | * | | * | | | * | | | | | | | | | |
| | Bags | | | | | | | | | | | | | | | | | * | |
| | Packaging prod. | * | * | | | | | | | | | | | | | | | * | |

* states that the output is destined to one of the intermediate or final use; no figure is available to give the percentages.

Source : Survey data.

exports consisted of only crude oil and natural gas; in addition now, SONATRACH exports an increasing proportion of refined products. The decrease in the production of crude oil was made up for, in terms of foreign currency earnings, by the export of refined products and condensates. Between 1979 and 1980, the quantity of exported refined products doubled. It should be stressed, however, that crude oil is still the dominant export. In 1979, Algerian crude oil was mainly exported to the USA, France, GDR and Italy. Natural gas was mainly exported to the USA, France and Spain (9). The destinations of these exports have changed dramatically since then with the decrease in crude oil exports and the cancellation of the El-Paso contract (USA) regarding the export of LNG. In 1980, LNG was exported mainly to France, West Germany, Italy and Spain. With respect to the destination of the outputs, therefore, SONATRACH differs considerably from SONIC, SNMC or SNIC. In contrast to these public enterprises, exporting is a major activity of SONATRACH. As far as the domestic market is concerned, SONATRACH is oriented towards the production of outputs for both intermediate and final use, while SONIC and SNIC outputs are oriented towards the production of outputs for final use only and SNMC outputs for intermediate use only.

International trade has become increasingly competitive due to the discovery and exploitation of new oil fields (in Mexico and the North Sea, for example), the development of new sources of energy (such as nuclear energy) and the more efficient use of oil in developed countries. Given this situation, Algeria, an OPEC member, has aligned its oil price with the internationally agreed OPEC price. According to United Nations statistics, the per barrel price of crude

Table 8.4: SONATRACH exports from 1970 to 1980

| Thousands of tons | 1970 | 1973 | 1977 | 1979 | 1980 |
|---|---|---|---|---|---|
| Crude oil | 45,070 | 47,400 | 48,036 | 49,013 | 37,956 |
| Natural gas | 1,587 | 2,522 | 4,221 | 12,256 | 6,623 |
| Refined products | 490 | 2,397 | 1,368 | 3,235 | 7,078 |
| -diesel | 133 | 501 | 41 | 351 | 1,896 |
| -fuel-oil | 157 | 1,089 | 720 | 1,468 | 2,551 |
| -naphtha | 69 | 400 | 300 | 727 | 1,785 |
| **Million dinars** | | | | | |
| Crude oil | 3,288 | 5,675 | 22,342 | 30,824 | 41,048 |
| Natural gas | 144 | 192 | 672 | 2,210 | 3,774 |
| Refined products | 73 | 429 | 609 | 2,909 | 7,561 |

Source: Ministry of Energy and Hydrocarbons.

Table 8.5: Average price of crude oil, LNG and LPG per annum for selected years

| Years | Crude oil US $/barrel | LPG $/Ton | LNG $/thousand BTU(1) |
|---|---|---|---|
| 1971 | 2.72 | 28.74 | 0.35 |
| 1973 | - | 31.57 | 0.35 |
| 1976 | 12.85 | 125.00 | 0.85 |
| 1977 | 14.30 | 125.00 | 1.13 |
| 1978 | 14.25 | - | - |
| 1979 | 14.81 | - | - |
| 1980 | 30 (2) | - | - |
| 1981 | 40 | - | - |

Sources: United Nations 1980 Yearbook of World Energy Statistics and Attal, A.A.: Financing Economic Development in Algeria 1967-77, op cit.

1 BTU stands for British thermis units.
2 A surcharge of US$ 3 was charged by Algeria for oil exploration expenses.
- Figures not available.

petroleum, as shown in Table 8.5, increased steadily from US$ 2.72 in 1970 to US$ 40 in 1980. It has since then decreased to around US$ 30 in 1983. Similarly, the price of LPG increased rapidly by a factor of 4.35 between 1971 and 1977. LNG is another important component of SONATRACH activities and particular attention has been paid to its production ever since SONATRACH took control of the hydrocarbon sub-sector. The LNG price, which is not fixed by OPEC and thus is subject to international market fluctuations, remained unchanged for a number of years because of the strong competition from crude oil. Since the increase in the price of crude oil, LNG has attracted considerable attention and its price has been constantly reevaluated. From 1971 to 1977, for example, its price increased from $ 0.35 to $ 11.30 per thousand BTU. This price, which is indirectly influenced by OPEC agreements, will probably continue to rise in the near future. SONATRACH is faced with a unique situation in the sense that the prices of its different exported outputs, which are subject to international conjuncture, are governed by different factors.

SONATRACH's labour force increased steadily from 10,100 workers in 1970 to 94,698 workers in 1980 (see Table 8.6). The actual labour force, inclusive of only the productive plants, is illustrated in Table 8.7. The labour force can be divided into three different categories according to level of qualifications: managers, technicians and supervisors, and semi-skilled and unskilled workers (see Figure 8.2). In 1980, 70% of the labour force was composed of semi-skilled and unskilled workers and 30% of technicians, supervisors and managers. For an industry which uses sophisticated technology, the proportion of skilled workers is low. The ratio of skilled workers employed by SONATRACH plants is lower than that for the public enterprise plants analysed earlier. The lack of a skilled labour force in SONATRACH is clearly outlined in Table 8.8. In 1980, 30% of the skilled workers were underqualified for the jobs to which they were appointed. All the plants suffered from a lack of skilled workers. The petrochemical plants were particularly affected and experienced the highest shortage: 65% of the workers were underskilled for their positions.

The highest proportion of managers is found in the Arzew LNG no. 2 plant, comprising a record 29% of its labour force in the plant. This in turn, gave rise to a high 8% ratio of managers to total labour force in the liquefied natural gas group. The technicians and supervisors ratio in the Arzew LNG plant no. 2 is also high, consisting of 40% of the total labour force in the plant. These ratios are probably to be expected in such a branch of industry. Such figures are, however, only reported for a few plants. Another example of high managerial ratios is the Hassi Messaoud refinery with a 13% ratio of managers to the total labour force, 73% technicians and supervisors and only 13% semi-skilled and unskilled workers. This example is, however, not representative of the group of refineries as only 4.4% of the labour force in the refineries are managers. The lowest ratios of managers encountered in SONATRACH plants were 3.5% and 4% in the fertiliser and plastic plants, respectively. A similarly low rate was recorded for the petrochemical plants, 4.7%. Overall LNG plants are best provided with skilled workers when compared to the other SONATRACH plants. The lack of a skilled labour force is more dramatic in SONATRACH than in the other public enterprises reviewed so far because of the technical

Table 8.6: Total labour force in SONATRACH in 1980

| Skill category | Algerian workers | Foreigners (1) | (2) | (3) | Total | % |
|---|---|---|---|---|---|---|
| Managers | 7,937 | | | | | |
| Technit. & supervi. | 18,989 | | | | | |
| Total skilled workers | 26,926 | 1,234 | 539 | 1,773 | 28,699 | 30.3 |
| Semi-skilled and unskilled workers | 54,654 | | | | 54,654 | 57.7 |
| Temporary workers | 11,345 | | | | 11,345 | 12.0 |
| Total SONATRACH | | | | | 94,698 | 100.0 |

Source: Survey data.

1 Technical assistance
2 Contractuals
3 Total.

Table 8.8: Competence of the labour force

in SONATRACH in 1980

| Group of plants producing the same outputs | Competence Adequate | Inferior | Superior |
|---|---|---|---|
| Head office of the production department, reinjection, maintenance, separation, GNL and GPL condensate. | 70% | 20% | 10% |
| Liquified natural gas | 73% | 21% | 6% |
| Motorfuel | 73% | 26% | 1% |
| Nitrate fertiliser | 80% | 19% | 1% |
| Phosphatic fertiliser | 70% | 30% | 0% |
| Petrochemicals | 35% | 65% | 0% |
| Plastic | 63% | 30% | 6% |
| Percentage of the total | 66.3% | 30.2% | 3.5% |

Source: Survey data.

sophistication involved in the production process.

In 1980, the rate of absenteeism for SONATRACH as a whole was 6.57%, representing 43,294 days of work, while the rate of labour turnover was 11%. According to SONATRACH managers, the rates of absenteeism and labour turnover in the plants are high. For example, the rate of labour turnover was 15% at the Arzew refinery and LNG no. 1 and no. 2 complexes and 13% at all other SONATRACH plants and complexes in Arzew (10). These rates are comparable to those for SONIC and SNMC. These high rates reflect the difficult working conditions in the southern Algeria and the low salaries offered to these workers compared to those in other public enterprises (except in the South). The foreign technical assistance in SONATRACH plants is much higher than that for SONIC, SNMC and SNIC, accounting for 6% of the total labour force in 1980 and 6.2% of the total SONATRACH managers, technicians and supervisors.

An interesting conclusion can be drawn from a comparison between the ratios of qualified workers in SONATRACH and SONIC. As illustrated in Figure 8.3, the proportion of skilled and unskilled workers for each category in the two public enterprises are very similar despite differences in capital intensity and level of technology used. Furthermore, the importance of foreign assistance in SONATRACH is much higher than in SONIC or SNMC, as it reached 6.2%, 0.34% and 0.2% of the total skilled workers, respectively.

We now turn to the discussion of input utilisation in SONATRACH plants. In a second section, the main causes of inefficiency in SONATRACH plants will be investigated.

Table 8.7: Labour force in SONATRACH plants in 1980

| Skill category / plants | Managers (1) | Managers (2) | Technic./ supervis. (1) | Technic./ supervis. (2) | Semi-skil./ unskilled (1) | Semi-skil./ unskilled (2) | Total (1) | Total (2) | (3) |
|---|---|---|---|---|---|---|---|---|---|
| Production head office div, intergas & petroleum units | 900 | 9.8 | 2,090 | 23 | 6,119 | 67 | 9,109 | | |
| -Foreigners | | | | | | | 373 | 4 | |
| Separation p. | 8 | 2 | 112 | 28 | 2,179 | 70 | 399 | | |
| -Foreigners | | | | | | | 3 | 0.7 | |
| LNG p. | | | | | | | | | |
| -Arzew LNG no.1 | 56 | 5 | 281 | 29 | 611 | 65 | 948 | | |
| -Arzew LNG no.2 | 62 | 29 | 92 | 43 | 59 | 27 | 213 | | |
| -Arzew LNG no.3 | 36 | 7.6 | 133 | 28 | 305 | 64 | 474 | | |
| -Skikda LNG no.1 | 51 | 5.3 | 113 | 12 | 785 | 83 | 949 | | |
| Total LNG p. | 205 | 8 | 619 | 24 | 1,760 | 68 | 2,584 | | |
| -Foreigners | | | | | | | 608 | 23 | |
| Refineries (RA) | | | | | | | | | |
| -Arzew RA no.1 | 59 | 4.5 | 227 | 17 | 1,017 | 78 | 1,303 | | 55 |
| -Algiers RA | 32 | 5.3 | 103 | 17 | 464 | 77 | 599 | | 65 |
| -Skikda RA no.1 | 41 | 4.2 | 122 | 12 | 791 | 83 | 954 | | |
| -Hassi Messaoud RA | 6 | 13 | 33 | 73 | 6 | 13 | 45 | | |
| -In Amenas RA | 5 | 5.3 | 35 | 37 | 54 | 57 | 94 | | |
| Total RA | 151 | 4.4 | 632 | 18 | 2,611 | 77 | 3,394 | | |
| -Foreigners | | | | | | | 92 | 2.7 | |
| Fertiliser plants | | | | | | | | | |
| -Arzew CEA | 49 | 3.5 | 359 | 26 | 983 | 70 | 1,391 | | 91 |
| -Annaba CEP | 53 | 3.2 | 253 | 15 | 1,336 | 82 | 1,624 | | 94 |
| Total fertili. p. | 102 | 3.3 | 612 | 20 | 2,319 | 77 | 3,015 | | |
| -Foreigners | | | | | | | 6 | | |
| Petrochemical pl. | | | | | | | | | |
| -Arzew CP no.1 | 42 | 6.7 | 168 | 27 | 412 | 66 | 622 | | 55 |
| -Skikda CP no.1 | 47 | 3.8 | 268 | 21 | 925 | 74 | 1,240 | | 40 |
| Total petrochemic. | 89 | 4.9 | 436 | 23 | 1,337 | 72 | 1,862 | | |
| -Foreigners | | | | | | | 474 | 25 | |
| Plastic plants | | | | | | | | | |
| -Algiers pl. no.1 | 15 | 3 | 88 | 18 | 374 | 78 | 477 | | |
| -Algiers pl. no.2 | 13 | 2.8 | 68 | 15 | 370 | 82 | 451 | | |
| -Setif pl. no.1 | 46 | 5 | 67 | 8 | 741 | 87 | 854 | | |
| -Dra Elmizan s.g. | 5 | 2.3 | 36 | 17 | 171 | 81 | 212 | | |
| -Laminated plast.p | 4 | 2.3 | 23 | 13 | 144 | 84 | 171 | | |
| -Plas. leaves p. | 5 | 3.8 | 28 | 21 | 97 | 75 | 130 | | |
| -Plas. firms p. | 5 | 8.4 | 5 | 8 | 49 | 83 | 59 | | |
| Total plastic p. | 93 | 3.9 | 315 | 13 | 1,946 | 82 | 2,364 | | |
| -Foreigners | | | | | | | 15 | 0.6 | |
| Total (4) | 1,540 | 6.8 | 4,704 | 21 | 16,092 | 72 | 22,328 | | |
| -Foreigners | - | - | - | - | - | - | 1,468 | 6 | |

Source: Survey data.

1 Total by skill category in the SONATRACH plants only.
2 % of the total labour force by skill category or origin in the plants(s).
3 Rate of overstaffing.
4 Total SONATRACH labour force within SONATRACH plants only.
- Not available.

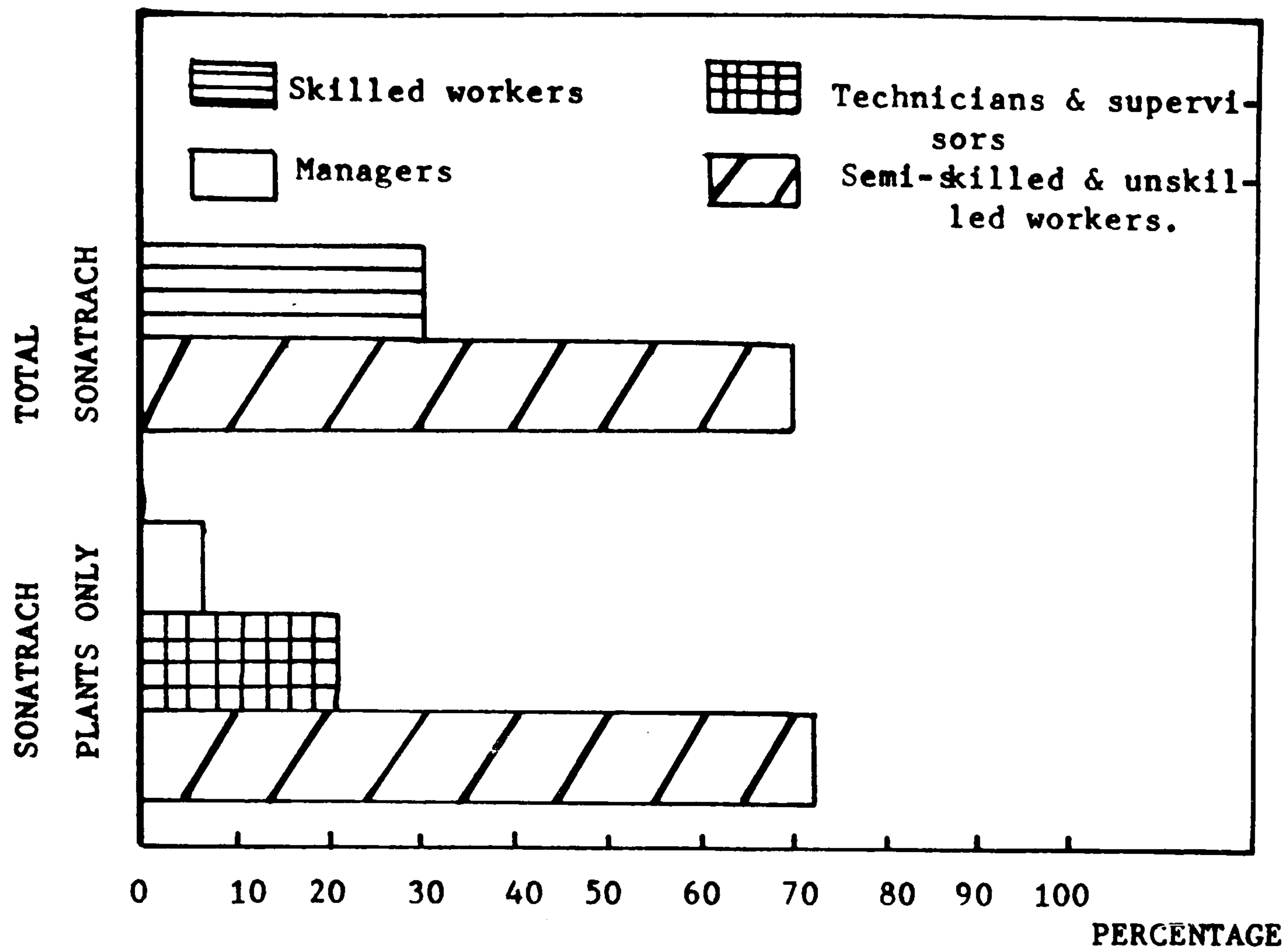


**Figure 8.2 : Labour force by skill category in SONATRACH.**
**Sources : Tables 8.6 and 8.7.**

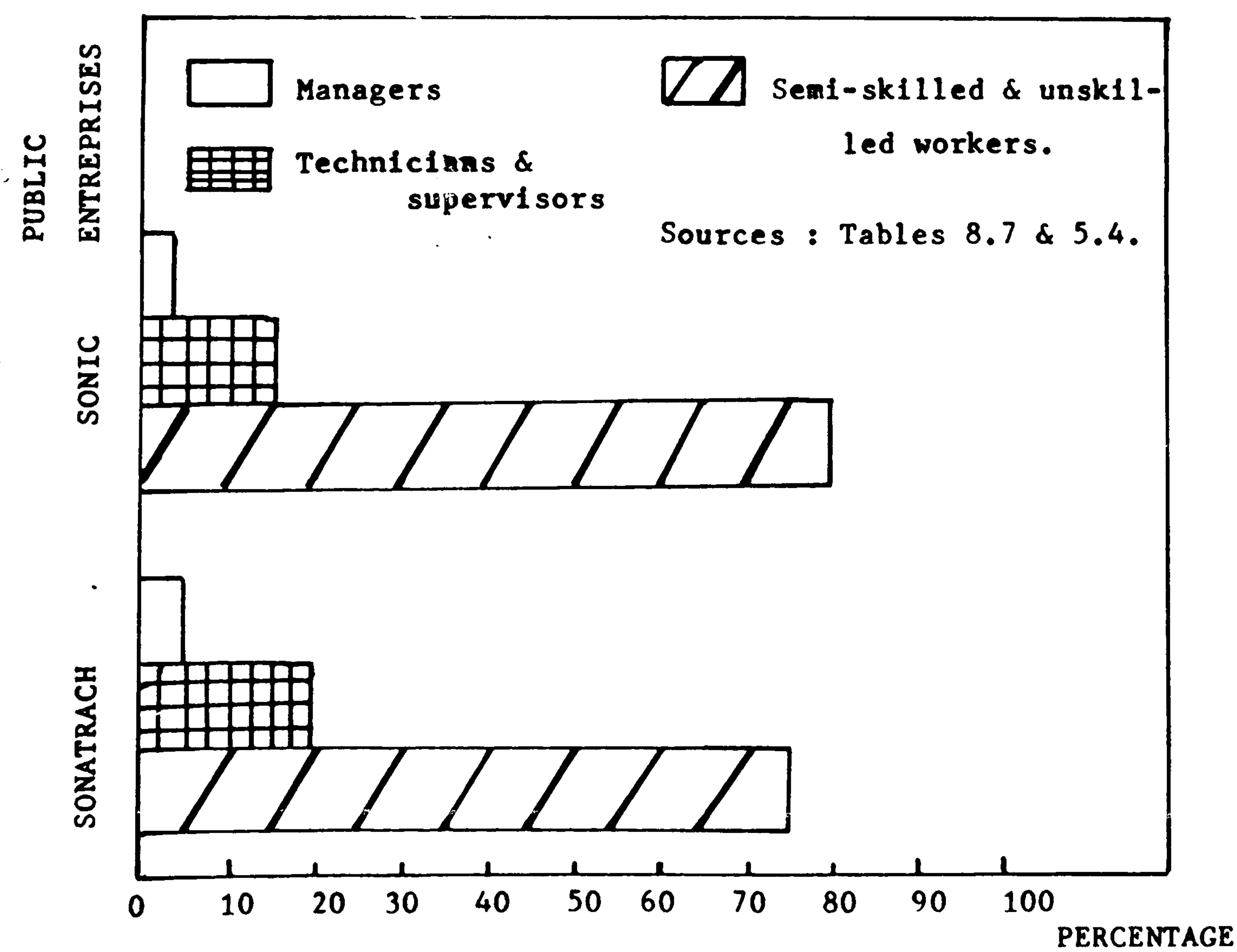


Figure 8.3 : Comparison of labour force by skill category in SONATRACH and SONIC.

### 8.1. Utilisation of inputs in SONATRACH

#### 8.1.1. Utilisation of raw materials and intermediate inputs

In SONATRACH plants, the underutilisation of raw materials and intermediate inputs is difficult to detect. Norms are not available and overconsumption has no effect on the utilisation of other inputs. In addition, these inputs are not scarce. In the future, as hydrocarbon reserves drain, the underutilisation of inputs is expected to become evident. At present, however, it can only be argued that raw materials are not being used inefficiently in SONATRACH plants. According to SONATRACH managers, on the other hand, chemicals and intermediate inputs are not used efficiently. Overconsumption has an effect on the utilisation of fixed capital and on production cost since less outputs are produced. The level of overconsumption is similar to that encountered in SNMC but is much lower than that for SONIC.

#### 8.1.2. Utilisation of fixed capital

As discussed in Chapter Four, U1 (ratio of actual over planned output), U2 (ratio of planned over technical capacity) and U3 (ratio of actual over technical time utilisation of fixed capital) are calculated by plant output, by plant, by SONATRACH output and for SONATRACH as a whole (without taking the interpetroleum and intergas plants and transport capacities into account), as shown in Tables H.1 in the Appendix H and 8.9. As indicated in Table H.1, U1 (for the figures available) by plant output ranged from 0% to 100% while U2 varied between 4.3% and 129%. The lowest rate of fixed capital utilisation (for the available figures), taking both U1 and U2 into account, was recorded for the plastic output (60%, 4.3%) in the plastic plant of Setif. The highest rate of fixed capital utilisation was recorded for LNG (86%, 100%)

in the Arzew LNG no. 4 plant. As illustrated in Table 8.9, the value of U1 and U2 for each SONATRACH plant varied between 5% and 92% and between 4.3% and 100%, respectively. The El Asnam plastic plant recorded the lowest fixed capital utilisation (60%, 4.3%) while the Arzew LNG no. 4 plant reached the highest rate of fixed capacity utilisation (86%, 100%). By SONATRACH output, the lowest rate of fixed capital utilisation was obtained for NPK (fertiliser) output (50%, 35%) while the highest rate of fixed capital utilisation was recorded for lubricant output (68%, 129%). SONATRACH as a whole (without the interpetroleum and intergas plants and transport capacities) was inefficient in the utilisation of its fixed capital (U1= 50.04% and U2= 60.26%).

In conclusion, as indicated in Table H.1, rates of fixed capital utilisation are higher in the SONATRACH plants producing LNG and petroleum products (in refineries) than in those producing fertiliser, petrochemical and plastic products. The rate of utilisation of fixed capital is related to the nature of the output produced and to the year of entry in production. The more recently built plants performed at a lower rate than those built earlier. In addition, large scale plants performed at a lower rate than small or medium scale plants. The proportion of skilled workers in a plant also influenced the rate of utilisation of fixed capital in SONATRACH plants.

U3 is calculated by plant output, by plant and for SONATRACH as a whole. In 1980, the actual time utilisation of fixed capital was lower than the technical norm. U3 (for the available figures) amounted to 82.35%. The highest U3 was obtained for the Setif plastic plants which operated as

Table 8.9: SONATRACH plants' fixed capital utilisation in 1980

| Plants | Year of entry in production | U1 | U2 (in percentage) | U3 |
|---|---|---|---|---|
| Arzew LNG no.1 | 1978 | 29 | 83 | 84 |
| Arzew LNG no.2 | 1979 | 64.5 | 83(1) | 84 |
| Arzew LNG no.4 (Camel) | 1964 | 86 | 100 | 84 |
| Skikda LNG no.1 | 1972 | 50 | 90 | 84 |
| Total LNG plants | | 57.37 | 89 | 84 |
| Arzew refinery no.1 | 1972 | 69.78 | - | - |
| Algiers refinery | 1964 | 92 | - | - |
| Skikda refinery no.1 | 1976 | 11.35 | - | - |
| Hassi Messaoud refinery | 1974 | 45.66 | - | - |
| Arzew refinery no.2 | | 65 | 99 | - |
| In Amenas refinery | | 33 | 60 | - |
| Total refineries | | 52.79 | - | - |
| Arzew nitrate ferti. no.1 | 1970/1 | 5 | - | - |
| Arzew nitrate ferti. no.2 | Nat. | - | - | - |
| Annaba nitrate ferti. | 1981 | - | - | - |
| Annaba phosphatic ferti. | 1970 | 28.3 | 69 | 93 |
| Total fertiliser plants | | 16.65 | - | - |
| Arzew petrochemical p. | 1974/6 | 39 | 92.75 | - |
| Skikda petrochemical p. | 1975/8 | 16.25 | 66 | 42 |
| Total petrochemical plants | | 27.7 | 79.37 | - |
| Algiers plastic plants(2) | | 58 | 100 | 94.5 |
| Setif plastic plants(5) | From 1973 | 60 | 4.3 | 100 |
| El Asnam plastic p.(4) | From 1981 | - | - | 60 |
| Total plastic plants(1) | | 59.42 | 31.64 | 84.45 |
| Total SONATRACH (1)(2) | | 50.04 | 60.26 | 82.35 |

Source: Table H.1 in the Appendix H.

1 Calculated from the available figures.
2 Without intergas and petroleum units as well as pipelines.
- Not available.

planned. The LNG plants worked at 84% of their technical norm. The lowest U3, 42%, was recorded by the Skikda petrochemical plant. SONATRACH (from the available figures) used its capacities over four fifths of the time. This ratio is probably one of the best rates among the Algerian public enterprises reviewed. These figures confirm that fixed capital is not used as intensively as it should be in all SONATRACH plants, with the exception of the Setif plastic plants.

The inefficient utilisation of fixed capital in SONATRACH (U1=50%, U2=60%) is more significant than in SONIC (83%, 83%), SNIC (72%, 95%) or SNMC (66%, 92%). The time utilisation of fixed capital, however, is lower in SONIC (80%), SNIC (76%) and SNMC (69%) than in SONATRACH (82%).

### 8.1.3. Utilisation of labour

Just as in SONIC, SNMC and SNIC, the only available measure of the utilisation of labour is the overstaffing rate. According to SONATRACH managers, considering the shortage of available data in Table 8.7, plants are overstaffed. For example, the overstaffing rate amounted to 92% in the fertiliser plants, 60% in the Arzew no. 1 plant and Algiers refinery and 47% in the petrochemical plants. Given these figures, together with the evidence given by the managers, it appears that labour is not used as efficiently as it should be (11).

## 8.2. Common causes of inefficiency in SONATRACH

Now that the underutilisation of the different inputs in SONATRACH plants has been discussed, the various causes of inefficiency are analysed in more detail with specific examples. There are several reasons for the underutilisation of inputs in SONATRACH plants. The main causes associated with the underutilisation of the different inputs, as perceived by the managers and from the analysis, follow.

### 8.2.1. Organisational factors

According to SONATRACH's managers and evidence presented in previous sections, the rates of absenteeism (6.5% for SONATRACH as a whole in 1981) and labour turnover (11% in 1981) are high in all plants. The rate of labour turnover is especially high among technical personnel. In 1980, for example, 85 instrumentalists resigned at the Skikda refinery. The Arzew LNG plant experienced a similar situation, where 14 out of 15 instrumentalists trained by SONATRACH left in 1980. As a result, maintenance work cannot be conducted properly and machines cannot be maintained and repaired regularly. These high labour turnover ratios preclude the accumulation of experience on the part of employees and do not favour the offering of incentives to improve the situation. High rates of absenteeism and turnover are partly due to the low salaries offered by SONATRACH when compared to the other public enterprises. In addition, they are also caused by insufficient social infrastructure such as housing, transport and canteens. According to studies carried out by SONATRACH, for example, 1,450 rooms and houses are needed to accommodate workers (and their families) employed in the injection plants (south). Regarding the transport of personnel, the LNG plants are 12 vehicles short to ensure adequate transportation.

In most SONATRACH plants the quality of intermediate inputs and outputs is up to international standards. There are exceptions, however. Fertiliser, petrochemical and plastic plants have some problems with the quality of their intermediate inputs as well as their outputs. SONIC's plants, as discussed earlier, encountered problems with the intermediate inputs supplied by the Arzew or Skikda petrochemical plants. These intermediate inputs are produced within SONATRACH or are imported. Low quality intermediate inputs has led to stoppages of production processes, more frequent maintenance requirements and deterioration of the machinery, all of which has greatly affected the utilisation of fixed capital and labour.

The overstaffing experienced in SONATRACH is partly due to the adoption of the "learning by doing" method where the position of a foreign technical assistant is duplicated. The very large size of SONATRACH as well as the diversification of its production also create problems. Given that SONATRACH is responsible for the exploitation, production, transport and commercialisation of crude oil, LNG, natural gas and petroleum products as well as housing, transport, training and welfare services of the workers has resulted in tendencies towards gigantism and diversification that is contrary to efficient management. SONATRACH's involvement in a large number of activities of different nature and complexity make its management very complex. According to the managers, the promotional process in SONATRACH plants is also inefficient. Combined with this, both incentives and interest are lacking on the part of the management (12) as well as an absence of human resource policy (13) and norms. Finally SONATRACH plants encounter problems due to a cumbersome bureaucracy and the lack of an efficient economic organisation (14) with clearly defined objectives, positions and procedures.

8.2.2. Shortages of inputs

8.2.2.1. Shortages of raw materials and intermediate inputs

Most of the raw materials used by SONATRACH are obtained locally and are not in short supply, with the exception of a few cases. For example, shortages of supplies such as natural gas at the LNG plants of Arzew no. 2 and Skikda and crude oil at the Arzew no. 1 refineries (for the production of motorfuel and bitumen) have occurred. Shortages of intermediate inputs, however, are frequent in a number of plants such as the refineries and the plastic, petrochemical and fertiliser plants. For example, the refineries ran short of chemicals and packaging goods products necessary for the production and conditioning of lubricants. Shortages of intermediate inputs were caused by the underutilisation of production capacity in the extraction, injection, pumping and reinjection units as well as in petrochemical plants and refineries.

The supply of water and electricity of different voltages (which, as discussed earlier, are in short supply) is, in this case as well, unreliable and inadequate. These shortages create needs for more frequent maintenance and repair duties and, therefore, more frequent work stoppages than anticipated. Fertiliser plants are the most severely affected by these shortages (15). The shortage of raw materials and intermediate inputs affects SONATRACH in a degree similar to SONIC, but to a greater extent than SNMC or SNIC. This is mainly due to the nature of the technology used and to the fact that these shortages affect almost all SONATRACH plants.

8.2.2.2. <u>Shortages of transport and infrastructure</u>

Most of the plants using road and rail as means of transport suffered from the lack of adequate systems. The Algiers and Setif plastic plants, in particular, were greatly affected by the lack of transport facilities. Similarly, all the refineries, particularly the Hassi Messaoud and In Amenas refineries, encountered problems inherent to the shortage of adequate transport, such as obtaining supplies of chemical and packaging goods and collecting finished outputs. The fertiliser plants of Annaba and Arzew were also faced with problems regarding the supply of inputs and removal of outputs. Plants using pipelines and ship carriers to supply their inputs or to remove their outputs, with the exception of the occasional loss of transport mainly due to breakdowns at the injection plants, were affected to a much lesser degree than plants using more conventional transport. Shortages of raw materials, consumable and intermediate inputs as well as the inadequate removal of outputs occurred because of insufficient and worn out means of transport within or outside SONATRACH.

Shortages of infrastructure and, in particular, port infrastructure, which leads to inefficient removal of outputs, affected the Skikda liquefied natural gas plants and the Arzew refinery. These shortages resulted in underutilisation of inputs since the plants had to slow down production.

8.2.2.3.Shortages of skilled labour

From the discussion in the first part of this chapter, SONATRACH lacks skilled workers (30% of its labour force was underqualified). Table 8.10 illustrates the lack of skilled workers by plant. Despite the presence of a large proportion of foreign technical assistants, 2.2% of the total labour force and 6.2% of the total skilled labour force in SONATRACH, the lack of skilled workers is still acutely felt. The lack of a skilled labour force, as discussed earlier, was particularly important at most plastic plants, the Annaba and Skikda fertiliser plants, the Skikda refinery, the Arzew separation unit and the LNG Arzew no. 4 plant. According to the managers, an extra 948 skilled workers are required to meet the technical norms. The lack of skilled workers has serious consequences on the levels of maintenance and repair of production capacities, especially since SONATRACH employs a type of technology which is both capital intensive and sophisticated. As a result, inefficiencies occurred at the technical level. The lack of skilled workers also has dramatic consequences on input utilisation.

Table 8.10: The estimated lack of skilled labour force by SONATRACH plant in 1980

| SONATRACH plants | Managers | Technicians and supervisors | Total |
|---|---|---|---|
| LNG of Arzew 4 | 7 | 54 | 61 |
| LNG of Arzew 1 | 21 | 102 | 122 |
| LNG of Arzew 2 | - | 9 | 9 |
| LNG of Skikda 1 | 4 | 12 | 16 |
| Algiers refinery | 7 | 3 | 10 |
| Arzew 1 refinery | - | - | - |
| Skikda 1 refinery | 18 | 157 | 175 |
| Hassi Messaoud refinery | 4 | 3 | 7 |
| In Amenas refinery | 5 | - | 5 |
| Annaba fertiliser plant | 6 | 57 | 63 |
| Arzew fertiliser plant | 1 | 8 | 9 |
| Skikda fertiliser plant | 12 | 46 | 58 |
| Arzew petrochemical plant | - | 2 | 2 |
| Arzew separation unit | 36 | 133 | 169 |
| Plastic plants | 32 | 209 | 241 |
| Total | 153 | 795 | 948 |

Source: Survey data.

The lack of a skilled labour force, which is much more important in SONATRACH than in SONIC, SNMC or SNIC, may be attributed to the use of its more capital intensive and sophisticated technology. This is confirmed by the presence of a much higher proportion of foreign skilled workers: 2.2% of the total employed labour force in SONATRACH as opposed to 0.2% to 0.4% in SONIC, SNMC and SNIC.

### 8.2.2.4. Shortages of imported spare parts and inputs

Almost all plants are faced with shortages of imported spare parts and inputs. Among those suffering most from the lack of spare parts are the fertiliser plants and the Skikda and Hassi Messaoud refineries. Calculations obtained from these plant managers give an idea of the actual length of time needed to obtain the required imported spare parts. In almost all plants, it takes an average of 13 months for a spare part to be delivered; if the item is not available in the suppliers' stock and has to be specially made following the order, an average of 16.5 to 21 months is needed.

These shortages are the result of several factors. Cumbersome administrative and governmental procedures play an important part. In addition, the planned requirements of imported spare parts and inputs are not always respected by the department of international trade. In 1979, for instance, the Annaba fertiliser plant received only a fifth of the 15,000 tons of sulphuric acid requested. The department of international trade decided to import only 3,000 tons of sulphuric acid for the whole year. According to the AGI allocated, this decision did not take into account the actual requirements of the plant. Consequently, underutilisation of fixed capital and labour occurred in the various workshops using sulphuric acid as an intermediate input. The shortage of imported spare parts is related to the length of delivery time and inefficient stock management. The long delivery time required may be attributed to the fact that spare parts, which often consist of an entire piece of machinery, are not stocked by the suppliers. Furthermore, some plants have problems with their suppliers because of unpaid bills. Finally, according to Algerian import regulations, any order exceeding 200,000 AD must be submitted to the supervisory ministry for approval. In 1980, according to SONATRACH managers, 566 orders, which constituted one third of all imported orders, had to be submitted to the supervisory ministry for approval (one order amounted to an average of 6,000,000 AD). This time-consuming procedure contributed to the absence of some imported inputs. All of these problems together led to higher inefficiencies relative to the lack of imported spare parts in SONATRACH as compared with SONIC, SNMC or SNIC.

8.2.2.5. Shortages of stocking areas

The stocking facilities for inputs and outputs are insufficient in the Algiers and Skikda refineries and all fertiliser plants. They are nonexistent in the Arzew no. 2 refinery and Setif plastic plants. The nonexistent (or insufficient) stocking facilities do not allow plants to secure a given amount of inputs or to stock outputs in periods of low demand. Such problems are, in fact, caused by the special nature, characteristics and seasonal fluctuations of the outputs in these plants. The shortage of inputs may, in some cases, be attributed to the lack of stocking facilities. This in turn leads to underutilisation of the various inputs.

8.2.2.6. Shortages of working capital

The price of some of SONATRACH's outputs, such as fertilisers (considered to be first necessity products), are frozen. These products are supposed to be subsidized by the government. In 1980, for example, the selling price of fertilisers, which had remained unchanged since 1974, covered, on average, only 40% of its production cost. As discussed earlier, the system of subsidies is inadequate. The poor system of fertiliser subsidies resulted in an unsuitable financial structure and eventually, a lack of working capital. Moreover, the price of output includes the state tax, which amounts to 90% of the total price. The remaining 10% does not cover production costs. Given the fact that the tax must, in most cases, be paid before receiving payment from the client, SONATRACH encounters financial difficulties. This situation indirectly affected the inefficient utilisation of various inputs in the different plants.

8.2.3.Allocative inefficiencies

The hydrocarbon branch of industry, which has been developed only recently, makes use of new technological advances which often have not proved their reliability. Consequently, this sector might expect to be faced with a variety of technical problems and difficulties which may lead to inefficient use of its production capacities. Such is the case, for instance, of the Arzew no. 1 refinery and all the LNG, petrochemical (turbo-machines) and plastic plants. In addition, some plants are faced with stoppages or inefficiencies due to the misconception of a machine or production line. The Arzew and Skikda LNG plants and refineries and the Hassi Rmel gas reinjection unit are typical examples of this state of affairs. At Arzew, the steam processor of the LNG plant and various machines in the urea production line of the fertiliser plant are underscaled, resulting in frequent work stoppages. In addition, the separation processes at the Arzew refinery are inadequate, placing the quality of the outputs in jeopardy.

In some cases, such as the Skikda refinery, problems are so serious that the rise in production anticipated and advocated by the contractor cannot be achieved. Another problem, associated with the sophistication of the technology, is mastery of its use. This problem was encountered within the sulphuric acid section of the Annaba fertiliser plant and resulted in irreparable damage to the acid production line. Up to 1979, no decision regarding the replacement of the damaged sulphuric acid production line had been made, despite the fact that no sulphuric acid had been produced since 1975 (the date of the inauguration of the plant).

The necessity to select equipment which enabled the product to be competitive (in the case of LNG) as well as satisfy both the domestic and international markets (in the case of fertiliser) led to the adoption of a substantial production capacity. Since this necessitated special equipment and prototypes, for which it was difficult to estimate performance, a number of problems were encountered. The maintenance of such equipment often requires a permanent body of foreign expertise, raising the high degree of foreign dependence as well as the output production cost in this branch of industry. The available technology is also often best suited for the production of outputs which have specifications in accordance with international or the country of origin's demand. Such technology may not be adequate in the Algerian context and the lack of normalisation and coordination in the acquisition of such production lines may result in the unnecessary accumulation of capital goods. The lack of coordination between the project and operating sector leads to the incompatibility between the techniques used in the production process and the basic product, as was the case for resin, mentioned above.

In addition, SONATRACH encountered other problems related to government policies, the present educational system, import and customs procedures, the inappropriate price system and absence of clear careers and promotion plans.

### 8.2.4. Demand shortages

#### 8.2.4.1. Cutback on oil outputs resulting from the energy crisis

In relation to the world energy crisis, the Algerian government imposed a cutback in the production of crude oil. This fall in production was intentional in order to maintain the international price of oil determined by OPEC (this also resulted in slower exhaustion of Algerian crude oil reserves). In 1982, the Algerian quota was reduced from 740,000 to 650,000 barrels per day. This excludes the production of condensates which exceeded 200,000 barrels per day. In fact, the production of crude oil for 1982 was only 560,000 barrels per day, well below the planned target (16). In contrast to exported petroleum products, amounting to 440,000 barrels per day (a figure which has doubled since 1980), crude oil exports have decreased (17). Following this drop in production, excess capacity occurred in interpetroleum plants such as pumping stations and separation units. The drop in production also had an impact on the utilisation of pipelines and ship carriers.

#### 8.2.4.2. Cancellation of contracts

The Algerian government cancelled the El-Paso gas contract which was originally signed for a 25 year period. The contents of this contract included the export of 11 billion cubic metres of natural gas per annum. In relation to this contract, LNG plants and pipelines were built and ship carriers were bought in order to begin exporting in 1978. Following the cancellation of the El-Paso contract in 1980, excess capacity occurred at the LNG plants, intergas plants (extraction, separation, injection, reinjection and pumping units) and in pipelines and ship carriers, since all were acquired to fulfill the export requirements of this specific contract. These excess capacities, which were caused by commercial constraints, are considered transitory since the Algerian and French governments reached an agreement on the price of gas in January 1982 and new contracts were signed and approved with other countries, such as West Germany, the Netherlands, Belgium and Greece (18). Since 1982, in fact, no excess capacity has been reported at the LNG and intergas plants or at the pipeline and ship levels.

8.2.4.3.Demand deficiencies

Demand deficiencies occurred primarily because plants were built larger than immediate demand warranted due to advantages arising from economies of scale and the anticipation of future demand. The choice of scale was also influenced by the technology available on the international market. Excess capacity exists in the fertiliser plant, for example, since only 1/3 of the present capacity would have been enough to satisfy local demand. No exporting is allowed since a clause in the contract prevents the plant from exporting for at least a period of 10 years. A second reason for demand deficiency was the inefficient distribution system of fertiliser and petrochemical products mainly in central and western Algeria where shortages were recorded. A third reason is that the industry as a whole is relatively vertically integrated but not horizontally integrated. Such is the case of the petro-chemical and plastic plants. For instance, the polyethylene plant was completed 2 years before the ethylene plant although the latter was supposed to use the output of the former (19).

Consequently, for two years the polyethylene plant's capacity was underutilised. In other cases, plants built to provide intermediate inputs for specific plants, which are either still under construction, in the planning stage or have been cancelled due to lack of financial resources, also suffer from an inefficient use of their inputs.

Excess capacity encountered in a number of plants is considered transitory since demand is expected to increase with the construction of new plants or the signing of new contracts. This is not the case, however, for the fertiliser plant, crude oil transport and interpetroleum units. Concerning demand shortages, the situation in SONATRACH presents some similarities with that of SNMC (domestic demand), however, SONATRACH encounters additional commercial constraints due to the energy crisis (international demand).

In conclusion, the causes of inefficiency in SONIC, SNMC, SNIC and SONATRACH are somewhat similar, however, in SONATRACH plants, inefficient input utilisation is mainly due to organisational factors, shortages of imported inputs and spare parts, technical inefficiencies and international commercial constraints.

## References

1 Until 1977, SONATRACH was under the supervision of the Ministry of Industry and Energy.

2 See Chapter Two for more detail.

3 See Temmar, H.: Strategie de Development Independant, le Cas de l'Algerie: un Bilan (OPU, Algiers, 1983) pp 209-210.

4 Ibid.

5 See Sutton, K.: The Algerian Natural Gas Industry. Journal of the Geographical Association, Sheffield, Vol. 64, no.2,

1979, pp 14-20.

6 Refer to 1980 Yearbook of World Energy Statistics, U.N.

7 The 82% consisted of crude oil and petroleum products.

8 1980 Yearbook of World Energy Statistics, op cit.

9 See Table H.2. in the Appendix H.

10 Refer to Actualite: Dossier Energie, no. 854, March 1982, Algiers, pp 4 & 6.

11 This was also stressed by the Minister of Energy and Hydrocarbons in a speech regarding the utilisation of Algerian managers. Reported in El-Moudjahid 13th January 1982, Algiers, p 4.

12 This fact was also reported by the Minister of Energy and Hydrocarbons quoted in El-Moudjahid 13th January 1982, op cit.

13 The absence of a human resource policy was also reported by El Moudjahid 13th January 1982, op cit.

14 The absence of organisation, organisational structure and an efficient plan of career were reported by EL-Moudjahid 13th January 1982, op cit.

15 The Skikda refinery is endowed with a power plant which could not be used during power outages because it was broken down. Refer to Actualite no. 854, op cit. p7.

16 Refer to The Economist Intelligence Unit: Quarterly Economic Review of Algeria, 3rd quarter 1983, op cit. p 12.

17 Ibid.

18 Refer to Table H.2. in the Appendix H.

19 See Schnetzler, J.: Le Developpement Algerien, op cit. pp 12

# CHAPTER NINE : SNS PUBLIC ENTERPRISE

SNS, created on the 3rd of September, 1964, is under the supervision of the Ministry of Heavy Industries. The functions assigned to SNS are in accordance with the national development plan based on Destanne De Bernis' "industrialising industry" strategy (1). Since its creation, SNS has been the main instrument for state intervention in ferrous and non-ferrous metallurgy as well as in the manufacturing of semi-finished and finished ferrous and non-ferrous products. SNS development has been sustained by the need for its outputs created by the various activities undertaken in all other sectors of the Algerian economy. The activities, which SNS encompasses, involve numerous technological stages. For instance, metal cannot be used directly as it leaves the steelmill. It must undergo a series of transformations in order to obtain its desired shape.

Like almost all state-owned enterprises in Algeria, SNS is responsible for all activities related to its outputs. SNS is responsible for: (1) production activities and commerce (import, market development and distribution); (2) management of existing production capacities as well as the creation of new ones according to economic policies (planning investigation, establishment and commissioning of new plants, for example); and (3) the employment of personnel as well as the training of new personnel in all positions and specialisations.

Starting from an almost non-existent steel industry, which consisted of only a few plants under construction at the El-Hadjar complex (2), SNS, in 1981, was comprised of 37 plants totally owned by the state (see Table 9.1). Five other plants

Table 9.1: SNS plants and their respective outputs in 1980

| SNS plants | Year of entry | Unit | Production Technical | 1981 Planned | Actual |
|---|---|---|---|---|---|
| El Hadjar complex | | | | | |
| -Cast iron no.1&2 p. | | | | | |
| -Coke | 1980 | Tons | 1,230,000 | 318,977 | 449,035 |
| -Conglomerate | 1980 | $10^3$ tons | 2,300 | 2,216.3 | 1,509 |
| -Liquid cast iron | 1969/81 | " " | 1,760 | 1,236.3 | 897.1 |
| -Oxygen steelmill no.1 | 1972 | | | | |
| -Liquid steel | | Tons | 1,400,000 | 686,605 | 418,205 |
| -Blooms | | Tons | 1,300,000 | 184,800 | 418,205 |
| -Oxygen steelmill no.2 | 1981 | | | | |
| -Liquid steel | | Tons | 700,000 | 268,958 | 41,859 |
| -Billettes | | Tons | 600,000 | 227,513 | 41,859 |
| -Electrical steelmill | 1975 | | | | |
| -Liquid steel | | Tons | 180,000 | 97,823 | 72,704 |
| -Iron ingot | | Tons | 123,000 | 80,523 | 69,704 |
| -Hot rolling mill | 1972* | Tons | 1,330,000 | 546,699 | 331,919 |
| -Coils | | Tons | - | 510,715 | 320,289 |
| -Thick iron sheet | | Tons | - | 35,984 | 11,630 |
| -Cold rolling mill | 1974 | Tons | 750,000 | 187,115 | 180,288 |
| -Iron sheets | | Tons | - | 100,429 ) | |
| -Galvanised iron sheet | | Tons | - | 86,686 ) | 180,288 |
| -Wire & round mill | 1978 | Tons | 540,000 | 512,230 | 392,482 |
| -Rim for wire drauwing | | Tons | - | 82,817 ) | |
| -Rim for round | | Tons | - | 230,955 ) | 238,300 |
| -Rounds in bars | | Tons | - | 198,458 | 154,182 |
| -Seamless tubes mill | 1977 | Tons | 70,000 | 46,738 | 40,461 |
| -Cast | | Tons | - | 37,241 ) | |
| -Pipelines | | Tons | - | 9,497 ) | 40,461 |
| -Welded tubes mill | 1969 | | | | |
| -Welded tubes | | Tons | 100,000 | 51,833 | 63,987 |
| Transformation group Tubes and flat products division | | | | | |
| -Reghaia big tubes p. | Nat. | Tons | 100,000 | 56,177 | 54,208 |
| -Tube & welded tube | | Tons | - | 22,890 | 21,154 |
| -Coated tube | | Tons | - | 33,287 | 33,054 |
| -Reghaia small tube p. | Nat. | Tons | 35,000 | 33,903 | 30,078 |
| -Gas tube | | Tons ) | | 24,499 | 21,354 |
| -Thin tube | | Tons ) | 35,000 | 9,404 | 8,724 |
| -Reghaia cold steelmill | 1975 | Tons | - | 181,193 | 144,179 |
| -Thin iron sheet | | Tons | 130,000 | 119,622 | 92,622 |
| -Welded tube | | Tons | - | 1,891 | 2,055 |
| -Sundry items | | Tons | 93,000 | 60,070 | 49,502 |
| -Ghardaia spiral tube | 1977 | | | | |
| -Welded iron tube | | Tons | 110,000 | 103,615 | 68,714 |

(Table continues on the following page.)

Table 9.1. (Continued)

| SNS plants | Year of ntry | Unit | Production Technical | 1981 Planned | Actual |
|---|---|---|---|---|---|
| Long products division | | | | | |
| -Oran steelmill | Nat. | Tons | 110,000 | 104,303 | 94,287 |
| -Iron ingot | | Tons | 31,500 | 29,303 | 24,998 |
| -Round | | Tons | 80,000 | 67,000 | 61,240 |
| -Welded wire mesh | | Tons | 10,000 | 8,000 | 8,049 |
| -Oued Smar electrode p. | Nat. | | | | |
| -Electrode | | Tons | 300,000 | 99,960 | 69,613 |
| -Sig nail plant | 1979 | Tons | 27,120 | 26,792 | 17,980 |
| -Wire drawing | | Tons | 13,000 | 14,451 | 8,925 |
| -Nail | | Tons | 15,000 | 12,210 | 8,925 |
| -Clip | | Tons | 2,000 | 131 | 130 |
| -Annaba welded wire mesh & metalic beam p. | 1979 | | | | |
| -Welded wire mesh | | Tons | 14,000 | 12,063 | 12,002 |
| -Metallic beam | | Tons | 12,000 | 12,407 | 992 |
| -Nail | | Tons | - | 1,013 | 750 |
| -Reghaia welded wire mesh & metallic beam p. | 1979 | | | | |
| -Metalic beam | | Tons | 6,000 | 4,788 | 1,017 |
| -Welded wire mesh | | Tons | 20,000 | 9,934 | 9,800 |
| -El Eulma electrode p. | 1979 | | | | |
| -Electrode | | Tons | 260,000 | 100,000 | 59,422 |
| -Extruded wire | | Tons | 32,000 | 27,255 | 20,371 |
| Metallic contains division | | | | | |
| -Kouba packaging plant | Nat. | Tons | 50,239 | 33,683 | 32,189 |
| -Barrel | | Tons | 6,135 | 1,519 | 1,736 |
| -Preserve can | | Tons | 36,000 | 25,232 | 23,622 |
| -Gas bottle | | Tons | 8,104 | 6,932 | 6,831 |
| | | Unit | - | 649,600 | 568,339 |
| -Arzew packaging plant | 1976 | | | | |
| -Packaging containers | | Tons | 19,169 | 9,886 | 9,623 |
| -Kouba aluminum plant | Nat. | Tons | 4,434 | 2,453 | 1,987 |
| -Kitchen utensile | | Tons | | 924 | 876 |
| -Other goods | | Tons | 4,434 | 1,529 | 1,111 |
| -Batna packaging plant | 1979 | | | | |
| -Gas bottle | | Tons | 10,611 | 9,774 | 9,689 |
| | | Unit | - | 773,600 | 705,359 |
| -Mascara packaging pla. | 1980 | | | | |
| -Small gas bottle | | Tons | 11,512 | 1,642 | 568 |
| -Other items | | Unit | 5,000,000 | 620,000 | 240,500 |

(Table continues on the following page.)

Table 9.1. (Continued)

| SNS plants | Year of entry | Unit | Production Technical | 1981 Planned | Actual |
|---|---|---|---|---|---|
| Salvage division | | | | | |
| -Central salvage plant | Nat. | Tons | - | 291,265 | 288,682 |
| -East savage plant | Nat. | Tons | - | 60,306 | 61,933 |
| -West salvage plant | Nat. | Tons | - | 37,843 | 27,786 |
| Non ferrous transformation group | | | | | |
| -Ghazaout zinc electrolysis plant | 1975 | Tons | 150,350 | 85,091 | 80,824 |
| -Zinc ingot | | Tons | 40,150 | 33,000 | 35,696 |
| -Cadmium | | Tons | 200 | 91 | 85 |
| -Sulphur acid | | Tons | 90,000 | 50,000 | 43,372 |
| -Zamac | | Tons | 20,000 | 2,000 | 1,671 |
| -Prosider p. | | | | | |
| -Cold rolled flat iron | | Tons | - | 4,375 | 3,700 |
| -Various products | | Tons | - | 3,893 | 3,600 |
| Industrial gas group By outputs | Nat. | | | | |
| -Acetylene | | $10^3$ $m^3$ | 2,704 | 1,327 | 1,799 |
| -Oxygen | | " " | 18,720 | 4,760 | 4,507 |
| -Liquid oxygen | | " " HL | 15,193 | 11,040 | 6,534 |
| -Nitrous oxide | | Tons | 360 | 120 | 111 |
| -Nitrogen gas | | $10^3$ $m^3$ | 12,192 | 154 | 252 |
| -Liquid nitrogen | | HL | 22,311 | 17,958 | 20,942 |
| -Hydrogen | | $10^3$ $m^3$ | 280 | 77 | 70 |
| -Carbon dioxide | | Tons | 48,800 | 4,956 | 5,644 |
| -Argon | | $10^3$ $m^3$ | - | 68 | 60 |
| -Liquid argon | | $10^3$ L | 194 | 120 | 67 |
| -Compressed air | | $10^3$ $m^3$ | - | 18 | - |

Source: Table J.1 in the Appendix J.

* Extended.

were on stream and a few more under construction or in the planning stage. SNS inherited one steelmill (Acilor (3)) and ten metallurgy plants (4). The former produces iron ingots, rounds and welded wire mesh, while the latter produce tubes, electrodes, metal packaging products, aluminum kitchen utensils and industrial gases, to name only a few. SNS also inherited three metal salvage plants. The pre-independence plants were progressively nationalised between 1968 and 1974. Several other plants were built as part of the implementation of various development plans, such as the El-Hadjar complex, which has become one of the country's major industrial centres mainly geared to the production of flat products. Subsequently, in 1981, SNS had grown into an organisation employing about 40,000 workers, 2.8 times the number in 1973. Between 1973 and 1978, SNS sales revenue grew by a factor of 3.4 to 3.68 billion AD and its fixed assets grew by a factor of 4.3 to 13.66 billion AD (5).

As illustrated in Table 9.1, SNS annual cast iron capacity is 1.76 million tons and its annual steel capacity is 2.3 million tons. The first stage rolling mill production capacity is 2.28 million tons: 1.33 million tons for the hot rolling mill and 0.75 million tons for the cold rolling mill. Second stage facilities are involved in the manufacture of a whole range of finished products such as seamless tubes, wire and round products, welded wire mesh, gas bottles and black and white metal packaging products. The annual capacities of these outputs by plant are given in detail in Table 9.1. Despite the substantial development experienced by this sector, SNS does not produce large quantities of iron and steel products to satisfy local market demand. In 1980, Algeria had to import about 75% of its steel and iron needs (6).

SNS is a divisionalised organisation (see Chapter Four). As indicated in Figure 9.1, SNS is made up of five different groups. The first group is the El-Hadjar complex, comprised of 12 plants involved in the transformation of iron and in first and second stage manufacturing. Included in this complex are one coking plant, two cast iron mills, three steel making mills, one hot and one cold rolling mill, one wire and round mill, one seamless tube mill, one welded tube mill and one galvanised tube workshop. Next, the transformation group consists of four divisions. The first, the long products division, is a regrouping of the plants producing welded wire mesh, electrodes, light metallic beams and nails. The second division, flat and tube products, is comprised of plants producing welded gas and coated tubes. The third division is the metallic containers division which consists of plants manufacturing gas bottles, various metal packaging containers and aluminum kitchen utensils. Finally, the fourth division is salvage, a regrouping of the plants specialised in metal scraps and salvage. The three remaining groups are the non ferrous transformation group (one plant producing zinc), the industrial gas group (five plants producing various gases) and the commercial group which is in charge of the distribution of local outputs and the importation of inputs and finished products for which SNS retains the monopoly. Each group has its own head office. The training centres and the equipment and promotion departments are managed by the SNS head office. The organisational structure of SNS is neither divisionalised solely by products nor by regions nor by functions but is a mixture of the three. The El-Hadjar complex, which comprises about one third of the SNS plants, prompted the formation of

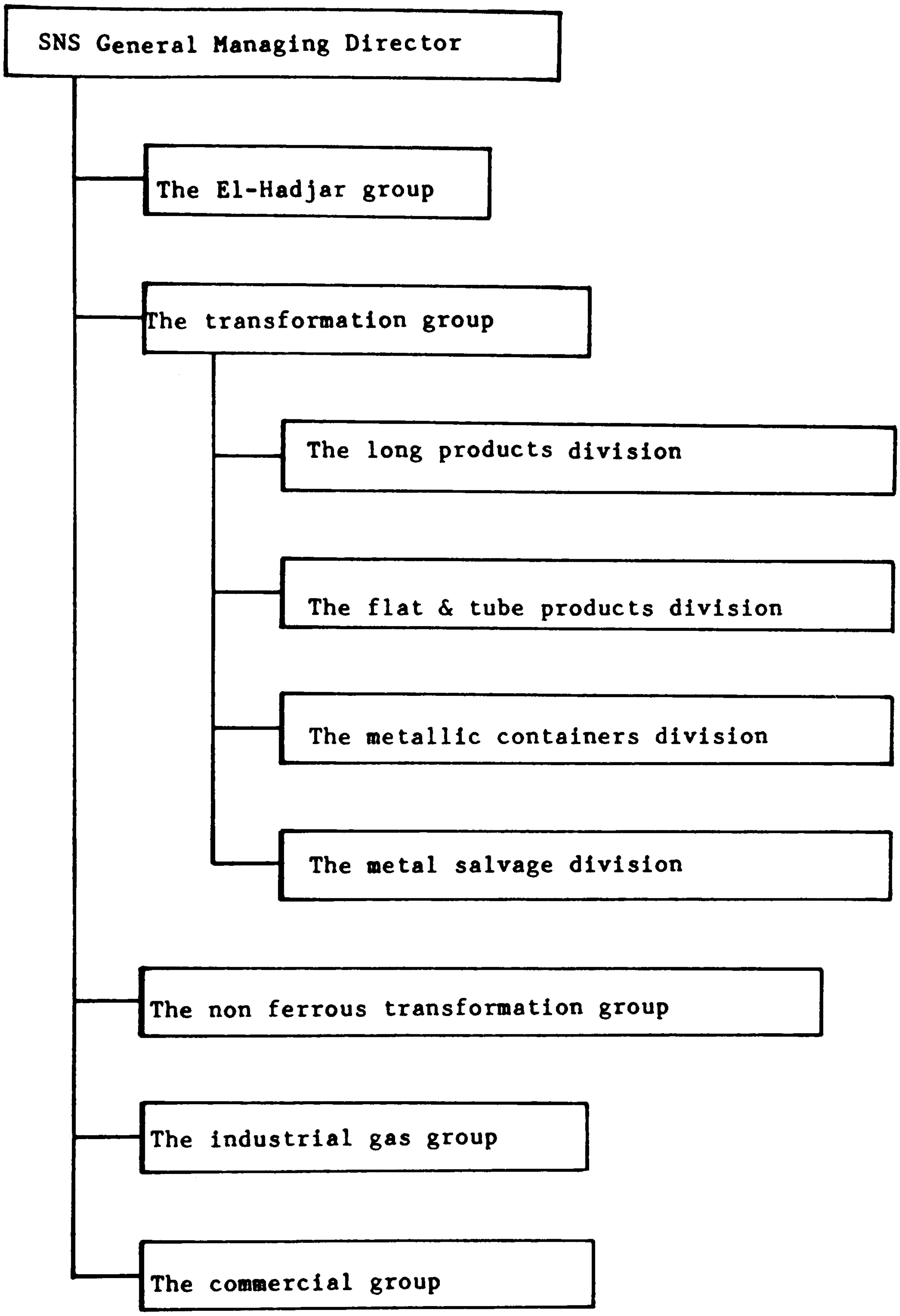


Figure 9.1 : SNS organisational structure in 1980.

Source : Survey data.

the El-Hadjar group. Similarly, the commercial group is the outgrowth of the enormous imports (75% of the local demand) for which SNS is responsible. The organisational structure of SNS is characterised by different problems which will be discussed later. Since 1981, SNS has been in the process of being restructured into sixteen different public enterprises (see Appendix B.2).

All SNS plants except the flat steel and industrial gas plants of Ghardaia and Ouargla, respectively, are situated in the northern part of Algeria. The reasons for the geographical imbalance between the south and the north are mainly due to natural resources (water) and climatic constraints. In addition, most SNS plants are concentrated in the north-east (the El-Hadjar complex) in Annaba. This is due to their proximity to the Ouenza iron ore mine which is located about 200 km south of Annaba. Prior to 1964, the entire production of the Ouenza mine was exported but, since then, the increasing activities of the El-Hadjar complex have required a larger proportion of the Ouenza mine production, reaching 36% in 1978. This complex is expected to use the entire iron ore production of the Ouenza mine by 1999.

SNS, with the largest industrial complex in Algeria, is the second largest public enterprise after SONATRACH as a result of the large investment share received by this branch of industry. The range of outputs produced by SNS is wider than that of SONIC or SNIC, for example. With respect to its organisational structure, SNS is grossly comparable to SNMC. In addition, the concentration of the different plants and complexes in the northern region is similar to all public enterprises reviewed so far.

As mentioned earlier, SNS has grown into a large public enterprise. By 1981, SNS owned 14 pre-independence and 23 post-independence plants. All pre-independence plants producing finished steel products use French steel technology (see Table J.2 in the Appendix J). The only pre-independence steel processing plant is the steelmill of Oran which uses French technology as well (Martin's furnace). The latter plant is also supplied with ingots and blooms which are either imported or produced at the El-Hadjar complex. The post-independence plants involved in first stage iron and steel processing use technology imported mainly from the USSR, France, GFR and Italy; plants producing semi-finished outputs use technology from the USSR, Italy, Great Britain and GFR; and plants manufacturing finished outputs a technology from France, GFR, Austria and England. In addition, the three salvage plants, nationalised in 1968, use French technology. Two principal channels of production (the classical process based on the reduction of coke or direct reduction by natural gas) are used by SNS plants and complexes and, particularly, by the El-Hadjar complex.

Regarding the scale of the different SNS plants, the pre-independence plants can be classified as small or medium-scale plants and the post-independence plants as large-scale plants. This breakdown is attributed both to factors concerning the availability of the technology (as pointed out in the SONIC Chapter) and to the origin of the technology. For example, West German technology is associated with medium scale plants while Russian technology is associated with large scale plants. A similar situation exists in all of the public enterprises reviewed this far.

SNS plants can be divided into monoproduct and multiproduct plants specialised in the production of cast iron and steel, in the manufacturing of semi-finished and finished ferrous products and in the processing of non ferrous and industrial gas products. As indicated in Table 9.1, only 21.6% (eight plants, of which three were built before independence) of the plants are monoproduct plants while the remaining 78.4% are multiproduct plants. In the public enterprises studied so far ( see previous chapters), multiproduct plants are generally highly integrated. In SNS, however, this implication is not always true, with the exception of the El-Hadjar complex which is highly integrated. The different multiproduct and monoproduct plants cannot be regarded as highly integrated.

As in all public enterprises in Algeria, SNS holds a monopoly in international trade regarding any products entering its sphere of activities. Since SNS imports large quantities of non-ferrous products such as aluminum, zinc and copper as well as ferrous semi-finished and finished products such as cast iron, long and flat products, gas bottles and seamless products all of which are destined to both SNS plants and other public and private enterprises, its international trade activity is very important. This situation is common to all public enterprises investigated. On the other hand, export activity has not been developed except when exports were used as a partial repayment of credit or in the case of excess supply at an early stage of production. The few products (copper, zinc and special cast iron) which are presently exported are only exported because they cannot be used or processed in Algeria. The low level of development of export activity compared to SONATRACH is mostly due to the fact that domestic production is insufficient. The lack of price competition and promotionnal and service facilities, however, do not favour an increase in the activity of this branch of international trade at the present time.

Locally, the production of semi-finished ferrous products and non-ferrous semi-finished and finished outputs is monopolized by SNS. The production of finished metal products, which is shared with private firms producing mainly metal kitchen utensils, is not the monopoly of SNS. The participation of the private sector is, however, minimal and consequently SNS does not encounter fierce local competition. Such a situation implies that this branch of industry is still underdeveloped.

The degree of dependency on imported inputs can be deduced from Table 9.2, which shows the origin of the main inputs. In 1978, 176 million AD worth of spare parts were imported. This constituted about 35% of the SNS imports, including capital goods, which were part of the investment plan (7) for that year. The high figure comes from the fact that the entire stock of capital goods is imported. Table 9.2 indicates that almost all the necessary raw materials, with the exception of the entire supply of coal and part of the coke and fine coke, are provided by the local market. In fact, the coking plant, which started production in 1980, should supply almost all the coke needed in the future. Fine coke, however, will still be imported. Coal used in the coking plant is imported because of the prohibitive price of transport within Algeria (the only coal mine in operation is located in the southwest). White iron, zinc and aluminum are also imported due to their scarcity in the local market. A large proportion of intermediate inputs is provided by the local market or produced

Table 9.2 : Origin of SNS inputs

| INPUTS \ OUTPUTS | Coke | Steel & cast iron | Ingots & blooms | Coils & bars | Heavy iron sheets | Thin iron sheets | Galvanised sheets | Small beams | Rails | Round of concrete | Water pipes | Machine wire | Electrodes | Nails | Different contain. | Zinc products | Aluminum utensiles | Different gases | Welded wire mesh | Seamless tubes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **RAW MATERIALS AND INTERMEDIATE INPUTS** | | | | | | | | | | | | | | | | | | | | |
| WITHIN SNS | | | | | | | | | | | | | | | | | | | | |
| Cast iron & steel | | | * | * | | | | | | | | | | | | | | | | |
| Scrap iron | | * | * | | | | | | | | | | | | | | | | | |
| Thin & heavy iron sheets | | | | | | | * | | | | * | | | * | * | | | | | * |
| Galvanised iron sheets | | | | | | | | | | | | | | | * | | | | | |
| Tin plated sheets | | | | | | | | | | | | | | | | | * | | | |
| Machine wires | | | | | | | | | | | | | * | | | | | | * | |
| Blooms & coils | | | | | * | * | | | | | * | | | | | | | | | * |
| Zinc oxyd & aluminum | | | | | | | * | | | | | | | | | * | * | | | |
| $O_2$ $H_2$ $NCO_2$ | | * | * | | | | | | | | | * | | | | | | | | |
| Iron ingots & bars | | | | | | | | * | | * | | * | | | | | | | | * |
| Electricity & coke | 50% electricity & 30% coke | | | | | | | | | | | | | | | | | | | |
| LOCAL MARKET | | | | | | | | | | | | | | | | | | | | |
| Iron ore | | * | | | | | | | | | | | | | | | | | | |
| Fuel oil & Water | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Electricity & gas | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Paint & varnish | | | | | | | | | | | | | | | * | | | | | |
| Hydrocarbon compound | | | | | | | | | | | | | | | | | | * | | |
| Motor vehicles | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Lime | | * | | | | | | | | | | | | | | | | | | |
| Railways | * | * | * | * | * | * | * | * | * | * | * | * | * | | | | | | * | * |
| Packaging materials | | | | | | | | | | | | | | * | | | | | | |
| Spare parts | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| INTERNATIONAL MARKET | | | | | | | | | | | | | | | | | | | | |
| Fine coke & coal | * | * | | | | | | | | | | | | | | | | | | |
| Argon | | | | | | | | | | | | | | | | | | * | | |
| Carbon dioxyd gas | | | | | | | | | | | | | | | | | | * | | |
| Iron ingots & sheets | | | | * | | | | | | | | | | | * | | * | | | * |
| White iron | | | | | | | | | | | | | | | | | | | | |
| Steel & tin | | | * | * | | | * | | | | | | | | | | | | | |
| Crude zinc | | | | | | | | | | | | | | | | * | | | | |
| Aluminum & combination | | | | | | | | | | | | | | | | | * | | | |
| Billets & coils | | | | | | | | | | * | * | * | | | | | | | | * |
| Iron bars | | | | | | | | | | * | | * | | | | | | | | |
| Spare parts | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| FIXED CAPITAL | 100% imported | | | | | | | | | | | | | | | | | | | |
| LABOUR — Foreign | 0.5% | | | | | | | | | | | | | | | | | | | |
| LABOUR — Local | 99.5% | | | | | | | | | | | | | | | | | | | |

* States the origin of the input without specifying the proportion.

Source : Survey data.

within SNS. Some semi-finished and intermediate inputs such as steel and iron coils, billets and ingots are also imported to make up for insufficient local production. The dependence on imported inputs in SNS is comparable to that of SONIC.

The destination of the various SNS outputs is indicated in Table 9.3. The different outputs consist of semi-finished and finished goods intended mainly for the local market. The semi-finished outputs are used equally by SNS and other branches of industry such as the metal equipment, electrical, electronic and mechanical engineering industries. For example, in 1978, half of the 1.75 million tons of semi-finished outputs were used within SNS. Finished outputs are used by the agricultural, hydraulic and industrial sectors and the health services (industrial gases). The only output directly used by consumers is also produced by the private sector (kitchen utensils). SNS is oriented towards the production of semi-finished and finished outputs for intermediary use (modified or not) due to the nature and the level of integration of this branch of industry. The production of consumer goods is not part of the principal SNS activities. As already discussed, exports involve only a few products such as special cast iron, heavy and thin iron sheets, industrial gas (liquified nitrogen) and scraps from salvage plants which do not have any use in Algeria.

The SNS labour force is described in Tables 9.4 and J.3 in the Appendix J. Similar to other enterprises, the SNS labour force can be divided into three categories: managers, technicians and supervisors and semi-skilled and unskilled workers. As indicated in Figure 9.2, in 1980 only 5% of the total labour force were managers, 13% were technicians or supervisors and 78% were semi-skilled or unskilled workers.

TABLE 9.3 : Destination of SNS outputs.

| SCOPE OF ACTIVITY | | SECTORS OF UTILISATION / MAIN PRODUCTS | DOMESTIC MARKET: INTERMEDIATE USE: SNS: Within plant | Within SNS | Agriculture | Hydraulic | Preserves | Militart use | Building construc. I | Transport | Energy | Machinery construct. | Metal equip-ment ind. | Electronic& electric I | Chemicals industry | Infrastruc. pubic works | Public health | Final use: Consumers | EXPORTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CURRENT STEELS | SMELTING | Smelting-cast iron | * | * | | | | | | | | * | | | | | | | * |
| | FLAT PRODUCTS | Heavy sheets | * | * | | | | * | | | | * | * | | | | | | * |
| | | Thin sheets | * | * | | | | | | | | * | * | * | | | | | * |
| | | Galvanised sheets | * | | | | | * | * | | | * | * | | | * | | | |
| | | White iron sheets | * | | | | | | | | | | | | | | | | |
| | | Coils | * | * | | | | | | | | | | | | | | | |
| | LONG PRODUCTS | Round of concrete | | | | | | * | * | | | | | | | * | | | |
| | | Small beams | | | | | | * | | | | | * | | | * | | | |
| | | Rails | | | | | | | | * | | | | | | | | | |
| | | Machine wire | * | * | | | | | * | | | | | | | * | | | |
| SPECIAL STEELS | | Bars | * | | | | | | | | | * | | | | | | | |
| | | Long products | | | | | | | | | | * | | | | | | | |
| | | Flat products | | | | | | | | | | * | | | | | | | * |
| TUBES AND TRANSFORMATION OF FLAT PRODUCTS | | Seamless tubes | | | | * | | | | | * | * | | | | | | | |
| | | Water pipes & other pipes | | | * | * | | | | | * | | | | | * | | | |
| | | Thin tubes | | | | | | | * | | | | * | | | | | | |
| | | Ribbed sheets | | | * | | | | * | | | | * | | | * | | | * |
| | | Lacquered sheets | | | | | | | * | | | | * | * | | | | | |
| | | Other cold rolling mill prod. | | | * | | | | * | | | * | * | | | | | | |
| TRANSFORMATION OF LONG PRODUCTS | | Welded wire mesh | | | * | | | * | * | | | | | | | * | | | |
| | | Nails | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | |
| | | Wires | | | * | | | | * | * | | * | | | | * | | | |
| | | Electrodes | | | | | | | * | | | | | * | | | | | |
| METALLIC CONTAINERS | | Cans & various containers | | | | | * | | | | * | | | | | | | | |
| | | Barrels & boxes | | | | | * | | | | * | | | | * | | | | |
| | | Gas bottles | | | | | | | | | * | | | | | | | | |
| RECOVERY NON-FERROUS METALS INDUSTRIAL GAS | | Scrap iron | * | * | | | | | | | | * | * | | | | | | * |
| | | Zinc products | * | * | | | | | | | | * | * | * | * | | | | * |
| | | Aluminum utensiles | * | * | | | | | | | | * | * | * | * | | | * | * |
| | | Different gases | * | | | * | * | | * | | * | * | * | * | * | * | * | | * |

* indicates the destination of the output without specifying the proportion which is not available.

Sources: SNS Annuaire Statistique 1962-78 (SNS, p 17, December 1980)and survey data.

More than half of the workers in the third category are unskilled workers. In the El-Hadjar complex, for example, out of 57% of the labour force who were semi-skilled and unskilled workers, 60% were unskilled workers (34% of the total labour force). The percentage of skilled workers, which was low for SNS as a whole, was low as well for each SNS plant. Taking the El-Hadjar complex example once more, only 15% of the total labour force were managers, technicians and supervisors. The latter figure is very representative of the lack of skilled workers throughout SNS since nearly half of the total SNS labour force is employed in this complex. A similar situation was encountered in the metallic containers, zinc electrolysis, salvage and tubes and transformation of flat products divisions where only 14.5%, 15%, 8.3% and 19% of the workers were qualified as managers and technicians or supervisors, respectively. The lack of skilled workers at the division level is reflected by the lack of a skilled labour force at the plant level. The figure given would be even lower if only the number of workers in the plants were considered (61.6% of the total SNS skilled workers). The number of skilled workers is not related to the scale or age of the plant but to the location of the plants. The plants located on the coast and in large cities showed a higher percentage of skilled workers than those located in small town and inland areas.

The foreign labour force employed by SNS amounted to only 0.5% of the total labour force. It accounted, however, for 8.6% of the total SNS managers. According to SNS managers, the rate of absenteeism and labour turnover are high in all the plants and especially in plants located in large cities. No figures are available to clearly support these statements,

Table 9.4: SNS personnel in 1980

| Skill category<br>Groups and head office | Managers (1) | Managers (2) | Technicians/ supervisors (1) | Technicians/ supervisors (2) | Semi-skilled/ unskilled (1) | Semi-skilled/ unskilled (2) | Total (1) | Total (3) |
|---|---|---|---|---|---|---|---|---|
| El Hadjar complex | 533 | 3 | 2,339 | 12 | 14,685 | 80 | 18,166 | 46.7 |
| Transformation gr. | 274 | 3.2 | 1,022 | 11.9 | 7,287 | 84.9 | 8,583 | 22.1 |
| -Long products div. | 85 | 3.7 | 250 | 11 | 1,895 | 83 | 2,267 | 5.8 |
| -Tubes & flat products division | 102 | 4 | 367 | 15 | 1,972 | 80 | 2,451 | 6.3 |
| -Metallic containers division | 73 | 2.5 | 336 | 11.5 | 2,505 | 85 | 2,915 | 7.5 |
| -Salvage division | 14 | 1.4 | 69 | 6.9 | 915 | 91 | 998 | 2.5 |
| Non-ferrous transformation group | 24 | 3 | 104 | 12 | 692 | 84 | 820 | 2.2 |
| Industrial gas group | 22 | 2.8 | 151 | 19 | 612 | 78 | 785 | 2 |
| Total SNS plants | 853 | 3 | 3,616 | 12.7 | 23,276 | 81.9 | 28,402 | 73.1 |
| Distribution group | 74 | 4.4 | 170 | 9.6 | 1,526 | 86 | 1,770 | 4.5 |
| Head office | 483 | 25 | 423 | 22 | 848 | 43 | 1,956 | 5 |
| Project | 444 | 7.8 | 901 | 16 | 4,284 | 75 | 5,676 | 15 |
| Promotion division | 40 | | 54 | | 307 | | 401 | 1 |
| Training centres | 72 | | 116 | | 165 | | 353 | 0.9 |
| Total SNS | 2,017 | 5 | 5,335 | 13 | 30,573 | 79 | 38,839 | 100 |
| -Foreigners | 174 | 8.6 | 7 | | 16 | | 197 | 0.5 |

Source: Table J.3 in the Appendix J.

1 Total by skill category in the complex, division, group, head office & SNS as a whole.
2 % of total labour force by skill category in the complex, division, group, head office & SNS as a whole.
3 % of total managers, technicians & supervisors, semi-skilled & unskilled workers in the complex, division, group and head office.

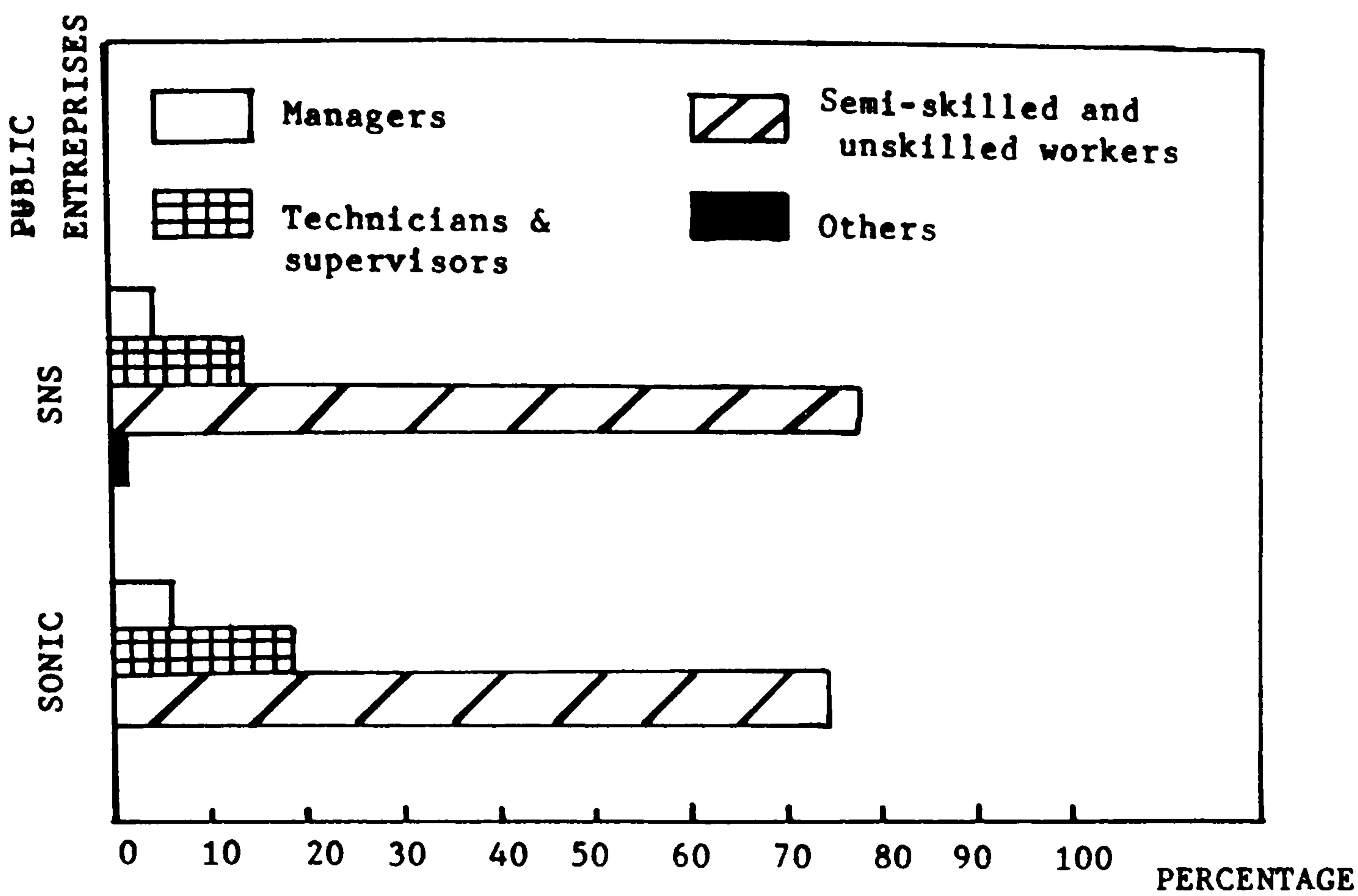


Figure 9.2 : Percentage of labour force by skill category in SNS and SONIC.

Sources : Tables 5.4 & 9.4.

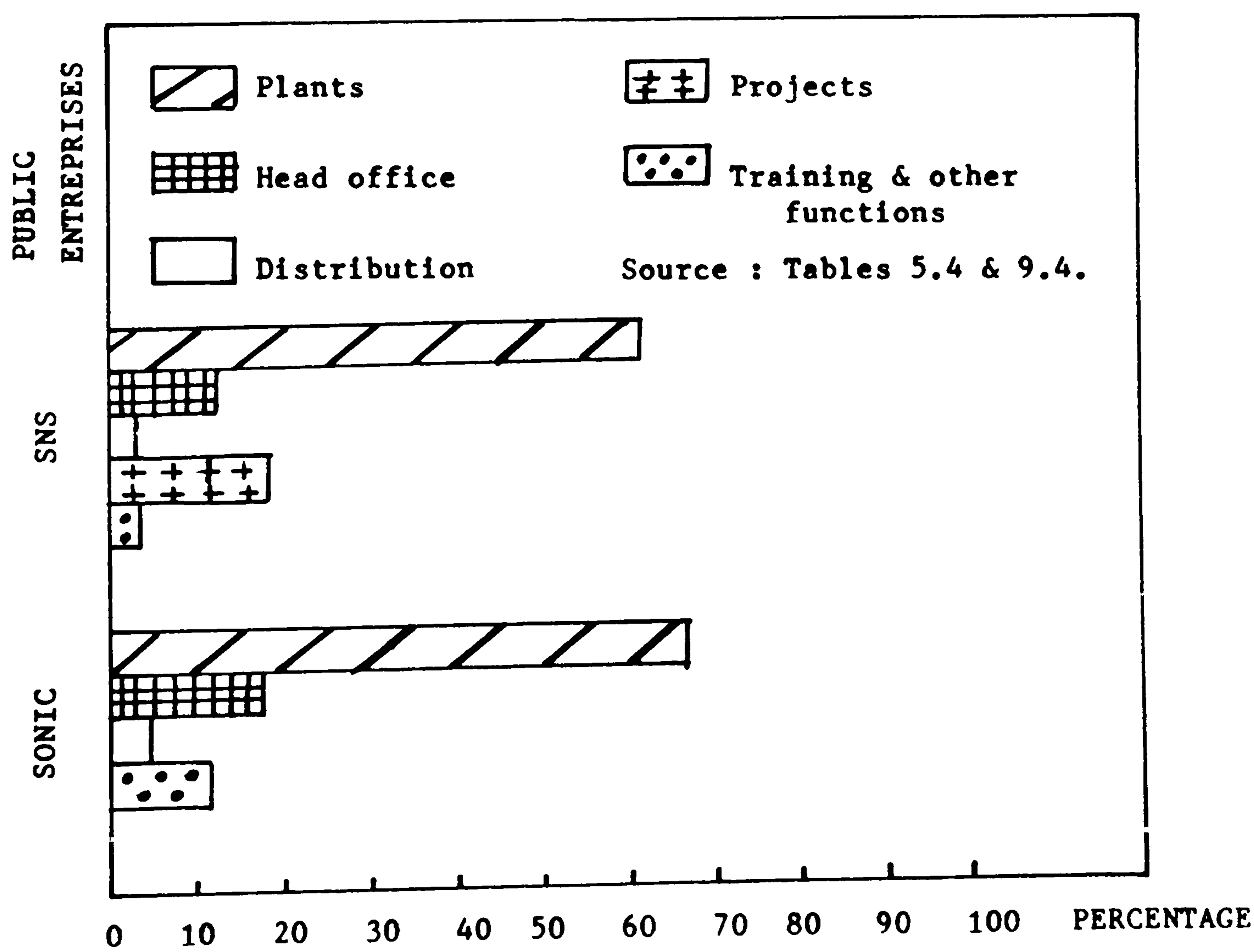


Figure 9.3 : Percentage of skilled labour force by function in SNS and SONIC.

except for the rate of absenteeism at the El-Hadjar complex, which amounted to 25% (8).

As indicated in Figure 9.2, SONIC is better provided with skilled workers than SNS (24% of the SONIC labour force are managers, technicians and supervisors compared to only 18% for SNS). This difference is further accentuated by the fact that a larger proportion of the skilled labour force was working in SONIC plants than SNS plants (see Figure 9.3). The lack of skilled workers affects SNS to a greater extent than SONIC.

## 9.1.Utilisation of inputs

### 9.1.1.Utilisation of raw materials and intermediate inputs

There is no real evidence, based on the contractor's norms, to show that raw materials and intermediate inputs are used inefficiently. The fact that blast furnaces are in continuous operation yet produce only about 70% of their planned production (6) implies, however, that electricity and natural gas are not used efficiently. In addition, according to SNS's managers, the proportion of scrap is higher than that advocated by the contractor. Despite the fact that scrap is usually recycled, this also tends to indicate that raw materials and intermediate inputs are not utilised efficiently. Underutilisation of raw materials and intermediate inputs results in underutilisation of fixed capital and labour and vice versa, and in drops in production and increases in production costs. It is very difficult to assess with precision the extent of this overconsumption of these inputs, however, one can conclude that it is similar to that encountered in SNMC or SONATRACH.

### 9.1.2.Utilisation of fixed capital

Following the definitions given in Chapter Four, U1 (ratio of actual over planned capacity) and U2 (ratio of planned over technical capacity) have been calculated for SNS. The results for 1981 are given in Tables J.1 in the Appendix J, 9.5 and 9.6. These rates are calculated for each plant output, for each SNS plant, for each SNS group and for SNS as a whole. As indicated in Table J.1, which gives plant output rates of fixed capital utilisation, U1 varied between 15% and 277% and U2 ranged from 1.26% to 111%. The highest rate of fixed capital utilisation by plant output, taking both U1 and U2 into account, was obtained for welded wire mesh (100%, 94%) at the Oran steelmill. The lowest rates of capacity utilisation were recorded for small gas bottles (34%, 14%) and liquid steel (15%, 38.4%) at the packaging plant of Mascara and the oxygen steelmaking plant no. 2, respectively.

The value of U1 calculated for each SNS plant in 1981 ranged from 16.5% to 168.5% while the value of U2 varied between 13% and 97% (see Table 9.5). The highest rates of fixed capital utilisation, when U1 and U2 are simultaneously analysed, were obtained for the packaging plant of Batna (98%, 92%) and for the small tube plant of Reghaia (89.5%, 97%). The lowest rates of fixed capital utilisation were recorded for the packaging plant of Mascara (36.5%, 13%) and the electrode plant of Oued Smar (69%, 23.2%). Given the available figures, the transformation group (81.35%, 65.89%), and by the El-Hadjar complex group (89.46%, 53.71%), performed better than the other groups. The lowest rates of fixed capital utilisation was recorded by the industrial gas group (90.18%, 40%). Analysing the fixed capital utilisation rates obtained for SNS as a whole, it appears that fixed capital was inefficiently used (U1= 85.6% and U2= 57.69%).

According to Table 9.6, the pre-independence plants

Table 9.5: SNS plants' fixed capital utilisation in 1980

| SNS complexes/ plants | Year of entry | U1 | U2 |
|---|---|---|---|
| | | (in percentage) | |
| El-Hadjar complex | | 89.46 | 53.71 |
| -Liquid cast iron | 1969 | | |
| no. 1 & no. 2 plants | 1981 | 93.66 | 64 |
| -Oxygen steel making no.1 | 1972 | 168.5 | 31.5 |
| -Oxygen steel making no.2 | 1981 | 16.5 | 38 |
| -Electrical steel making | 1975 | 80 | 59.5 |
| -Hot rolling mill (LAC) | 1972 ext | 60.7 | 41 |
| -Cold rolling mill (LAF) | 1974 | 96 | 25 |
| -Wire and rounds mill | 1978 | 76.6 | 94.8 |
| -Seamless tubes mill | 1977 | 86 | 67 |
| -Welded tube mill | 1969 | 123 | 52 |
| Transformation group | | 81.35 | 65.89(1) |
| Tubes & flat products div. | | 85 | 81.41 |
| -Reghaia big tube p. | Nat. | 95.5 | 56.17 |
| -Reghaia small tube p. | Nat. | 89.5 | 96.86 |
| -Reghaia cold steelmill | 1975 | 89 | 78.5 |
| -Ghardaia spiral tube p. | 1977 | 66 | 94 |
| Long products division | | 72.72 | 65.29 |
| -Oran steelmill | Nat. | 93 | 85.58 |
| -Oued Smar electrode p. | Nat. | 69 | 23.2 |
| -Sig nail plant | 1979 | 77.66 | 66.16 |
| -Annaba welded wire mesh & metallic beams plant | 1979 | 71.66 | 94.5(1) |
| -Reghaia welded wire mesh & metallic beam plant | 1979 | 60 | 65 |
| -El Eulma electrode plant | 1979 | 65 | 57.33 |
| Metallic containers div | | 83.23 | 54.2 |
| -Kouba packaging plant | Nat. | 101.66 | 60 |
| -Arzew packaging plant | 1976 | 97 | 51 |
| -Kouba aluminum plant | Nat. | 83 | 55 |
| -Batna packaging plant | 1979 | 98 | 92 |
| -Mascara packaging plant | 1980 | 36.5 | 13 |
| Salvage plants | | 90.66 | |
| -Centre salvage plant | Nat. | 99 | |
| -East salvage plant | Nat. | 101 | |
| -West salvage plant | Nat. | 72 | |
| Non-ferrous transformation group | | 90.81 | 48(1) |
| -Ghazaouet zinc electrolysis | 1975 | 92.13 | 48 |
| -Prosider East plant | | 89.5 | - |
| Industrial gas group | Nat. | 91.81 | 40(1) |
| Total SNS (1) | | 85.61 | 57.69(1) |

Source: Table J.1 in the Appendix J.

1 Calculated from the figures available.
- Figure not available.

performed more efficiently than the post-independence plants. This is true, for instance, in the case of the transformation plants, built before and after independence. The evidence suggests that transformation plants which use labour intensive technology performed better than plants in the first and second stages of production which use capital intensive technology. Furthermore, the scale and origin of the technology used directly influence the utilisation of capacity since some technologies are more efficient than others. For example, Japanese technology is thought to be the most efficient technology in the world (9). In addition, utilisation of fixed capital is also influenced by the level of mastery of imported technology. In conclusion, the scale, age, origin and mastery of technology all were major influences on the utilisation of fixed capital in the different plants in SNS.

Table 9.6: Rates of fixed capital utilisation in SNS pre- and post-independence plants in 1980 (in percentages)

| Group and divisions | pre-independence plants | | post-independen. plants | |
|---|---|---|---|---|
| | U1 | U2 | U1 | U2 |
| The El-Hadjar complex | - | - | 89.46 | 53.71 |
| The transformation group | 89.29 | 62.80 | 73.42 | 68.25 |
| -The tube and flat pro. div. | 92.5 | 76.51 | 77.50 | 87.68 |
| -The long products div. | 81 | 54.39 | 68.58 | 70.74 |
| -The metalli. container div. | 92.33 | 57.5 | 77.16 | 52.00 |
| -The recovery div. | 90.66 | ... | - | - |
| The non-ferrous transformation group | - | - | 90.81 | 48(1) |
| The industrial gas group | 90.18 | 40(1) | - | - |
| Total SNS (1) | 89.60 | 54.65 | 82.71 | 59.39 |

Source: Table 9.5.

(1) Calculated from the figures available.
- Not applicable.

Some interesting conclusions can be drawn from the analysis of U2. Some of the low values of U2 can be explained by the fact that this branch of industry requires a particularly long gestation time. For example, it takes about eight months for a black furnace to reach its required temperature. The low values of U2 for the cold rolling mill (25%), the oxygen steel making plant no. 1 (31.5%), the hot rolling mill (41%), the welded tube mill (52%) and the electrical steel making plant (59.5%) in the El-Hadjar complex cannot be explained in such terms, however, considering that these plants were built before 1976.

The extent of inefficient utilisation of fixed capital in SNS is higher than that encountered in SONIC, SNIC and SNMC. Comparing SONATRACH and SNS, it appears that SNS fixed capital is used more efficiently. In fact, excess capacity, which is one of the main causes of underutilisation of capacity in SONATRACH, is not encountered in SNS. On the other hand, the consequences of such underutilisation in term of poor performance are similar in the five public enterprises investigated so far.

9.1.3.Utilisation of labour

Again, labour utilisation is measured through overstaffing rates since no other figures are available. According to SNS's managers, overstaffing is common to all the different plants, reaching a ratio of 20 to 25% for SNS as a whole. Labour is, therefore, not utilised efficiently. In addition, rates of absenteeism and labour turnover were lower in the pre-independence plants than in the post-independence plants. The labour force was probably more efficiently used in the former than in the latter. High labour costs, which amounted to 25% of sales revenue in 1978 (10), lead to high production costs and low productivity and, eventually, to poor performance in SNS plants and in SNS as a whole. The extent of the underutilisation of labour, although difficult to assess with precision, is considered to be similar to that of the other public enterprises studied.

### 9.2. Common causes of inefficiency in SNS

Now that the general profile of SNS and evidence on the underutilisation of raw materials and intermediate inputs, capital and labour has been given, an analysis of the causes of inefficiency is presented.

#### 9.2.1. Organisational factors

Inexperience, working conditions encountered in the iron and steel industry and, more importantly the lack of housing are among the main organisational factors affecting efficiency in SNS. For example, 28.8% of the El-Hadjar complex workers, who lived in shanty towns around Annaba, urgently needed housing (11). Moreover, of the remaining personnel working at the complex, 31% lived in only one room accommodation and the same proportion lived in two rooms (12). Under these strenuous conditions workers, particularly those working the night shift, can be expected to seek opportunities to improve their life style. Lack of housing is one of the major reasons for the high rate of labour turnover, which was 25% in 1980 (13).

The large size and diversity of activities of the El-Hadjar complex were dictated by the goal of reaching a high level of integration. Instead, they resulted in increasing management complexity and inefficient utilisation of fixed capital and labour. A typical example, at the El-hadjar complex, is the use of only 20 to 25% of the production capacity of its own power plant. Furthermore, the complex, which accounts for about half of the total SNS labour force, employs more than 18,000 workers and consequently had to satisfy their enormous needs for food, housing and transport, to name only few. Also a result of the large size of the complex, investments in all sorts of activities (such as the production of electricity, medicine, housing and welfare services) which could have been left to local subcontractors or to the state had to be made.

The lack of quality control in some plants gave rise to organisational inefficiencies. For example, the electrode plant of El-Eulma, which lacked the necessary labour force to carry out rigorous control of its outputs, could not sell its production to SONELEC and TELECOM which argued that the outputs were not up to the standard. Ironically, despite a large existing demand, the El-Eulma plant outputs could not be sold on the domestic market. As mentioned earlier, higher scrap quantities than those advocated by the contractor characterised most SNS plants. Higher scrap quantities, which are mainly attributed to the low quality of intermediate inputs produced by SNS, lead to input underutilisation since more inputs are needed to produce the planned outputs.

As discussed above, inherent to this branch of industry is a particularly long output gestation time (14). For example, it takes about eight months for a blast furnace to reach the required temperature. Consequently, during the first years of production, the various plants are expected to show low values of U2 (planned over technical capacity). This is the case in the newly built SNS plants.

Besides these problems, SNS is also confronted with problems such as a cumbersome bureaucracy resulting from the system itself, an inappropriate incentive and wage system, complex recruitment procedures, an inefficient promotion system (17), inefficient management of the spare parts stock and dilapidated equipment.

#### 9.2.2.Shortages of inputs

##### 9.2.2.1.Shortages of raw materials and intermediate inputs

The Shortage of raw materials such as iron ore, which is supplied locally and is not in short supply, does not occur. In this respect, SNS is comparable to SONATRACH. Water and electricity supplies, on the other hand, are not adequate and reliable. Electricity is an important input which is used in the steel making mills and as a source of energy in all the other different first stage and transformation plants. Plants which are not equipped with their own power plant suffer greatly from this shortage. The lack of water, a very important input used in cooling down outputs, can also result in serious inefficiencies.

Supplies of intermediate inputs supplied by the local market or SNS are subject to several problems. For example, in order to reduce the need to import coke, the El-Hadjar complex built a coking plant requiring coal which, for reasons discussed earlier, is also imported and thus subject to supply problems. This, in turn, may affect other plants or industrial sectors. For example, the steelmill of Oran was short of blooms and billettes and the large and small tubes plant of Reghaia was short of iron coils and thick and thin sheets, both plants being supplied by the El-Hadjar complex. In other instances, inefficiencies arising in other branches of industry may affect SNS plants. For example, the nail plant of Sig lacked the necessary packaging container supplied by SONIC. Such shortages seriously affect the utilisation of fixed capital and labour within and outside SNS plants. They are the result of a lack of transport and infrastructure, underutilisation of inputs (supplier plants), lack of respect for delivery plans, technical constraints and lack of a skilled labour force.

### 9.2.2.2. Shortages of transport and infrastructure facilities

Railways and lorries are the most commonly used means of transport in SNS. This is because the inputs and outputs transported are heavy, voluminous and require large means of transport, similar to SNMC. Almost all plants complained about the shortage of these means of transport. The El-Hadjar complex, for example, had problems with its railway switching. Not enough trains were available to transport its inputs (raw materials, intermediate inputs and labour) and outputs. In fact, an estimated 8% of lost planned production resulted from the lack of worker transport alone. This corresponds to 45 minutes per day. Another example is the welded wire plant of Reghaia which encountered problems with the transport of its inputs and outputs (the closest railway was about six kilometres away). All SNS plants experienced difficulty in delivering outputs due to the lack of transport facilities. Inevitably this resulted in interruptions of production since the stocking areas were insufficient to stock the undelivered outputs.

Transport shortages are due to the nature and characteristics of the transported products, the dispersion of the different plants (which are obliged to carry the intermediate inputs or outputs), the old age of the different transport means, the imbalanced development of planned objectives and the lack of financial means. The effects of shortages of means of transport and infrastructure were similar between SNS and SNMC, but had a far greater impact on SNS than on SONIC.

9.2.2.3. Shortages of skilled workers

As seen earlier, SNS is faced with an important shortage of skilled workers which leads to serious inefficiencies and emphasizes its dependency on foreign technical assistance. For instance, the nail plant of Sig had to considerably reduce production for six months due to breakdowns of the automatic packaging machine for which there was an inadequate supply of maintenance workers. The lack of skilled workers is partly the result of the relatively recent entry of this branch of industry into the Algerian economy. In fact, in 1969, 90% of the total labour force of the El-Hadjar complex had no previous experience in the steel and iron industry (16). The lack of skilled workers is also due to certain governmental restrictions on the training of the work force, imposed for financial reasons. At the Oran steelmill, for instance, the number of maintenance workers trained was only half that required resulting in serious maintenance problems. This situation is worsened by the difficult living conditions encountered in some remote regions of Algeria where plants are located and by the housing crisis in general. For instance, the El-Eulma plant, which currently employs only one quarter of the maintenance workers it requires, lost part of these workers to other public enterprises offering better conditions. Foreign assistants, employed to make up for this lack of skilled workers, represented 8.6% of the total managers in SNS. In addition, in 1979 the expenses of foreign assistance for the El-Hadjar complex alone amounted to 170 million AD (17). The lack of skilled workers is more significant and has far more serious effects on the efficient use of inputs in SNS than in any of the other public enterprises studied in this thesis.

9.2.2.4.Shortages of imported inputs and spare parts

The shortage of imported inputs and spare parts is considered by the managers to be one of the most important reasons for the non-realisation of planned production. Due to the large proportion of imported intermediate inputs, these shortages cause important inefficiencies. For example, the Oran steelmill imports about 50% of its required inputs (blooms and billettes) although all of its inputs are supposed to be supplied by the El-Hadjar complex. The El-Hadjar complex, in turn, imports its requirements of fine coke, coal, some intermediate inputs and almost all of its spare parts. It overstocks coal because of shortages encountered in previous years. The extent of the dependence on imported inputs is similar for all SNS plants and leads to similar inefficiencies. Shortages of imported inputs or spare parts are mainly due to cumbersome import and customs policies, described in Chapter Three. The shortage of intermediate inputs and spare parts is as important in SNS as in SONIC and results in similar underutilisation of fixed capital and labour in the two public enterprises.

9.2.2.5.Shortages of stocking areas

The shortage of stocking areas leads to serious inefficiencies in SNS since inputs and outputs, which are voluminous most of the time, must be stocked in covered areas to prevent them from rusting. The Oran steelmill encountered a serious lack of stocking areas, especially in the stocking of imported inputs. As mentioned earlier, the lack of stocking areas was worsened by the shortage of transport. One important reason for the transport shortage is that plants are not allowed to sell directly to their customers who would probably remove the goods much quicker than the distribution centre.

### 9.2.3.Allocative inefficiencies

#### 9.2.3.1.Limited technical choice

The choice of technology is generally dictated by cost considerations, optimal allocation of resources, technical specifications and mastering of the means of production. These choices, which require rigorous appreciation of the constraints faced by each branch considered, raise the question of the degrees of freedom offered to a nation in the choice of its principal production channels (a classical process based on the reduction of coke or direct reduction by natural gas). Fabrication processes, within a principal production channel (ingot or continuous casting), raise the same question. The first choice concerning principal production channels is mainly dictated by the will to develop natural resources (Ouenza mine). The second choice regarding the fabrication processes within a principal production channel, which supposedly offers a wider margin of manoeuvre, might be restricted by the marketing tendency towards internationalisation at the production and marketing levels of this branch of industry. This tendency, which is relatively restricted at the upstream level of the branch (coking plant and blast furnace, for example, for the classical process) where production processes which are highly automated are common and are ruled by strict and rigid parameters (temperature and pressure, for example), becomes more significant at the downstream level of the branch (steel processing), which offers the widest possibilities of choice, given a sufficient level of skill of the work force. In conclusion, the choice of technology, which has direct implications for increases in the production rate, the utilisation of different inputs and, consequently, on the efficiency of a plant, is relatively restricted (18).

9.2.3.2.The choice of sign contracts

As indicated in Table J.2 in the Appendix J, several forms of contracts of different origins have been adopted by SNS to build its various plants and complexes. The contracts are of different types: equipment supply, supply and setting up of equipment, decomposed and turnkey contracts. It should be pointed out that none of these contracts take responsibility for the training of the labour force. Thus, it is the responsability of SNS to independently insure that its workers get some training. Finding a firm (generally foreign) that uses the same type of machinery and which accepts responsibility for the training of the workers is a difficult and expensive task. Training expenses are the responsibility of SNS which encounters enormous difficulties in raising the necessary funds. The decisions of how much, where and when have to be agreed to by the Ministry of Heavy Industries, which very often cuts the proposed number of training programmes in half (see part 9.2.2.3). The choice of contract adopted by SNS influences the number of trained workers and consequently contributes indirectly to the underutilisation of inputs in SNS plants.

9.2.3.3.Diversity of suppliers and equipment

Following government policies which advocated the diversification of suppliers in order to decrease dependency on a given technology, SNS invested in a number of different technologies from different countries (see Table J.2 in the Appendix J). The adoption of these different techniques and technologies, which are quite often incompatible (different standards), resulted in an inefficient use of production capacities. This was worsened by the misleading recommendations made by international engineering consultancy firms, the lack of control and coordination supposed to be achieved by the INAPI and the lack of experience of the skilled Algerian labour force.

9.2.4.Demand shortages

Demand shortages occur firstly in plants such as the welded wires plant of Reghaia and the electrode plant of El-Eulma which were built in anticipation of future demand. Secondly, the deficiency of demand was due to problems of distribution which resulted from the imbalanced development between the building sector and the steel industry, the latter having undergone a more rapid development than the former. In addition, deficient retail distribution and transport systems led to overstocks in some regions although other regions lacked the outputs. Thirdly, shortages of demand were also due to the lack of control and coordination of the Algerian authorities which did not encourage foreign contractors to buy their required materials and equipment from Algeria when applicable. Finally, demand shortages also occurred because of the lack of quality of the output (the case of the electrode plant of El-Eulma).

As in SNMC, demand shortages are only transitory and do not present an insoluble inefficiency since demand is expected to rise. As a result, inputs will be used more efficiently in plants experiencing these deficiencies. Presently, no output which rusts easily is stocked for future demand. Such excess capacity, however, probably cannot be exported due to the lack of price competitiveness.

In conclusion, the causes contributing to the inefficient utilisation of the raw materials, intermediate inputs, fixed capital and labour observed in SNS , despite presenting some characteristics specific to this branch of industry, are very similar to those observed in the other public enterprises studied.

## References

1 Refer to Chapter One for more details on the Destine de Bernis G. theory.

2 Four plants were under construction as part of the Constantine development plan which started in 1960 under the French government.

3 See Schnetzler, J.: Le Developpement Algerien, op cit. p 109.

4 These French firms were Latraf, Coalmeto, Altumec and Sotubal, quoted in Schnetzler, J.: Le Developpement Algerien, op cit. pp 109-110.

5 La Synthese du Bilan Economique et Social de la Decennie 1967-1978, op cit. p 277.

6 Refer to Pole de Developpement et Arriere Pays: Le Cas de Annaba, El-Hadjar, Quelque Conclusions D'analyse, INEAP, Algiers, May 1980, p 20.

7 See Pole de Developpement et Arriere Pays: Le Cas de Annaba, El-Hadjar, 3C, Reproduction et Politique Sociale, INEAP, Algiers, July 1981 p 19.

8 Refer to Bouchema, A.: Element pour une Approche des Problemes de Productivite de la Siderurgie Algerienne,

Revue Tiers Monde, Tome XXI no. 83, July 1980, p 500.

9 Ibid p 496.

10 La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 280.

11 Refer to Pole de Developpement et Arriere Pays: Le Cas de Annaba, El-Hadjar 3C, op cit. p 12 and Element pour une Approche des Problemes de Productivite de la Siderurgie Algerienne by Bouchema, A., op cit. p 500.

12 See Pole de Developpement et Arriere Pays: Le cas de Annaba, El-Hadjar, Quelque Conclusions D'Analyse, op cit. p 43.

13 Refer to Pole de Developpement et Arriere Pays: Le Cas de Annaba, El-Hadjar, 3C, op cit. p 65.

14 For more information see Presentation du Complexe Siderurgique D'El-Hadjar (SNS, June 1980) p 11.

15 Refer to Actualite no. 854 of 25th February, 1982.

16 Refer to Bouchema, A.: Element pour une Approche des Problemes de Productivite de la Siderurgie Algerienne, op cit. p 501.

17 For more details, see L'Economie Algerienne, Afrique Noire, op cit. p 129.

18 See Bouchema, A.: Element pour une Approche des Problemes de Productivite de la Siderurgie Algerienne, op cit. pp 497-498.

# CHAPTER TEN: SONACOME PUBLIC ENTERPRISE

SONACOME, at the time of its establishment on the 9th of August, 1967, was only involved in the import and marketing of mechanical construction goods. Since then, the construction of five complexes and twelve plants totally owned by the state (1) has made SONACOME one of the largest public enterprises in Algeria and considerably increased its activitites. SONACOME, which is a medium-sized public enterprise, is under the supervision of the Ministry of Heavy Industries (2). In 1978, SONACOME's fixed capital was 5.56 billion AD, 5.6 times as much as in 1973 and its sales revenue were 4.75 billion AD, 3 times as much as in 1973 (3). By 1980, its labour force had risen to 40,000 workers, almost 4 times that of 1973. SONACOME is an industrialising industry, similar to SONATRACH and SNS and was created to meet the satisfaction of local needs

SONACOME is responsible for two principal activities: an industrial activity, which is defined in terms of the development of the Algerian mechanical engineering industries, and a commercial activity, which is an outgrowth of an import monopoly in mechanical products. SONACOME activities also extend to the finance, planning, personnel and building and implementation of projects within these two activities. Commercial activity in SONACOME, which is very important, will not be considered in this chapter since the main interest of this study is the performance of the production plants only.

Following the massive investments received by SONACOME (see Chapter Two), five complexes and one plant as part of the first three-year development plan and six additional plants as part of the next two four-year development plans were built. In 1981, SONACOME consisted of seventeen complexes and plants, five of which were nationalised between 1973 and 1974. SONACOME also owns twenty five commercial vehicle units and four customs and transport units. SONACOME is still expanding with five complexes and plants going on stream in 1981 and 10 under construction or in the process of being built. Despite this rapid and substantial expansion, SONACOME production does not meet the requirements of local demand. As a result, 82% of the industrial vehicles were imported in 1979 (4).

In 1981, as indicated in Figure 10.1, SONACOME was a divisionalised organisation similar in structure to SONATRACH. SONACOME comprises five divisions as well as its staff and lines. Each of the five divisions is independently controlled by a managing director and has its own administrative departments. In 1982, SONACOME underwent a major reorganisation, similar to all of the other public enterprises. This reorganisation forsaw the division of SONACOME into five different public enterprises (see Appendix C.2) corresponding to the structural divisions illustrated in Figure 10.1. The objectives, functions, managerial environment, authority and autonomy within SONACOME are similar to those of all Algerian public enterprises (see Chapter Four).

Regarding SONACOME's production capacity in 1981, vehicle capacity was 7,125 vehicles per year (6,425 lorries weighing between 5 and 35 tons and 700 buses with seating capacities between 49 and 100 persons), machine tool capacity was 1,200 units, engine capacity was 10,500 units (2 to 8 cylinders diesel ranging from 25 to 240 HP) and tractor capacity was 6,500 units (between 35 and 75 HP). In addition, the cycle capacity of SONACOME was 71,000 units per year and the nut, bolt and screw cutting capacity was 8,360 tons per year. Table 10.1 shows the different complexes and plants and their

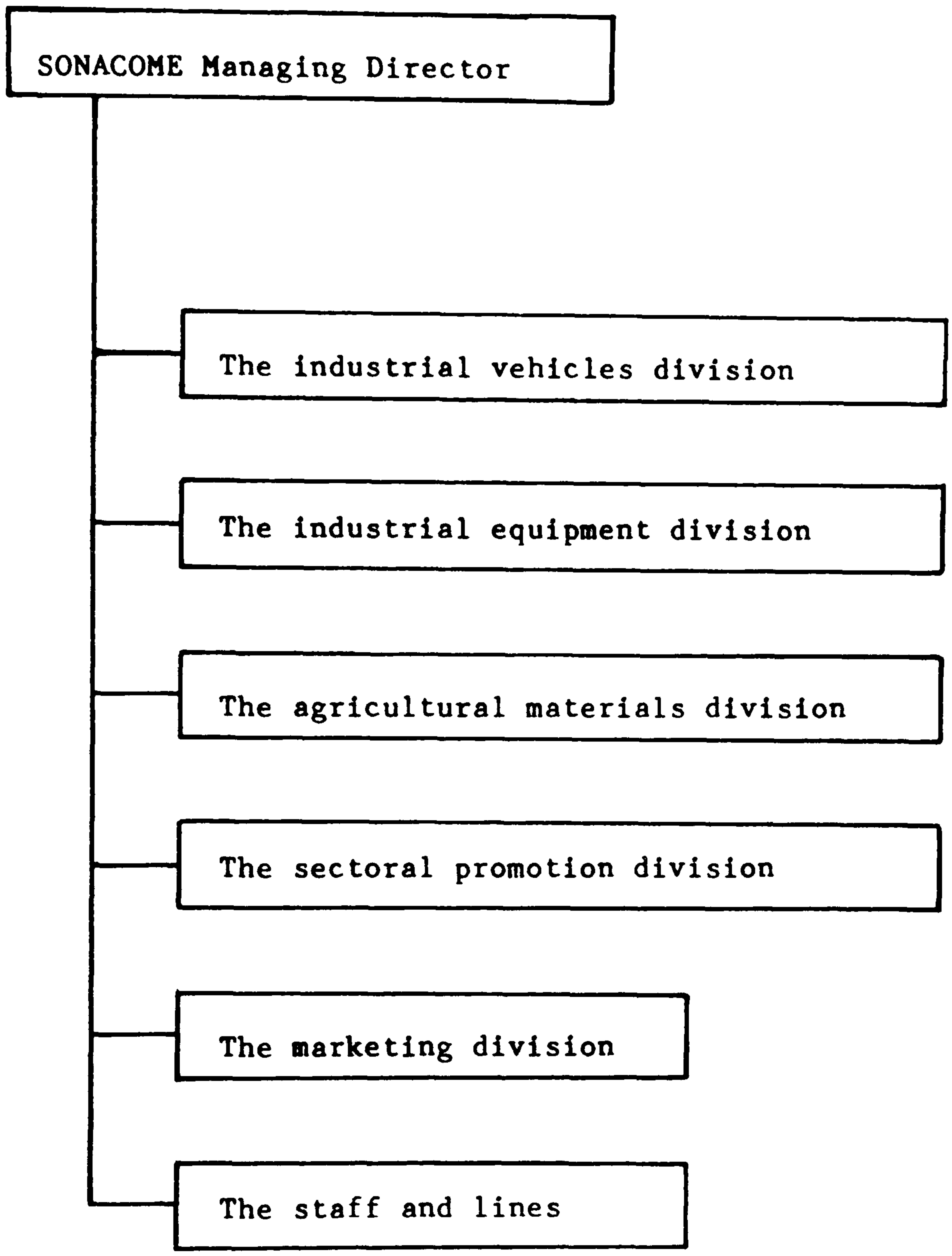


Figure 10.1 : SONACOME organisational structure in 1980.

Source : Survey data.

Table 10.1: SONACOME complexes and plants in

operation and their respective outputs in 1981

| SONACOME complexes and plants /outputs | Rate of integration | Year of entry product. | Unit | Production Technical | Planned | Actual |
|---|---|---|---|---|---|---|
| Industrial vehicle division | | | | | | |
| -The Rouiba industrial vehicle c. | 70% | 1974 | | | | |
| -Bus and coach | | | Unit | 1,000 | 645 | 577 |
| -Lorry | | | Unit | 8,000 | 6,425 | 5,625 |
| -The Hussein Dey equipment vehicle p. | 70% | Nat. | | | | |
| -Vehicle body | | Ext. | Unit | 2,500 | 1,840 | 2,557 |
| -The Rouiba equipment vehicle p. | 70% | 1979 | Unit | 10,000 | 8,725 | 6,845 |
| -Equipment for vehicles | | | Unit | - | 7,220 | 5,724 |
| -Industrial vowing | | | Unit | - | 150 | 0 |
| -Semi-vowing | | | Unit | - | 1,055 | 946 |
| -Engine carrier | | | Unit | - | 300 | 175 |
| Agricultural machinery division | | | | | | |
| -The Constantine engine & tractor c. | 58/76% | 1972 | | | | |
| -Wheel tractor | | | Unit | 5,000 | 5,500 | 4,379 |
| -Caterpilar tractor | | | Unit | 1,000 | 0 | 0 |
| Total tractor | | | Unit | 6,000 | 5,500 | 4,379 |
| -Chain engine | | | Unit | 9,500 | 9,500 | 7,051 |
| -V-engine | | | Unit | 1,000 | 0 | 0 |
| Total engine | | | Unit | 10,500 | 9,500 | 7,051 |
| -The Bel Abes agricultural material c. | 70/100% | 1976 | Unit | 20,500 | 10,653* | 8,160* |
| -Harvester-thresher | | | Unit | 550 | 550 | 355 |
| -Collector gatherer press | | | Unit | 2,000 | 2,000 | 1,539 |
| -Light plough | | | Unit | - | 753 | 640 |
| -Various plough | | | Unit | 3,900 | 750 | 463 |
| -Rake | | | Unit | - | 2,500 | 1,711 |
| -Universal reaper | | | Unit | - | 2,500 | 1,871 |
| -Disk-harrow-1oo litres- | | | Unit | 400 | 400 | 440 |
| -Portable ramp | | | Unit | 400 | 400 | 440 |
| -Blowing engine | | | Unit | - | 400 | 287 |
| -Ramp | | | Unit | - | 400 | 414 |
| -Seed-lip | | | Unit | - | 150,000 | 84,000 |
| -Discs | | | Unit | - | 30,000 | 9,619 |
| -The Rouiba agricultural machinery p. | | Nat. | Unit | 18,000 | 12,570 | 17,529 |
| -Vowing | | | Unit | - | 1,600 | 2,570 |
| -Tunk | | | Unit | - | 1,900 | 2,183 |
| -Agricultural machinery | | | Unit | - | 6,300 | 8,614 |
| -Plough | | | Unit | - | 2,770 | 4,162 |

(Table continues on the following page.)

Table 10.1. (Continued)

| SONACOME complexes and plants /outputs | Rate of integra- tion | Year of entry product. | Unit | Production Technical | Planned | Actual |
|---|---|---|---|---|---|---|
| Industrial equipment division | | | | | | |
| -The Constantine machine tool p. -ALMO- | 70% | 1975 | Unit | 1,700 | 500 | 317 |
| -Turning lathe | | | Unit | - | 50 | 23 |
| -Milling machine | | | Unit | - | 20 | 0 |
| -Shaper | | | Unit | - | 70 | 0 |
| -Drilling machine | | | Unit | - | 70 | 70 |
| -Grinding lathe | | | Unit | - | 15 | 2 |
| -Shapening machine | | | Unit | - | 110 | 90 |
| -Saw | | | Unit | - | 165 | 132 |
| -The Berrouaghia pump and valve p. | 85% | 1975 | Tons | 13,500 | 10,388 | 7,129 |
| -Cast iron | | | Tons | 9.500 | 7,166 | 4,763 |
| -Valve and junction | | | Tons | 4,000 | 3,212 | 2,366 |
| -The Ain Oussara small vowing p. | 70% | 1980 | | | | |
| -Small vowing | | | Unit | 3,000 | 3,000 | 1,830 |
| -The Oran smelting plant | | Nat. | | | | |
| -Cast iron | | | Tons | 6,000 | 6,000 | 4,050 |
| -Special cast iron | | | Tons | 1,000 | 1,000 | 776 |
| -Sundry items | | | Unit | - | 90,750 | 81,884 |
| -Boiler work | | | Unit | - | 69.300 | 65,364 |
| -The El-Harrach smelting plant | | Nat. | | | | |
| -Cast iron | | | Tons | 6,000 | 5,437 | 5,400 |
| -Semi-vowing | | | Unit | - | 31 | 30 |
| -The Bakari pump p. | | Nat. | Unit | 6,000 | 5,850 | 4,511 |
| -Horizontal pump | | | Unit | - | 5,350 | 3,928 |
| -Vertical pump | | | Unit | - | 500 | 583 |
| Sectoral promotion division | | | | | | |
| -The Guelma cycle c. | 64/82% | 1973 | | | | |
| -Engine for motorcycle | 64% | | Unit | 6,000 | 6,000 | 6,029 |
| -Cycle | 82% | | Unit | 25,000 | 20,000 | 20,500 |
| -Motocycle | 74% | | Unit | 40.000 | 37.000 | 37.395 |
| -The Ainsmara scoop and crane p. | 60% | 1980 | | | | |
| -Scoop | | | Unit | 700 | 295 | 285 |
| -Cran | | | Unit | 300 | 64 | 3 |
| -The El-Kerira nut, bolt and screw p. | 92/100% | 1978 | | | | |
| -Nut and screw | 100% | | Tons | 4,400 | 2,800 | 1,789 |
| -Brass founding and finishing | 92% | | Tons | 1,234 | 660 | 368 |
| -The Oued-Rhiou nut, bolt and screw p. | 92/100% | 1978 | | | | |
| -Nut and screw | 100% | | Tons | 4,950 | 2,250 | 1,110 |
| -Brass founding and finishing | 92% | | Tons | 1,234 | 601 | 287 |
| -The Cheraga nut,bolt and screw p. | 100% | 1977 | | | | |
| -Nut, bolt and screw | | | Tons | 1,980 | 1,810 | 878 |
| Total SONACOME | 70% | | | | | |

Source: Table K.1 in the Appendix K.
* Figures caculated without taking into account the seed-lip and "disques" outputs.

respective capacities and outputs which were in operation in 1981. The plants and complexes going on stream, their respective output capacity and year of entry in production are shown in Table 10.2. All the complexes and plants going on stream were having some problems since they were suppose to start production between 1980 and 1981.

As shown in Table 10.1, all SONACOME complexes and plants are multiproduct complexes and plants. All of them operate with two shifts and close 30 days annually for maintenance work except the nut, bolt and screw plants which use only one shift (see Table 10.3). SONACOME complexes and plants produce a wide variety of outputs which range from buses and lorries to agricultural machinery and apparatus. All plants, similar to most public enterprises, are located in the northern regions of Algeria with a denser concentration in the centre (Algiers area) and in the east (Constantine area).

Comparisons between the public enterprises studied indicate that as far as size, number of products, and plants and development trends are concerned, SONACOME shows greater similarity to SONATRACH, SNS and SNMC than SONIC or SNIC. In fact, SONACOME is the third largest public enterprise in Algeria and, like SONATRACH and SNS, received a large share of industrial investment. As a result, large complexes and plants, and numerous jobs were created.

As indicated in Table 10.1, the different complexes and plants are integrated at a rate ranging from 70% to 100%. The rate of integration is higher in complexes and plants specialised in the production of intermediate inputs and/or finished outputs. The level of integration of SONACOME as a whole is estimated to be about 70%. This rate is among the highest encountered in Algeria and even among Western countries in this particular branch of industry. A high level of integration is difficult to attain in this branch of industry and in fact may lead to the inefficient use of fixed capital due to economies of scale. Only the intermediate inputs which are not produced in the plants are imported. The level of integration is comparable in both pre- and post-independence SONACOME's plants. Comparing SONACOME with other selected public enterprises, on the whole it is more integrated than SONATRACH and SNS.

Table 10.2: SONACOME complexes and plants under construction and their respective outputs in 1981

| Complex, plant and outputs | Capacity | Year of entry in production |
|---|---|---|
| -The GS Rouiba smelting p. | 10,000 tons | 1981 |
| -The Ain Smara compressor-roller c. | | |
| -Compressor roller | 4,000 units | 1981 |
| -The Bouchetif industrial equipment and vehicle c. | 25,000 units | 1980-81 |
| -semi-vowing, engine vowing and tunks | | |
| -The Tizi-Ouzou cutlery p. | 26,000,000 units | 1981 |
| -Spoon, knife and folk | | |
| -The Oued Hamimine small vowing p. | 3,000 units | 1981 |

Source: Survey data.

Table 10.3: Number of shifts in SONACOME complexes and plants in 1981

| Number of shifts | Number of plants | Percentage of total | Pre-indepen. (1) | Pre-indepen. (2) | Post-indepen. (1) | Post-indepen. (2) |
|---|---|---|---|---|---|---|
| 1x 8h | 3 | 17.6 | ... | ... | 3 | 25 |
| 2x 8h | 14 | 82.3 | 5 | 100 | 9 | 75 |
| 3x 8h | 0 | 0 | ... | ... | ... | ... |
| Total | 17 | 100 | 5 | 100 | 12 | 100 |

Source: Table K.1. in the Appendix K.

1 number of plants
2 Percentage of pre- or post-independence plants.

Following the example of the other public enterprises studied, SONACOME complexes and plants can be divided into two categories: pre-independence and post-independence complexes and plants. Although five post-independence plants were nationalised, the creation of SONACOME was not the result of massive nationalisation of an existing sub-sector. The number of post-independence complexes and plants is much larger (70.6%) than the pre-independence plants. It is tempting to state that the post-independence complexes and plants use modern capital intensive technology as opposed to the pre-independence plants which use traditional labour intensive technology. A comparison of the technologies used by SONACOME and the Western motor industry (which is highly automated), however, indicates that SONACOME uses labour intensive technology. Despite this, some plants, like the nut, bolt and screw plants, use highly automated technology. In this particular branch of industry, the use of labour intensive technology is not incompatible with the use of modern technology. The post-independence complexes and plants use modern technology while the pre-independence plants use more traditional labour intensive technology. The use of traditional and modern labour technology has created different problems in SONACOME complexes and plants.

The differences between the pre- and post-independence complexes and plants extend to their scale, similar to SONIC and for the same reasons (see Chapter Five). The pre-independence plants are small and medium-scale and the post-independence complexes and plants are large-scale. It should be pointed out that currently the mechanical engineering industry and, in particular, the motor industry are dominated by multinational firms which tend to use large-scale technology.

SONACOME holds the local market monopoly on both the production and international trade of mechanical construction engineering products. Since 1978, however, the international trade monopoly has been restricted to imports of mechanical engineering products used only by SONACOME complexes and plants and by the private sector. The other public enterprises directly import their mechanical engineering product requirements, especially spare parts (see Chapter Three). As indicated earlier, importing is an important activity of SONACOME. Its main imports consist of cars, lorries, machine tools and spare parts (industrial and commercial). For instance, SONACOME will import 500,000 lorries from France as part of the gas contract signed between Algeria and France. On the other hand, exports are not developed at all. In contrast to SNMC, for example, SONACOME does not encounter any competition from the almost nonexistent Algerian private sector.

Regarding the level of integration within SONACOME, Table 10.4 shows that 30% of its inputs are imported and the remaining 70% are produced locally. Most of the locally-produced intermediate inputs are produced within the plant. The rest is supplied either by other SONACOME plants or by SNS. SNS supplies SONACOME plants with basic intermediate inputs such as iron sheets, cast iron and a few other intermediate inputs. In 1980, the foreign technical labour force in SONACOME amounted to 54 people, which represented only 0.13% of the total labour force and 0.8% of the total skilled labour force. The foreign dependency of SONACOME, therefore, extends only to the supply of 30% of its intermediate inputs, its spare parts and its capital stock since fixed capital is

Table 10. 4 : Origin of SONACOME inputs

| OUTPUTS / INPUTS | | Mould cast iron &steel | Tractors | Bus & coach | Lorries | Agricultural machinery | Brass founding & finishing | Hydraulic pumps | Cycles & motocycles | Body making parts | Pumps & valves | Machine tools | Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RAW MATERIALS AND INTERMEDIATE INPUTS | WITHIN SONACOME | | | | | | | | | | | | |
| | Moulded cast iron and steel | | | | | | * | * | | | * | | |
| | Brakes | | | | | | | | | | | | * |
| | Gear box | | | | | | | | | | | | * |
| | Hand drill | | | | | | | | | | | | * |
| | Engine shaft | | | | | | | | | | | | * |
| | Engine | | * | * | * | * | | | | | | | |
| | Body built parts | | * | * | * | * | | | * | | | * | * |
| | Nut & bolt | | * | * | * | * | | | * | | | * | * |
| | LOCAL MARKET | | | | | | | | | | | | |
| | Cast iron | * | | | | | | | | | | | |
| | Steel | * | | | | | | | | | | | |
| | Iron sheets | | * | * | * | * | | * | * | * | * | * | * |
| | Water & electricity | * | * | * | * | * | * | * | * | * | * | * | * |
| | INTERNATIONAL MARKET | | | | | | | | | | | | |
| | Special cast iron | * | | | | | | | | | | | |
| | Special steel | * | | | | | | | | | | | |
| | Intermediate inputs | | 30% | 30% | 30% | 30% | | | 30% | | | 30 | 30 |
| | Spare parts | 99% imported | | | | | | | | | | | |
| FIXED CAPITAL | | 100% imported | | | | | | | | | | | |
| LABOUR | Foreign | 0.13% | | | | | | | | | | | |
| | Local | 99.87% | | | | | | | | | | | |

* indicates the origin of the input without specifying the exact proportion.

Source : Survey data.

entirely imported.

The degree of dependency vis-a-vis foreign inputs is probably higher than in SNMC, SNIC or SONATRACH but slightly lower than SONIC or SNS. It is important to stress, however, that in view of the low level of development of the Algerian industrial sector, the degree of foreign dependency shown by this branch of industry, which depends on a wide variety of intermediate inputs, is not surprising. The extent of foreign dependency on fixed capital and the labour work force is similar in all the public enterprises studied with the exception of SONATRACH which shows greater dependence on foreign technical assistance.

SONACOME complexes and plants can be divided into three different categories. The first category specialises in the production of intermediate outputs only used within SONACOME, like the Rouiba vehicle body plant; the second category specialises in the production of finished products intended for the local market, such as the Rouiba lorry and bus complex or the Constantine machine tool plant; and the third category specialises in the production of intermediate and finished outputs for use within the plant or SONACOME and intended for the local market, such as the Constantine engine and tractor complex. Table 10.5 indicates the destination of these various outputs. For example, all agricultural materials and machinery, tractors and harvester-threshers are destined for the local agricultural sector while engines are solely used by SONACOME. The range of outputs produced, despite the fact that a few outputs, such as buses and screws are used directly by the consumer, is mainly oriented towards the satisfaction of industrial and agricultural needs. All SONACOME outputs are produced for intermediate use on the local market. As

Table 10.5 : Destination of SONACOME outputs

| SECTORS OF UTILISATION / MAIN OUTPUTS | DOMESTIC MARKET | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INTERMEDIATE USE | | | | | | | | | | | | FINAL USE by Consumers |
| | Within plant | Within SONACOME | Agriculture | Hydraulic | Energy | Building construction ind. | Transport | Public works | Preserves ind. | Metal equip. ind | Chemical ind. | Paper industry | |
| Moulded cast iron & steel | * | * | | | | | | | | | | | |
| Buses & coaches | | | | | | | * | | | | | | |
| Lorries | * | * | * | * | * | * | * | * | * | * | * | * | |
| Brass founding & finishing | | | | * | | * | | | | | | | |
| Hydraulic pumps | | | | * | | | | | | | | | |
| Valves & unions | | | | * | * | * | | | | | | | |
| cycles | | | | | | | | | | | | | * |
| Motorcycles | | | | | | | | | | | | | * |
| Cranes | | | * | | | * | | * | | | | | |
| Wheel harrows | | | * | | | * | | * | | | | | |
| Machines tools | | | | | * | * | | | * | * | * | * | |
| Engines | * | * | | | | | | | | | | | |
| Tractors | | | 100% | | | | | | | | | | |
| Plough | | | 100% | | | | | | | | | | |
| Disk harrows | | | 100% | | | | | | | | | | |
| Collector press | | | 100% | | | | | | | | | | |
| Harvester-thresher | | | 100% | | | | | | | | | | |
| Farmer rakes | | | 100% | | | | | | | | | | |
| Universal reapers | | | 100% | | | | | | | | | | |
| Agri. towing mach. | | | 100% | | | | | | | | | | |
| Body making parts | * | * | | | | | | | | | | | |
| Nuts & bolts | | * | * | * | * | * | * | * | * | * | * | * | * |
| Brakes | * | * | | | | | * | | | | | | * |
| Gear box | * | | | | | | * | | | | | | 1% |

* indicates the destination of the output without specifying the proportion.

Source : Survey data.

mentioned earlier, export activity is not developed. SONACOME is comparable to SNMC and SNS as far as the destination of outputs is concerned.

The SONACOME labour force, which is shown in Table 10.6, can be divided into three different categories: managers, technicians or supervisors and semi-skilled and unskilled workers. In 1980, 73% of the total labour force was composed of unskilled and semi-skilled workers, 14% were technicians or supervisors and only 2.6% were managers (see Figure 10.2). The proportion of the SONACOME labour force, which is skilled, is very low reflecting the lack of skilled workers in the different complexes and plants. For instance, the percentages of skilled workers at the El-harrach and Rouiba smelting plants were 8.8% and 9.3% of the total labour force, respectively. The Oued Rhiou and El-Khebira nut, bolt and screw plants were also characterised by a low proportion of skilled workers, amounting to 10.7% and 11.3%, respectively. The highest ratios were 22.7% and 25% at the Tiaret vehicle body complex and the Berrouaghia pump plant, respectively. A detailed analysis of the percentage of skilled workers by plant indicates that the complexes and plants built under a product-in-hand contract were better equiped with skilled workers than the others. Most likely, this occurs because the training of the labour force is the responsibility of the contractor in such types of contract (see Appendix C.1).

According to SONACOME managers, all plants and complexes were affected by high rates of absenteeism (for example, 12% in the industrial vehicles division in 1980). These rates are comparable to those encountered in other public enterprises. The rate of labour turnover was also high in all complexes and

Table 10.6: SONACOME personnel in 1980

| Plants and complexes | Managers (1) | Managers (2) | Technicians/ supervisors (1) | Technicians/ supervisors (2) | Semi-skilled/ unskilled (1) | Semi-skilled/ unskilled (2) | Total** (1) | Total** (3) | Rate of absent-eeism |
|---|---|---|---|---|---|---|---|---|---|
| Industrial vehicles division | 169 | 1.6 | 1,337 | 13 | 7,628 | 74 | 10,313 | 0.24 | |
| -Rouiba complex | 130 | 1.6 | 962 | 12 | 5,918 | 77 | 7,683 | 0 | 40% |
| -Hussain-Dey equipment vehicles plant | 3 | 0.1 | 33 | 12 | 232 | 85 | 273 | 0 | |
| -Rouiba vehicles body plant | 9 | 0.7 | 143 | 11 | 1,019 | 81 | 1,253 | 0 | 14% |
| *Rouiba smelting plant | 3 | 1.3 | 18 | 8 | 85 | 38 | 223 | 0 | |
| *Tiarret vehicles body complex | 24 | 2.7 | 182 | 20 | 374 | 42 | 881 | 2.8 | |
| | | | | | | | | | |
| Industrial equipment division | 156 | 3 | 527 | 10 | 3,853 | 76 | 5,072 | 0.3 | |
| -Berrouaguia pump & valves plant | 95 | 3.3 | 233 | 8 | 2,095 | 73 | 2,851 | 0.4 | 42% |
| -Constantine machine tool plant | 27 | 4.4 | 113 | 18 | 464 | 76 | 612 | 0 | |
| -El-Harrach smelting plant | 5 | 0.8 | 52 | 8 | 533 | 90 | 595 | 0 | |
| -Oran smelting plant | 2 | 0.3 | 76 | 12 | 439 | 73 | 601 | 0.3 | |
| -Baraki pump plant | 2 | 1.3 | 18 | 12 | 119 | 83 | 143 | 0 | |
| *Berrouaghia pump plant | 22 | 11 | 27 | 14 | 143 | 75 | 192 | 0 | |
| *Ain Oussera small vowing plant | 3 | 3.8 | 8 | 10 | 60 | 77 | 78 | 0 | |
| | | | | | | | | | |
| Agricultural machinery division | 138 | 2.1 | 947 | 15 | 4,794 | 75 | 6,337 | 0.015 | |
| -Constantine engine & tractor complex | 76 | 1.8 | 587 | 14 | 3,141 | 77 | 4,078 | 0 | 50% |
| -Bel Abes agricultural machinery comp. | 58 | 3.2 | 299 | 16 | 1,278 | 70 | 1,811 | 0.05 | 10% |
| -Rouiba agricultural machinery plant | 4 | 0.9 | 61 | 14 | 375 | 83 | 448 | 0 | |
| | | | | | | | | | |
| Sectoral promotion division | 162 | 2.7 | 734 | 12 | 4,307 | 73 | 5,850 | 0.07 | |
| -Guelma cycle complex | 30 | 2.1 | 251 | 18 | 1,083 | 76 | 1,422 | 0 | 29% |
| -El-Kebira nut, bolt & screw plant | 14 | 1.3 | 111 | 10 | 896 | 85 | 1,057 | 0.2 | 92% |
| -Cheraga nut, bolt & screw plant | 8 | 2.5 | 47 | 15 | 251 | 80 | 316 | 0 | 5% |
| -Oued Rhiou nut, bolt & screw plant | 14 | 1.7 | 73 | 9 | 677 | 83 | 814 | 0.2 | |
| -Ainsmara scoop & cran complex | 80 | 4 | 230 | 11 | 1,315 | 64 | 2,046 | 0 | |
| *Ainsmara cycle complex | 13 | 9.7 | 12 | 9 | 46 | 34 | 134 | 0 | |
| *Menaiel cycle complex | 3 | 4.9 | 10 | 16 | 19 | 31 | 61 | 0 | |
| | | | | | | | | | |
| Distribution division | 153 | 1.7 | 1,681 | 19 | 6,379 | 71 | 8,885 | 0.04 | |
| | | | | | | | | | |
| Head office & administrative departments in division | 265 | 7.3 | 433 | 12 | 2,409 | 67 | 3,588 | 0.2 | |
| -Sonacome head office | 239 | 6.7 | 421 | 12 | 2,398 | 67 | 3,539 | 0.2 | |
| -Administrative departments in divisions | 26 | | 12 | | 11 | | 49 | 0.00 | |
| Total SONACOME | 1,043 | 2.6 | 5,659 | 14 | 29,370 | 73 | 40,045 | 0.13 | |

Source: Survey data.

1 Total by skill category in the plant, division and SONACOME as a whole.
2 % of the total labour force by skill category in the plant or complex, division and SONACOME as a whole.
3 % of the foreigners in the plant or complex, division and SONACOME as a whole.
* Plant or complex still under construction.
** The total includes also workers attached to other functions and in training.

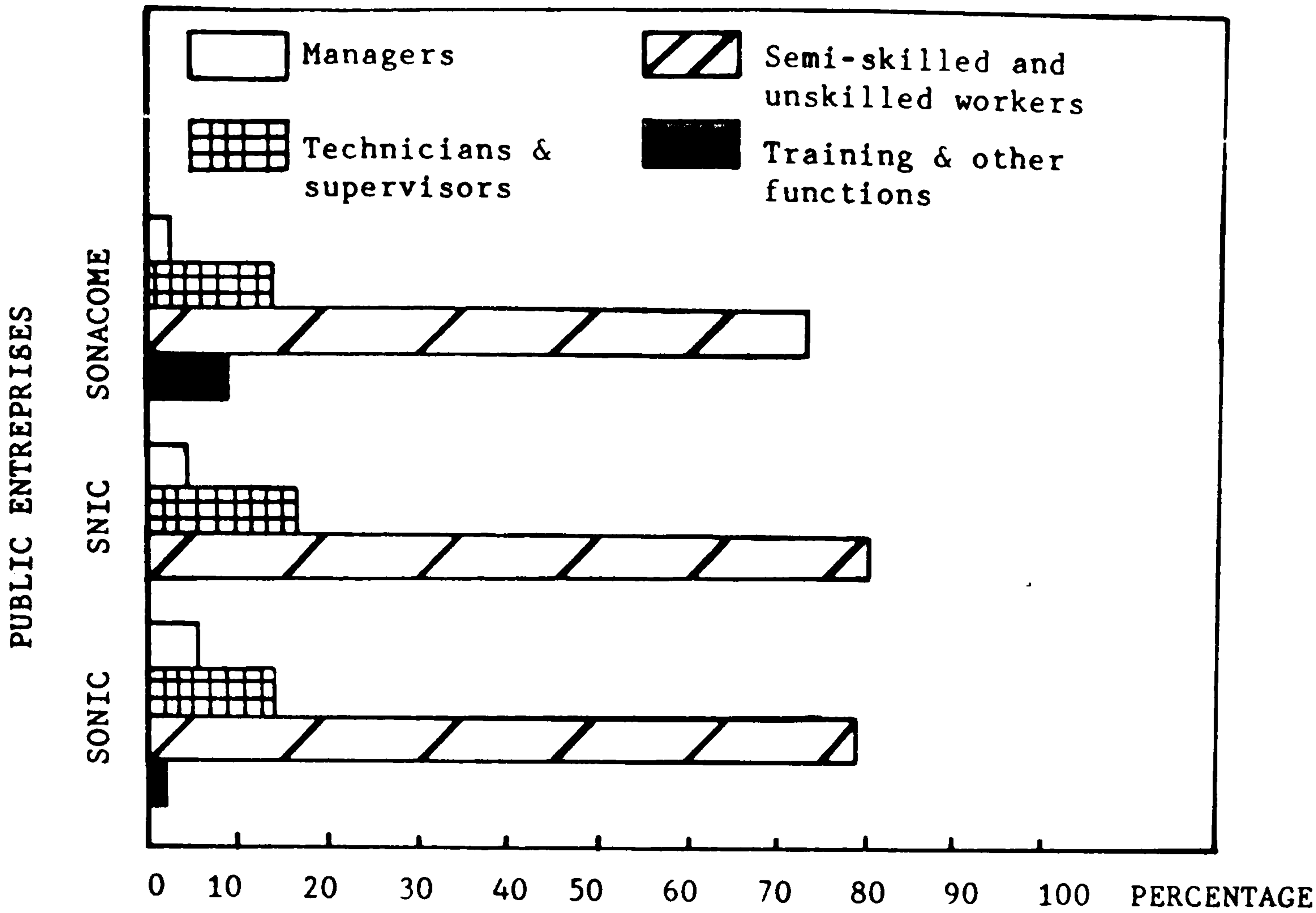


Figure 10.2 : Percentage of labour force by skill category in SONACOME, SNIC and SNS.

Sources : Tables 10.5, 7.5 and 9.4.

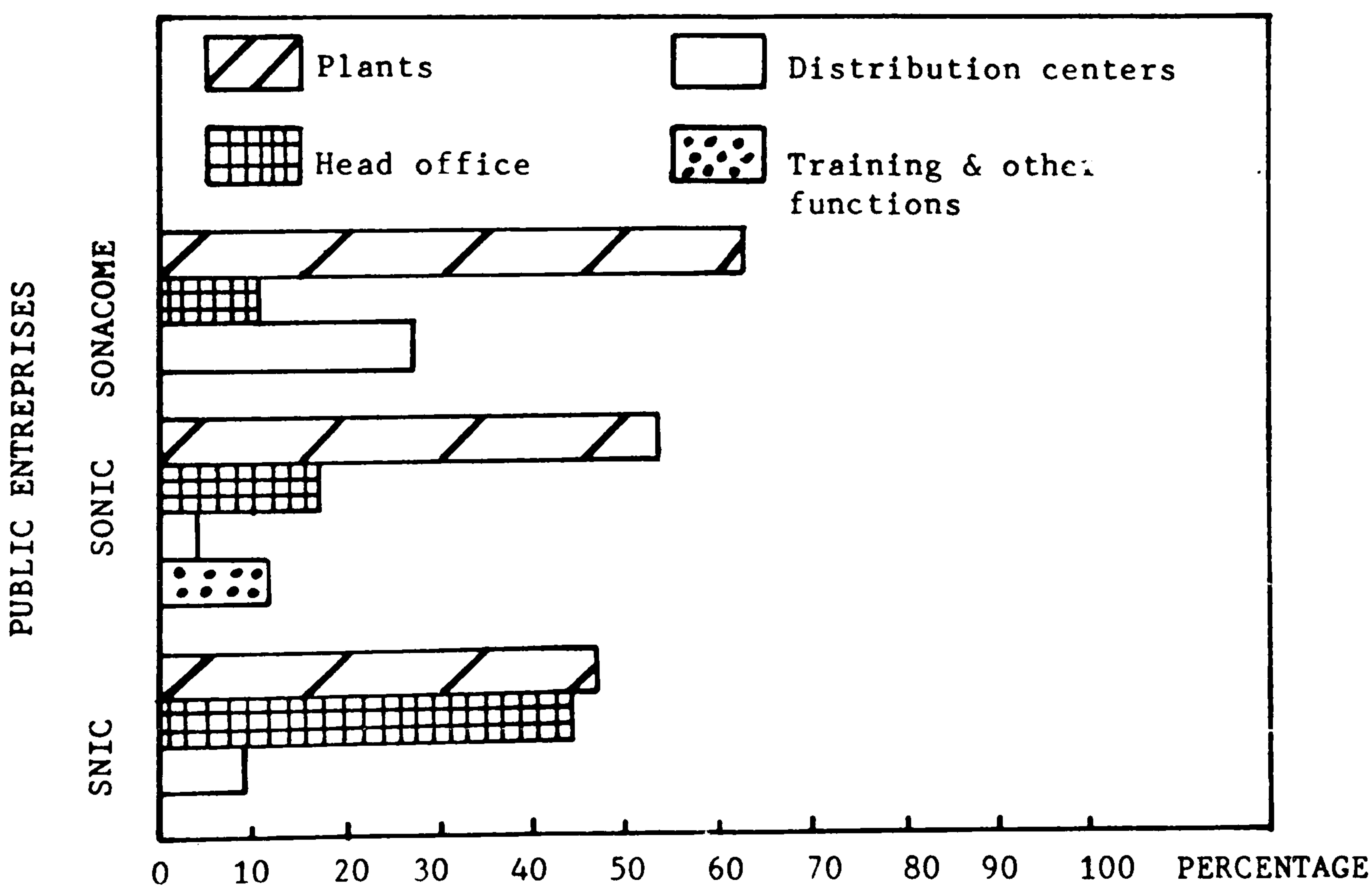


Figure 10.3 : Percentage of skilled labour force by function in SONACOME, SONIC and SNIC.

Sources : Tables 10.5, 5.4 & 7.5.

plants (0.54% in the industrial vehicles division in 1980). Labour turnover rates were much higher in the complexes and plants located in the central regions than those located in the east or west. The high rates in the central region may be related to the greater opportunities of obtaining training and consequently finding another job and to the average age of the workers, 24 years. Foreign technical assistance, as mentioned above, is insignificant (0.13% of the total labour force).

As indicated in Figure 10.3, the proportion of skilled workers was much lower in SONACOME than in SNIC or SNS (16.6%, 19.2% and 20%, respectively). This can be explained by the fact that a large proportion of workers were undergoing training (6.8% of the total labour force) and that labour intensive technology is used in SONACOME. Another interesting finding is the smaller proportion of skilled workers in the administrative departments of the different divisions of SONACOME than in SONIC or SNIC (10.4%, 17.3% and 44.1%, respectively). The proportion of skilled workers in the SONACOME complexes and plants (62.2%) was higher than that in the SNIC plants (46.3%) but lower than that encountered in the SONIC plants (67.3%). In addition, the administrative departments in the complexes and plants show a high proportion of semi-skilled and unskilled workers. For example, at the Rouiba industrial vehicles plant, 27.5% of the total labour force working in the administrative departments consisted of semi-skilled and unskilled workers. Finally, the proportion of the SONACOME labour force, which is foreign, is lower than that of SONIC (0.4%).

We now turn to a discussion of the utilisation of the different inputs in SONACOME complexes and plants. Common causes of inefficiency in SONACOME complexes and plants are investigated in a second section.

## 10.1. Utilisation of inputs in SONACOME

### 10.1.1. Utilisation of raw materials and intermediate inputs

The vast majority of inputs used by SONACOME are intermediate inputs. Hardly any raw materials are used. My field study indicates that, except for a few cases, intermediate inputs are not used efficiently by the various SONACOME complexes and plants. The amount of intermediate inputs used is usually higher than that advocated by the contractors' norms. For example, at The Rouiba complexes, intermediate inputs which are stocked outdoors are inefficiently used. These intermediate inputs, which typically are perishable, deteriorate, leading to overconsumption of these inputs.

### 10.1.2. Utilisation of fixed capital

Based on what has been said earlier, U1 (ratio of actual over planned output), U2 (ratio of planned over technical output) and U3 (ratio of actual over technical number of shifts) have been calculated, whenever possible, for each plant output, for each complex or plant, for each division and for SONACOME as a whole. In 1981 as indicated in Table K.1, U1 by plant output ranged from 0% to 160% and U2 varied between 21% and 110%. The highest rates of fixed capital utilisation, when taking both U1 and U2 into account, were obtained for the 100 litres disk-harrow (110%, 100%) and portable ramp (110%, 100%) both in the agricultural machinery complex of Bel Abes. The lowest rate of fixed capital utilisation was recorded for the crane (4.6%, 21%) in the scoop and crane complex of Ainsmara. U1 and U2 by plant ranged from 48% to 148.5% and 29.4% to 100%, respectively (see Table 10.7). The highest rate of fixed capital utilisation was obtained for the pump plant of Baraki (101%, 97.5%) and the

Table 10.7: SONACOME complexes and plants' rates of fixed capital utilisation in 1981 (in percentages)

| SONACOME plants and complexes | U1 | U2 | U3 |
|---|---|---|---|
| The industrial vehicles division | 93.66 | 78.3(1) | 52.4 |
| _The industrial vehicle c. of Rouiba | 86.5 | 74 | 52.4 |
| _The equipment vehicle p. of H Dey | 138 | 73.6 | 52.4 |
| _The equipment Rouiba plant | 56.5 | 87.25 | 52.4 |
| The agricultural machinery division | 100 | 70.93 | 52.4 |
| -The Constantine engine & tractor c. | 76.5 | 91 | 52.4 |
| -The Bel Abes agricult. machinery c. | 75 | 52(2) | 52.4 |
| -The Rouiba agricult. machinery p. | 148.5 | 69.8 | 52.4 |
| The industrial equipment division | 76.25 | 76.1(1) | 52.4 |
| -The machine tool p. of Constantine | 45.75 | 29.4 | 52.4 |
| -The pump and valve p. of Berrouaghia | 68.5 | 77.5 | 52.4 |
| -The small vowing p. of Ain-Ouassara | 61 | 100 | 52.4 |
| -The smelting plant of Oran | 82.5 | - | 52.4 |
| -The pump plant of Baraki | 101.25 | 97.5(2) | 52.4 |
| -The smelting plant of El-Harrach | 98.5 | - | 52.4 |
| The sectoral promotion division | 61.3 | 63.73 | 36.68 |
| -The cycle complex of Guelma | 101 | 90.66 | 52.4 |
| -The scoop and cran c. of Ainsmara | 50.5 | 31.5 | 52.4 |
| -The nut, bolt and screw (NBS) cutting plant of El-Kebira | 59 | 58.5 | 26.2 |
| -The NBS cutting p. of Oued Rhiou | 48 | 47 | 26.2 |
| -The NBS cutting p. of Cheraga | 48 | 91 | 26.2 |
| Total SONACOME (1) | 79.11 | 71.93 | 47.77 |

Source: Table K.1 in the Appendix K.

1 Figures calculated from the available figures.
2 Figures calculated by dividing the total planned output by the total technical output.

lowest rate for the machine tool plant of Constantine (45.75%, 29.4%).

Regarding divisions, the highest rate of fixed capital utilisation was recorded for the industrial vehicles division (93.66%, 78.28%), while the sectoral promotion division experienced the lowest rate (61.3%, 63.73%). In view of these low figures, it is not surprising to find that fixed capital in SONACOME as a whole is not used efficiently (U1= 79.11% and U2= 71.93% (for the figures available)).

Comparing the rates of fixed capital utilisation obtained for the different complexes and plants, it appears that the plants and complexes built in the late 1970's performed better than those built in the 1980's. This may be attributed mainly to experience gained over the period. No relationship appears to exist between the proportion of skilled labour force and the rate of fixed capital utilisation.

An analysis of U3 indicates that, in all the complexes and plants, fixed capital is left idle at least one third of the time. U3 for SONACOME as a whole was 47.77%. All complexes and plants operated with two shifts, with the exception of the nut, bolt and screw plants which operated with only one shift. This is particularly surprising considering the enormous local demand and that the return on investment in such an industry, which makes use of labour intensive technology, can only be achieved through intensified use of the expensive fixed capital.

SONACOME's fixed capital is used at a higher rate than SNS and SONATRACH but lower than that of SONIC, SNIC or SNMC. The time utilisation of fixed capital in SONACOME, however, is the lowest.

### 10.1.3.Utilisation of labour

Labour utilisation rates are again evaluated from overstaffing data as no other figures are available. According to the managers and the few figures available, overstaffing rates were high in all plants and complexes. For example, high rates ranging from 20% to 42% were obtained for the industrial vehicles complex of Rouiba, the pump and valve plant of Berrouaghia and the agricultural machinery complex of Bel Abes. The rate was much lower in the nut, bolt and screw plant of Cheraga and the engine and tractor complex of Constantine (2% to 5%). According to SONACOME managers, high overstaffing rates were recorded for semi-skilled and unskilled workers and for workers employed in administrative departments, in particular.

From the data discussed above, it can be concluded that the different inputs are not used efficiently. This study now turns to an investigation of the reasons for such inefficiencies and an analysis of their common causes.

## 10.2.Common causes of inefficiency in SONACOME

### 10.2.1.Organisational factors

The enormous number of intermediate inputs and spare parts required for this industry leads to inefficiencies in stock management. For example, the industrial vehicles complex of Rouiba has to manage 2,638 different intermediate inputs for the assembling of only one type of lorry. These intermediate inputs, which can vary greatly in size, require extremely efficient stock management methods. Such methods are not employed and consequently, management of this enormous number of intermediate inputs is very inefficient. Stock management is inefficient due to the lack of a skilled labour force, the shortage of space and lack of an efficient organisation within the complex or plant. Imported intermediate inputs are, in addition, in short supply most of the time. In order to prevent these shortages, the various complexes and plants overstock different imported intermediate inputs, a situation which lead to inefficient utilisation of inputs.

Another cause of inefficiency is due to the lack of control and coordination. This is well examplified by the valve and pump plant of Berrouaghia which stopped production because of abnormally high stocks of outputs. The lack of knowledge of real consumer demand led to this situation. The Berrouaghia plant, which produces two different types of pump, overproduced one type at the expense of the other despite the lack of demand for this product. In order to make up for the shortage in the second type of pump, the SONACOME head office imported it without consulting the plant, which had already readjusted its planning programme and greatly increased production of the pump in question. Moreover, no incentive is given to foreign contractors to buy local products when possible, another factor contributing to the inefficient utilisation of fixed capital. The above case illustrates the inefficiencies which result from a cumbersome, bureaucratic administration.

Labour was inefficiently used in all plants where overstaffing prevailed. The inefficient utilisation of labour resulted in high unit labour costs and low labour productivity. In 1978, for example, labour costs accounted for 13% of the SONACOME sales revenue (5). High rates of absenteeism and labour turnover, mainly due to shortages of social infrastructure such as housing and transport, led to an inefficient incentive system which influenced the rate of productivity of the workers in general. At the same time, the poorly organised financial system in SONACOME, which led to a difficult financial situation and the lack of profit, also contributed to an inefficient incentive system. According to the Socialist Management's Charter, profits are to be distributed among workers; a lack of profits inhibits a favourable climate for higher productivity. The main consequence of the above organisational factors, which are common to all of the public enterprises studied, is the poor performance of SONACOME complexes and plants and consequently, of SONACOME as a whole.

Besides these organisational causes of inefficiency, which are to a certain extent specific to SONACOME, inefficiencies resulting from inappropriate wage and incentive systems, a cumbersome bureaucracy, rigid bureaucratic controls and problems related to government policies such as customs, banking and import policies, are common to all public enterprises.

10.2.2.Shortages of inputs

10.2.2.1.Shortages of intermediate inputs

Shortages of intermediate inputs such as steel, cast iron and heavy iron sheets supplied by SNS or other inputs supplied within SONACOME, were encountered in all SONACOME complexes and plants. For example, the Rouiba industrial vehicles complex, the Bel Abes agricultural machinery complex and the nut, bolt and screw plants were short of intermediate inputs supplied by the local market or produced within SONACOME. These shortages were caused by delays in delivery, lack of infrastructure and storage facilities and underutilisation of inputs in the suppliers' plants (or complexes), within and/or outside of SONACOME. Shortages of water and electricity supplies added to these problems. For instance, frequent voltage fluctuations led to high rates of machinery breakdowns and consequently, to more strenuous maintenance duties and frequent production stoppages.

10.2.2.2.Lack of infrastructure facilities

The lack of port infrastructure and the poverty of the road network resulted in shortages of imported intermediate inputs and spare parts. Aside from this, the lack of housing facilities around complexes and plants was responsible for the high rates of absenteeism and labour turnover observed in all plants. As a result of these shortages, which were common to all complexes and plants, the different inputs were underutilised.

10.2.2.3.Shortages of skilled labour force

As seen earlier, the shortage of skilled labour affected some complexes and plants more deeply than others. Labour shortages were particularly consequential at the smelting plants of Rouiba and El Harrach, the pump and valve plant of Berrouaghia, all the nut, bolt and screw plants and the vehicle body plant of Rouiba. The other SONACOME complexes and plants, though lacking a skilled labour force, were affected to a much lower extent. The foremen, maintenance and stock management positions were particularly affected by the lack of skilled workers. Among the many reasons for the lack of a skilled labour force, the main one is the actual training system which proved very inefficient. This training system, however, has started to improve lately. Secondly, government policies, which influenced the location of the complexes and plants, were responsible for not attracting the necessary skilled labour force to the deprived regions. Thirdly, lack of social infrastructure acted to increase these difficulties.

A reduction in the number of shifts operating in complexes and plants (one or two instead of three) is the direct consequence of this lack of skilled workers.

10.2.2.4.Lack of imported intermediate inputs

In this particular industry, about 30% of the intermediate inputs and the bulk of spare parts are imported, therefore, shortages of imported intermediate inputs and spare parts tremendously affects the utilisation of fixed capital and labour. The following is a case in point. In order to make up for the low production rate at the harvester-thresher production line (complex of Bel Abes), the head office signed an import contract with a German firm for delivery of 1,100 harvester-threshers. For unknown reasons this foreign firm, which supplied 30% of the intermediate inputs to the Bel Abes complex, stopped delivery. Consequently, the affected production line was threatened with closure due to a shortage of imports. Most SONACOME plants and complexes suffered from shortages of intermediate inputs and spare parts. Reasons for these shortages which are attributed to government policies and inefficiencies have already been discussed in the previous chapters.

10.2.2.5.Shortages of storage facilities

Underutilisation of production capacity also occurred in the industrial vehicle complex of Rouiba due to inefficient stocking methods. These problems, connected to the enormous number of intermediate inputs used for the assembling of lorries and buses, arose from a lack of space and building facilities. This led to inefficient management of the stock and deterioration of the intermediate inputs and spare parts when stocked outdoors.

10.2.2.6. Shortages of working capital

According to government policies, the price of outputs had been frozen. None of these fixed output prices, however, meet production costs. For example, the production cost of a tractor is twice as high as its actual selling price and the retail price of an agricultural machine covers only two fifths of its production cost. In order to make up for the difference, the complexes and plants receive subsidies granted by the state. The system of subsidies, however, is very inefficient and serious financial difficulties are a common problem to all SONACOME complexes and plants. For instance, in 1978, SONACOME working capital and cash flow were negative and amounted to 337.09 million and 110 million AD, respectively. The resultant financial difficulties obliged the various plants to resort to bank loans which carry enormous financial charges. In fact, these financial charges represented 11% of the sales revenue and 9% of the total charges in SONACOME for 1978 (6). This lack of profit, as mentioned earlier, does not encourage workers to increase productivity. In conclusion, the shortage of working capital had an indirect effect on the utilisation of the various inputs.

10.2.3. Allocative inefficiencies

With respect to inefficiencies due to the choice of assorted inputs, the only evidence comes from the engine and tractor complex of Constantine. This plant was built to produce two types of engines and two types of tractors; currently, however, only one type of engine and one type of tractor are produced. The second type of engine was supposed to be used in the second type of tractor and in heavy machinery. The production of heavy machinery was planned for future development. According to SONACOME managers, the reasons for not producing these outputs were that the second type of tractor was not adapted to Algerian conditions and that the labour force was not trained in the assembly of these outputs which were considered complex. As a result, most of the machinery, which was imported and bought at a high price from a German firm (Diag), was left idle all the time. The invested capital was used very inefficiently. The inappropriate choice of assorted outputs was made by the planning commission, following political considerations, and the SONACOME Board of Directors, who are to blame for agreeing with their suggestion.

SONACOME has also encountered problems resulting from technical inefficiencies. In 1978 for example, the agricultural machinery complex of Bel Abes stopped production for three months because of serious technical failures. The gear box, which should be produced by the complex, is still imported.

In conclusion, the common causes of underutilisation of raw materials, intermediate inputs, fixed capital and labour in all SONACOME complexes and plants are roughly identical to those described for the other public enterprises analysed in this thesis. These include organisational inefficiencies, shortages of inputs and allocative inefficiencies. Shortages of demand, in contrast to SONATRACH or SNMC, have not been observed in any SONACOME complexes or plants.

References

1 All the plants were owned entirely by the state except the machine tool plant of Constantine which was owned 75% by the state and 25% by a West German group: Frizt Werner Werkzeng Mashinen and Diag.

2 SONACOME was under the supervision of the Ministry of Industry and Energy until 1977.

3 See La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 277 for more details.

4 Refer to Benamrane, D.: Le Developpement de la Branche des Vehicules Industrials dans la Strategie de Liberation Economique de L'Algerie, RASJPE, Vol. XVIII, no. 3 September 1981, Algiers, pp 499-539.

5 See La Synthese du Bilan Econmique et Social de la Decennie 1967-78, op cit. p 278.

6 Ibid pp 277, 278 & 280.

# PART THREE

# CHAPTER ELEVEN: CROSS COUNTRY ANALYSIS: A COMPARISON OF THE ALGERIAN, TURKISH AND EGYPTIAN ECONOMIC SYSTEMS

Now that the main problems encountered by the Algerian public industrial sector have been identified, a comparison with other public industrial sectors may prove informative. The comparison of economic systems in general, may enrich the understanding and sharpen the merits or demerits of the systems and lead to suggestions of organisational and operational changes which would improve the performance of the system. In turn, interesting conclusions may arise concerning the different problems encountered in an industrial public sector which may lead to the identification of adequate solutions to alleviate, if not eliminate, inefficiencies in the Algerian case.

The choice of the countries compared was directed by the need to find economic systems which are as similar as possible to the Algerian economic system. Turkey and Egypt were chosen because their respective economies were dominated by a large public sector. The aim of the comparison is to draw some parallels regarding inefficiencies encountered by the respective public industrial sectors. When comparing the Algerian, Turkish and Egyptian economic systems, the main focus of concern and interest will be each of their industrialisation efforts from which emerged a preeminent industrial public sector dominated by centralised planning, state control and significant state intervention. The period in question, which started in the 1960's in Turkey and Egypt, ended around 1974. Since then, the two countries have adopted completely different development policies. Egypt, for example, opted for the opening and liberalisation of its economic system based on foreign investment and its domestic public sector. The data used in the comparison correspond to the 1978-81 period for Algeria and to the 1971-74 period for Turkey and Egypt.

An economic system, as defined by Borstein (1), evolves according to rules and orders and the interaction of organisations of participants engaged in production, distribution and use of goods and services. In comparing the Algerian, Turkish and Egyptian economic systems, of primary interest are the forces influencing and determining the character of the economic systems, the nature and extent of state intervention in daily economic operation and finally, the overall performance of the economic systems. Each of these three aspects will be discussed in some detail for each economic system (when information is available) and will then be compared from one system to another.

### 11.1.Forces influencing the Algerian, Turkish and Egyptian economic systems

In the investigation of the forces influencing the economic system and determining its character, three categories will be discussed: features of the economy, social and cultural factors and economic performance. For the period reviewed here, the three countries were characterised by a centralised system and underwent an intensive phase of economic development. This is clear from such evidence as the socialisation of the means of production, the sharp increase in the rate of investment, rapid structural changes and changes in the distribution of income. Resource allocation was dominated by physical planning and administrative rationing.

The main features of the Algerian, Turkish and Egyptian economies are summarized in Tables 11.1 and 11.2. The rate of population growth was higher in Algeria than in Turkey or

Table 11.1: Population, GNP at market price

& GNP per capita in Algeria, Turkey and Egypt

(mid 1974, 1978 and 1979)

| Country | Population mid (000) 1974 | 1978 | 1979p | GNP at market price US $ Million 1974 | 1978 | 1979p | GNP per capita US $ 1974 | 1978 | 1979p |
|---|---|---|---|---|---|---|---|---|---|
| (1) | 15,215 | 17,635 | 18,235 | 11,100 | 25,730 | 28,940 | 730 | 1,450 | 1,580 |
| (2) | 39,167 | 43,144 | 44,260 | 29,460 | 53,890 | 58,760 | 750 | 1,250 | 1,330 |
| (3) | 36,350 | 39,855 | 44,855 | 10,210 | 16,890 | 18,600 | 280 | 420 | 460 |

(1) Algeria
(2) Turkey
(3) Egypt
P:preliminary.

Sources: 1976 and 1980 World Bank Atlas, U.N.

Table 11.2: Labour force and unemployment

in Algeria, Turkey and Egypt

| | Algeria-1980 | Turkey-1975 | Egypt-1972 |
|---|---|---|---|
| Population | 19,875,000 | 40,196,670 | 34,323,000 |
| Labour force | 3,860,000 | 14,300,000 | 9,471,100 |
| Immigrant | 417,000 | | 350,000 |
| Labour force as % of the population | 20% | 40.7% | 27.6% |
| Employment | 2,830,000 | 8,749,819(1) | 8,816,600 |
| Unemployment | 670,000 | 116,770 | 654,500 |
| Unemployed as % of the total labour force | 19% | 1.3% | 6.9% |

Sources: 1974, 1978, 1980 & 1982 I.L.O. Yearbooks of Labour Statistics. In addition, for Algeria refer to Chapter One and Two and for Turkey to: Statistical Yearbook of Turkey 1979, Prime Ministry, State Institute of Statistics, Turkey.

Egypt: 3.5%, 2.6% and 2.4% per annum, respectively (2). Population pressures, labour force availability and unemployment pressures were different in the three countries. Unemployment was more widespread in Algeria (19%) than in Turkey or Egypt (1.3% and 6.9%, respectively). The percentage of the population living in rural areas amounted to 57%, 62% and 58%, respectively (3). The population per hectare on arable land and land under permanent crops was higher in Egypt than in Algeria and Turkey. These figures were 0.0785 ha per inhabitant in Egypt, 0.4136 ha in Algeria and 0.7206 ha in Turkey (4). The rate of adult illiteracy was lower in Turkey than in Algeria and Egypt as it reached 39.8%, 59.9% and 61.8%, respectively (5).

Algeria recorded an average rate of growth of GNP in real terms of 2.6%, Turkey, 4.3%, and Egypt, 1% (6). As indicated in Table 11.1, GNP per capita in current terms was higher in Algeria than in the two other countries. This can be attributed to the oil price increase which contributed about 95% of Algeria's total foreign exchange resources. The longer industrial experience in Turkey and Egypt resulted in higher ratios of skilled to total labour force which, in turn, influenced productivity and the rate of growth in real terms.

The share of GDP obtained from primary, secondary and tertiary activities shows that Algeria depended mainly on the industrial sector while Turkey and Egypt depended on agriculture and services. Algeria depended more heavily on the hydrocarbon sub-sector since the manufacturing sub-sector represented less than 25% of the total industrial contribution to GDP. Manufacturing activities were much more developed in Turkey and Egypt than in Algeria. This is confirmed by the figures given in Table 11.3.

Table 11.3: The contribution to GDP in Algeria, Turkey and Egypt (in percentages)

| Sector of activities | Algeria 1980 Current prices | Turkey 1973 Factor cost | Egypt 1973 Factor cost |
|---|---|---|---|
| Agriculture | 6.3% | 26% | 29% |
| Industry | 45.1% | 23% | 19% |
| -Hydrocarbons | 32.5% | | |
| -Manufacturing | 11.1% | 21% | 16% |
| Construction | 12 % | 6% | 3% |
| Services | 21.7% | 20% | 13% |
| Others | 14.9% | 21% | 24% |
| Total | 100.0% | 100% | 100% |

Sources: United Nations Statistical Yearbook 1975 and Table A.5 in the Appendix A.

A complete description of the Algerian economic system and its features was presented in the first chapters of this thesis and will not be repeated here. Turkey, in comparison to Algeria, benefits from a temperate climate, a strategic location (near the Middle Eastern Oil transit lines) and substantial agricultural wealth. Similar to Algeria, it is endowed with minerals. During the 1970's, Turkey promoted an especially good relationship with both Eastern Europe and the EEC and benefited from important sources of foreign currency and special foreign financial assistance (7). Turkey has considerable resources such as coal, iron ore, chrome, copper, petroleum, sulfur, cotton, wool and agricultural products. Its industry is geared to the production of steel, petroleum, petrochemicals and fertiliser products, hard and liquid coal, carbon and paper, woolen and cotton products, cement and chemicals and is substantially characterised by engineering (trucks, heavy mechanical equipment, tractor, diesel engines) and food and sugar industries.

Egypt is a medium-sized country with 97% desert land (8). The richness of Egyptian resources comes mainly from the alluvial soil of the Nile Valley and Delta. Agriculture has remained the main source of economic wealth (9). The Egyptian economy is relatively well endowed with natural resources, particularly minerals. These include not only oil, natural gas, iron ore, phosphate, salt, limestone and manganese but also long-staple cotton and sugar cane. Iron ore and petroleum have provided backward linkages to two small industrial sectors of the economy: steel and petroleum refining (10). Egypt's mineral wealth is concentrated in a narrow but valuable range of commodities. Mineral resources offered the possibility for primary industrial development, which could later extend to engineering, food and more sophisticated fields. The domestic market in both Turkey and Egypt was large enough to support the development of many industries.

A comparison of the resource endowments among the three countries shows some similarities regarding natural and material resources. Algerian resources, such as oil and gas, are easy to market. In contrast, Turkish and Egyptian resources are used to produce primary products and commodities which are difficult to market at reasonable prices in view of the international competition. This gives Algeria a privileged position when it comes to borrowing from the international institutions and leads to fewer balance of payments difficulties.

Tables 11.4 and 11.5, which focus mainly on the role and control of the state, summarize the similarities and differences between the three countries.

Table 11.4 : Similarities among Algeria, Turkey and Egypt

| |
|---|
| Centralised and controlled economy |
| Industries based on public ownership |
| Nationalisation, control of money and financial structure |
| Domestic private sector practically nonexistent, distrusted, incapable of raising rate of growth and standard of living and willing to invest only in high profit and low risk activities |
| Foreign investors not permitted to invest |
| Rapid industrialisation based on the development of heavy industries |
| Creation of a public sector |
| Private sector development in the light industrial sector |
| National integrated planning instead of unorganised & individual laissez faire |
| Implementation of development plans |
| Almost all large and medium scale industries owned by the state |
| Development based on industrial development and rapid industrialisation |
| Export of labour provided a source of foreign exchange |

Sources: Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy: The Turkish Case (Johns Hopkins Uni. Press, England, 1981); Mabro, R. and Radwan, S.: The Industrialisation of Egypt 1939-1973 (Clarendon Press, Oxford, England, 1976) and survey data.

Table 11.5: Differences among Algeria, Turkey and Egypt

| | Algeria | Turkey | Egypt |
|---|---|---|---|
| Economy | Socialist | Mixed (1) | Socialist |
| Administrative system | Inherited from the French system | Bureaucratic different from that of Algeria | Different from that of Algeria |
| Ideology | Nationalism diversification | Different | |
| Sources of foreign currency | Oil and gas | Primary commodities | |
| Foreign currency pressure | Quite manageable | Put a brake on their development | |
| Percentage of GDP invested | 60% in 1978 | 21% in 1972 | 12.3% in 1973 |
| Industrial experience | None | Long | |
| Skilled labour force | Lack | Available | |
| Foreign participation | Insignificant | Important | |

1 Comment by Ibrihim Ongut quoted by Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy: The Turkish Case, op cit, p 87.

Sources: Similar to Table 11.4.

## 11.2. The nature and operation of the Algerian, Turkish and Egyptian economic systems

### 11.2.1. The institutions

Turkey, Egypt and Algeria had similar social structures based on the preference of a ruling group who was not selected through an electoral process. The community's preference with regard to the composition of output or the distribution of income, however, held very little weight since the major decisions concerning the economy were made by the ruling group. These decisions were expressed more precisely in specific economic policies and, in quantitative terms, as targets.

There were two variants of ownership that existed side by side in the industrial sectors: public and private. In Turkey, the public sector was mainly developed in industries such as the steel, petroleum, petrochemical, fertiliser, pulp and paper, cement, textiles, sugar and engineering industries (trucks, heavy mechanical equipment, tractors and diesel engines). The private sector, on the other hand, flourished in light industries (food, light engineering and cement industries). In 1972, the Turkish industrial sector generated 23.43% of total value added. The share of public enterprise manufacturing VA was 47.3% of total manufacturing VA while its manufacturing employment was 37.4% of total manufacturing labour force (11). Large public enterprises constituted the public sector. In 1972, for example, 14 public enterprises accounted for 96% of the activity of the manufacturing and mining sectors (12).

In Egypt, the ownership structure was also dominated by public assets. The private sector was virtually excluded from all important activities. It was in control of small establishments in only five minor industries -leather, furniture, wool, wearing apparel and printing. Since 1967, however, this sector has developed links with the public sector in the form of inter-industrial integration through subcontracts. Nonetheless, public firms assumed almost complete control of the modern sector of the economy. The domination of the public sector varied between industries: 100% in petroleum; 97% in electrical machinery; 96% in basic metals, tobacco and textiles; 95% in paper, rubber and chemicals; and 16% in printing. The public sector generated 64% of total manufacturing value added and employed 60% of non-agricultural labour force or 30% of total working population (13). The public sector controlled almost all the modern, heavy and manufacturing sub-sector.

Some interesting conclusions can be drawn from the comparison of the institutions in the three countries. The public sector was very important in all three countries. The VA generated by the Algerian public sector, comparable to that generated by the Egyptian public sector, was slightly higher than that generated by the Turkish public sector. The development of similar heavy capital goods and intermediate goods industries was the basis for industrialisation in all three countries.

Similarities and differences can also be drawn with respect to the organisation, administration and management of public enterprises. The public industrial organisation in the three countries is shown in Table 11.6. In Turkey, the public enterprise is very much like a holding company in which its objectives are controlled by Parliament and, ultimately, by the people. The organisational structure found in Egypt was very much like that found in Eastern Europe. State firms are incorporated into the state apparatus. The General Organisations are semi-autonomous bodies responsible to the Ministry of Industry.

The public enterprises in the three countries were administered by their relevant ministries rather than by a state industrial holding. They were managed by a Board of Directors who made all the day-to-day decisions concerning the running of the company. The members of the Board of Directors were appointed by higher authorities and consisted mainly of civil servants. Important decisions, however, were made by or referred to the higher echelon while directives, guidelines and other instruments of control were relayed down the structure, from the ministry via the head office to the firm. Companies saw their initiative limited by regulations. On pricing, investment and personnel policies for example, the Council of Ministers acted as an overall Board of Directors for the state enterprises. The entrepreneurial function was usurped by the Ministry of Planning rather than left to the enterprise board. Public enterprises must operate within a framework of administered prices, stringent controls over all foreign exchange transactions, labour regulations and planned investment. They must also refer to higher authorities on most matters concerning their plans for the future. In conclusion, the institutions which existed in the three countries were very similar. Algerian public enterprises, however, closely resembled those found in a centrally planned economy like the USSR, for example.

Table 11.6: Organisational structure of the industrial public sector in Algeria, Turkey and Egypt.

| ALGERIA | TURKEY | EGYPT |
|---|---|---|
| Council of ministries Corresponding ministry | Council of ministries Corresponding ministry | Ministry of industry |
| Public enterprise | State enterprise | 9 General organisations |
| Managing Director Chairman of the Board | Managing director Chairman of the Board | |
| Board | Board | |
| Head office | | |
| Plants Board | Plants | 294 companies Board |

Sources: Walstedt, B.: <u>State Manufacturing Enterprises in a Mixed Economy</u>, op cit.; Mabro, R. and Radwan, S.: <u>The Industrialisation in Egypt 1939-1973</u>, op cit. and survey data.

### 11.2.2. The instruments

Table 11.7 indicates the state instruments which are similar in the three countries. Industrial investment continues to be a public sector responsibility with projects initiated either by the relevant organisation or the ministry. Investment was incorporated into an annual or multiyear plan. Implementation depended on the availability of foreign exchange, offers of project aid and other conditions. In the three countries, fiscal instruments were used, including tax subsidies and payment transfers. Monetary instruments, which involved changes in interest rates, reserve ratios, credit rationing and government lending and borrowing were also utilised in the three countries. Alteration of the exchange rate was another instrument. Among direct controls were production assignments, production tariffs, quota restrictions, the fixing of prices and wages and allocation of foreign exchange for imports. In conclusion, it appears that Turkey and Egypt used monetary instruments to drive economic activities towards the achievement of social goals, while administrative instruments were used in Algeria. This is most likely due to the more important role assigned to banks in Turkey and Egypt.

## 11.3. Performance of the Algerian, Turkish and Egyptian economic systems

To complete the comparison of the three countries and to assess the performance of their public industrial enterprises, the utilisation of the different inputs of the public industrial enterprises in the Algerian, Turkish and Egyptian (14) economic systems is analysed based on the methodology described in Chapter Four. Common causes of underutilisation of inputs in the three countries will be investigated in a second section.

Table 11.7: Similar government instruments in Algeria, Turkey and Egypt

| Government instruments |
| --- |
| Administrative control |
| Fixation of prices |
| Fixation of wages |
| Distribution of income |
| Labour legislation |
| Regulation of imports, import licenses and allocation of foreign exchange for imports, among others |
| Regulation of investments: for example, choice of technology, choice of produced outputs, location of plants and scale |
| Levels of protection: foreign exchange, prohibition of certain imports, protection tariffs and quota restrictions |
| Monetary instruments: such as interest rates, reserve ratios, credit rationing, government lending and borrowing and exchange rates |
| Fiscal instruments: taxes, subsidies, transfer payments and tax exemptions among others |

Sources: Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy, op cit.; Mabro, R. and Radwan, S.: The Industrialisation in Egypt 1939-1973, op cit. and Chapter Three.

### 11.3.1.Utilisation of inputs in the three countries

#### 11.3.1.1.Utilisation of raw materials and intermediate inputs

As recorded in Chapters Five through Ten, Algerian public enterprises utilised their raw materials and intermediate inputs inefficiently. There is some evidence that chemicals were also used inefficiently in Turkish public corporations. No evidence, on the other hand, exists to support that these inputs were inefficiently used in Egyptian public enterprises.

### 11.3.2.2.Utilisation of fixed capital

The Algerian public enterprises studied recorded an under-utilisation of fixed capital for almost all complexes and plants (92% of the plants and complexes surveyed). Among Turkish corporations, only the cement corporation and the sawmills (for which figures are available) showed underutilisation of their fixed capital (in 1973, U1 was 87.85% and 88%, respectively (15)). In addition, refineries also underutilised their capacities. No other data exists to support the hypothesis that Turkish public enterprises used their fixed capital inefficiently.

With respect to Egyptian public enterprises, some fragmentary data exist on the manufacturing sub-sector which can act as a basis for an Algerian and Egyptian comparison. These figures, available for 1963 only, are restricted to a few branches of the manufacturing sub-sector. As indicated in Table 11.8, 60% of the plants surveyed underutilised their capacities: 42% recorded a range of underutilisation between 2% and 33% with the remaining 68% between 3% and 80%. The food, cotton ginning, cement, tobacco and match plants underutilised their capacity at a lower rate than the light chemical, cotton textiles and paper plants (see Table 11.9). In the latter, however, the degree of underutilisation was relatively small and was limited to a few plants. In Egypt, the underutilisation of production capacity was greater in small than in large plants. There was no correlation between the degree of utilisation and the nature of the industry (16).

It appears that underutilisation of fixed capital occurred in all three countries compared. The rate of underutilisation of fixed capital is higher in Algerian public enterprises than in Egyptian firms. Some similarities also exist between the

Table 11.8: Fixed capital underutilisation

in Algeria and Egypt (1)

| Activities | Algeria (2) 1980-81 | | | Egypt (3) 1963 | | |
|---|---|---|---|---|---|---|
| | (4) | (5) | (6) | (4) | (5) | (6) |
| Dehydrated vegetables | | | | 4 | 4 | 17-33 |
| Cottonseed oil and soap | | | | 13 | 13 | 3-80 |
| Rice mills | | | | 7 | 6 | 9-50 |
| Tobacco | | | | 5 | 4 ) | 5-20 |
| | | | | | ) | 20-33 |
| Cotton ginning | | | | 17 | 13 | 5-60 |
| Cotton textiles | | | | 28 | 12 | 2-13 |
| Paper | | | | 3 | 0 | |
| Pulp & paper | 10 | 9 | 1-42.6 | | | |
| Printing | | | | 9 | 1 | 20 |
| Hydrocarbons | 22 | 22 | 8-95 | | | |
| Fertilisers(nitrate) | | | | 3 | 1 | 28 |
| Light chemicals | 16 | 15 | 1-78 | | | |
| Pharmaceutical | | | | 10 | 4 ) | 9-23 |
| | | | | | ) | 23-50 |
| Matches | | | | 3 | 2 | 13-17 |
| Cement | | | | 4 | 4 | 11-50 |
| Construction materials | 71 | 67 | 4-78 | | | |
| Steel and iron products | 35 | 31 | 1-83.5 | | | |
| Mechanical engineering | 17 | 13 | 1.5-52 | | | |
| Total | 171 | 157 | | 106 | 64 | |

Sources: Mabro, R. and Radwan, S.: *The industrialisation of Egypt 1939-1973*, op cit. p 158 and survey data.

1 The basis for the calculation of the rate of utilisation of fixed capital for the two countries is different.
2 These figures are the U1 (ratio of actual over planned outputs) calculation which takes into account only public industrial enterprises.
3 The figures concerned all Egyptian enterprises. The private sector contribution, however, was insignificant in almost all the branches of industry.
4 Number of firms or plants.
5 Number of plants with underutilisation of capacity.
6 Percentage range of underutilisation.

Table 11.9: Ranking* of branches of industry by degree of fixed capital underutilisation in Algeria and Egypt

| ALGERIA 1980-81 (1) | EGYPT 1963 |
|---|---|
| 1 Light chemicals | 1 Printing |
| 2 Pulp and paper | 2 Paper |
| 3 Construction materials | 3 Petroleum |
| 4 Mechanical engineering | 4 Textiles |
| 5 Iron and steel | 5 Transport equipment |
| 6 Hydrocarbons | 6 Engineering and metallic products. |
| | 7 Glass |
| | 8 Basic metals |
| | 9 Wood and furniture |
| | 10 Chemicals |
| | 11 Food,beverages & tobacco |
| | 12 Building materials |
| | 13 Electrical machinery and appliances. |

Sources: Mabro, R. and Radwan, S.: The industrialisation of Egypt 1939-1973, op cit. p 160 and Table 11.8.

* From lowest to highest.
1 For the available figures only taking into account of both U1 and U2.

branches of industry in these two countries. For example, the pulp and paper industry shows one of the highest rates of fixed capital utilisation in both countries. The similarities, however, do not extend to the hydrocarbon, materials construction and light chemical branches which show very different rates of fixed capital utilisation from one country to the other.

11.3.1.3.Utilisation of labour

According to available figures, overstaffing occurred in Egyptian (17), Turkish (18) and Algerian public enterprises. No other evidence was found to support the statement that labour was inefficiently utilised in plants.

### 11.3.2. Common causes of inefficiency in Algeria, Turkey and Egypt

In the following, common causes of inefficiency that led to underutilisation of inputs in public enterprises and corporations in the three countries are presented.

#### 11.3.2.1. Organisational factors

The economic organisation of the industrial public sector led to inefficiencies. The relationship of the firm to the state, as opposed to that of an autonomous unit accountable for economic results, was comparable to that of a state department. This relationship incorporated public enterprises into the state apparatus. Managers were considered to be civil servants who were expected to take full responsibility for public enterprise operation. Public enterprises were, therefore, run as if they were part of the administration, according to rules. All important decisions were either made by or referred to higher level of hierarchical echelons while directives and guidelines were relayed down the structure from the ministries via the public enterprise's head office to the plants (Algeria and Turkey) or via the organisation to the firms (Egypt). This economic organisation, which allowed ministries and head office of public enterprises to interfere in short, medium and long term management decisions, led to a total lack of autonomy of the plant. Consequently, it restricted the freedom of managers and limited their decision-making power. For example, decisions regarding the possible investment of profits were centralised at the Ministry of Planning level. Public enterprise managers were merely restricted to a consultative role (i.e. suggestions and submission of projects) in matters of this nature. The prices of goods were also fixed and administered by other state agencies. This organisational structure failed to provide firms or plants with an efficient system of incentives to improve productivity.

There also existed an overlapping of support and an insufficient shifting of priorities. Direction and coordination (19) at the top level and coordination among public enterprises and between ministries and public enterprises were inadequate. These problems were mainly due to imprecise (or nonexistent) policies and work objectives. The frequent replacement of top level administrators did not favour the building of an experienced administration. The business knowledge of civil servants and politicians occupying high positions in public enterprises was often questionable. Furthermore, the three systems were ruled by bureaucratic systems (20), which were characterised by lack of autonomy, lack of motivation, an excessive multiplication of activities under one roof and long delays before important decisions could be reached. Activities were not linked by a clear economic and managerial rationale. This resulted in high administrative costs.

As already mentioned, the public sector in Algeria, due to the lack of social infrastructure (transport, housing, personnel security), is faced with high labour turnover and absenteeism rates, high social costs and lack of workers' participation. These obviously were factors accounting for low productivity. No evidence of such problems was found in either Turkey or Egypt. This may be attributed to the relatively longer period of industrial experience that these two countries possessed and the greater availability of social infrastructure. On the other hand, wage and incentive systems were inefficient in all three countries (21). Wage policies were not based on worker productivity and adjusted to the production level.

The economic organisation and environment in which public enterprises operated created inefficiencies due to gaps in job responsibilities, friction among workers, duplication and insufficient coordination of efforts and communication. This environment did not favour efficient decisions-making. Consequently, underutilisation of inputs occurred in the three countries' public industrial sectors.

11.3.2.2. Shortages of inputs

As mentioned earlier, shortages of local raw materials and intermediate inputs occurred in all Algerian public enterprises. Turkish public enterprises, on the other hand, did not have such problems with the exception of one public enterprise (a shortage of wood (22)). In the Egyptian firms, only plants using natural gas and scrap metal experienced shortages of these inputs (23). Shortages of means of transport and infrastructure facilities were evident only in Turkish and Algerian public enterprises.

According to the available evidence, the shortage of a skilled labour force affected all three countries. The extent to which the public sector was hurt by this, however, differed considerably from country to country. The effect that the shortage of this particular input had on the performance of the public sector was minor in Egypt, mild in Turkey but, as reviewed in the previous chapters, very important in Algeria. In Egypt only the Ministry of Planning suffered from this shortage. In Turkey, public enterprises lacked knowledgeable professionals with economic and commercial expertise which left the door open to political considerations in the appointment of persons to managerial positions (24). Labour shortages in Turkey were related to the utilisation of capital intensive technology and the existence of a large private sector which was in constant competition for the available skilled labour force.

Public enterprises in the three countries were not provided with sufficient working capital (25). This was attributed to the fact that financing of plant did not include investment, such as that required for the training of workers and the development of necessary environmental infrastructure, and was often left as the plant's responsibility. In addition, the distribution of subsidies was inadequate. This led to considerable increases in financial charges through extensive borrowing which enabled public enterprises to make up for the lack of working capital.

Foreign trade was a state administered and controlled activity in Algeria and Egypt. As a result, public enterprises were subject to the bureaucratic inefficiencies of a centralised system of import procurements which often led to shortages of imported inputs in the two countries. In addition, input shortages were often the result of barter deals, linking imports required by the plants to the main exports of the economy. Imported goods, under such circumstances, usually did not conform to the specifications and norms stipulated by the plant contractor. A shortage of foreign exchange also led to shortages of imported inputs (26). Delays in obtaining important imports resulted in the idling of production capacity and to costly building-up of precautionary inventories. The consequences of such procedures were bottlenecks in production and lack of optimisation of import timing to take advantage of seasonal price patterns. Cumbersome customs policies also influenced the shortage of imported inputs. In Egypt, 40 to 60 per cent of the firms suffered from the shortage of imported inputs. This shortage was the major cause of underutilisation of inputs in Egypt and Algeria. There was no evidence to believe that Turkish public enterprises suffered from a lack of imported inputs.

#### 11.3.2.3.Allocative inefficiencies

Inappropriate choice of output often led to inefficiencies related to investment criteria and method of project appraisal in all three countries. The system put sectoral planning into the hands of departments unequipped to study projects. Priorities were often not properly defined and the methods used were extremely crude (27). The degree of competence and the procedures used in project selection were, therefore, questionable. For instance, a project was often approved according to some crude calculations of value added per unit of capital invested, potential foreign currency savings and some crude estimates of employment effects. As a result, plans included a number of noneconomic projects. For obvious reasons, production capacity was underutilised. For example, in Egypt the decision to invest in a jet fighter plant and not to renovate textile plants and/or invest in construction materials plants, much needed industries, was questionable. Another example was the decision to develop a pulp and paper industry in Algeria which needs a large amount of water that is not available.

Plant location rarely took into account the effect that it would have on the utilisation of inputs. For example, Egyptian dairy products factories were located in places where they could not easily be supplied with milk. Similar cases, as mentioned earlier, were experienced in Algeria. No evidence of such inefficiency existed for Turkish public enterprises (29).

The large scale of the production capacity resulted in underutilisation of inputs, too. In Egypt and Algeria for example, the scale of production capacity in the food industries was far too large with respect to the availability of natural resources (raw materials).

11.3.2.4.Demand shortages

In the three countries, plants were built larger than necessary to satisfy actual demand. This was mainly due to economies of scale and the availability of technology on the international market (30). The public organisations responsible for foreign trade found difficulties in breaking into export markets (31). They also lacked the necessary incentives and skills to promote exports. In addition, the high production cost of outputs kept these countries' products from being competitive on the international market. For these reasons, despite being faced with excess capacities, plants could not export.

11.4.Conclusions

To summarize, for the period reviewed, the Algerian, Turkish and Egyptian economic systems were all dominated by a public sector characterised by centralised planning, direct control and significant intervention of the state. The three countries had considerable natural resources which offered the possibility for industrial development. All were under an intensive phase of economic growth where the development of similar heavy capital goods and intermediate goods industries was the basis for industrialisation. Public enterprises were founded to sustain economic development in all three countries. The contribution of the public industrial sector to total industrial value added was significant in Algeria, Egypt and Turkey, in that order. Similar instruments were used to control the economy although monetary instruments were used in Turkey and Egypt while administrative instruments were used in Algeria.

Some interesting conclusions can be drawn with respect to the performance of the public industrial sector in the three countries. First, the raw materials, intermediate inputs, fixed capital and labour were underutilised. Second, the underutilisation of inputs was lower in the Turkish and Egyptian industrial public sectors (in that order) than that of Algeria. This was attributed to the greater industrial experience of the former two countries. In the third place, the existence of a relatively large, competitive private sector and an effective distribution system of subsidies accounted for the higher utilisation of production capacity shown by the Turkish public sector. It should be stressed, however, that despite these differences in the level of utilisation of inputs, the three countries were afflicted by very similar causes of inefficiency, namely organisational factors, shortages of inputs, allocative inefficiencies and shortages of demand. The fact that some causes of inefficiency encountered in the Algerian public sector were not experienced by both the Turkish and Egyptian industrial sectors should not detract from the more interesting point that some inefficiencies encountered by the industrial public sectors of the three countries are intrinsic and inherent to a country's economic organisation. In that respect, the

Egyptian and Turkish systems, which showed persistent inefficiencies, are typical examples which clearly indicate the direction to be taken to alleviate, if not eliminate, inefficiencies encountered by Algerian public enterprises, specifically, a change in certain government policies.

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9 Refer to Mabro, R. and Radwan, S.: The Industrialisation of Egypt 1939-1973 (Clarendon Press, Oxford, England, 1976) p 35.

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11 Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy: The Turkish Case, op cit. pp 238-241.

12 Ibid pp 31 & 91.

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1939-1973, op cit. p 40.

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15 Refer to Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy: The Turkish Case, op cit. pp 290-291 and Industrial Development Bank of Turkey: Sawnwood and Wood-Based Panels Industries (Research Department Publication in no. 10, April 1977) quoted in Walstedt, B. op cit. p 42.

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21 Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy: The Turkish Case, op cit. p 190 & 192-193.

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23 Mabro, R. and Radwan, S.: The Industrialisation of Egypt 1939-1973, op cit. p 162.

24 Walstedt, B.: State Manufacturing Enterprises in a Mixed

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25 Ibid p 340.

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27 Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy: The Turkish Case, op cit. pp 190, 341-342 and 344-345.

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31 See Ibid p 163; Yusuf, J. Ahmed: Absorptive Capacity of the Egyptian Economy: An Examination of Problems and Prospects, op cit. p 133 and Walstedt, B.: State Manufacturing Enterprises in a Mixed Economy: The Turkish Case, op cit. p 341.

# CHAPTER TWELVE: CONCLUSIONS AND SUGGESTIONS

The principal aim of this work has been to assess the performance of public industrial enterprises in Algeria and identify the main causes of inefficiency by focusing on capacity utilisation as a measure of efficiency which influences the levels of industrial output and employment. The aggregative analysis at the plant level was based on empirical evidence obtained from six of the most representative public enterprises in the Algerian public industrial sector. This chapter proposes to synthesize the main conclusions that have emerged and suggest some requirements and proposals for policy on this subject.

Algeria has been characterised, since independence, by the will to achieve a level of economic development comparable to that of some Western developed countries. In order to achieve this level of development, the Algerian government set objectives which were to be realised by the state through the "industrialising industry" strategy. Algeria's choice of development strategy, which focuses on the industrial sector as opposed to the agricultural sector, has been strongly influenced by the nature of its resource endowment (e.g., oil and gas). To that effect, the proceeds of oil and gas exports have been used to expand the country's industrial base, develop agriculture and strengthen the economic and social infrastructure. Growth in investment and structural reforms have been accompanied by the centralisation of decision-making in regard to the formulation and implementation of development plans. The outcome of the above policies has been the emergence of a strong public industrial sector.

Encouraging results regarding growth, investment, savings, employment, education, regional development and income distribution were achieved during the last decade. The period spanning 1969 to 1979 saw a 7% growth in GDP in real terms. During the same period, the share of total investment at current prices averaged 39% of GDP per year. During the period 1969-80 more than 1.4 million non-agricultural jobs were created and enrollments in schools and universities rose sharply. The repartition of investment carried out in the industrial sector can be deduced from the share of value added recorded by the different branches of industry. The largest contribution to the industrial VA comes from the hydrocarbon sub-sector (45% in real prices in 1978) followed by the iron and steel, mechanical and electrical engineering and construction materials industries.

Despite these remarkable results, the industrial sector is faced with a wide variety of difficulties. Some of these difficulties have arisen from the imbalances created by the rapid growth of the industrial sector (e.g., social infrastructure and training). In order to assess the consequences of these difficulties on the performance of this sector and identify the causes of inefficiency, a representative sample of public industrial enterprises has been studied.

Although the public enterprises studied show some peculiarities, they are characterised by a large number of common features. These enterprises, which are either heavy industries producing durable capital goods or consumer goods industries, are all industrialising industries of medium or large size playing an important role in Algerian development. With the exception of SONATRACH (hydrocarbons), which is geared for export, all the public enterprises are import substitution industries and produce outputs destined for the domestic market. Most of the plants belonging to these enterprises were built during the post-independence period and use capital intensive technology imported from different countries. These plants, which are large in scale, are mainly located in the northern part of Algeria. Despite the fact that some plants show a high rate of integration (70%), the level of integration of public enterprises and the Algerian public industrial sector in general is not very high. Raw materials and labour are almost totally supplied by the local market although some public enterprises employ a significant proportion of foreign labour. On the other hand, intermediate inputs, capital and spare parts are almost totally imported. The public enterprises studied, which do not encounter fierce competition from the underdeveloped private sector and thus occupy a monopolistic position regarding national production, are very rarely faced with lack of local demand.

An efficiency measure has been adopted to evaluate the performance of the six public enterprises selected. What is meant by efficiency is how inputs (raw materials, intermediate inputs, fixed capital and labour) are utilised with respect to outputs. To that effect, raw materials and intermediate inputs, fixed capital and labour utilisations have been evaluated for each plant output, for every plant and public enterprise. Since Algeria is a capital-scarce economy, emphasize has been placed on the measurement of fixed capital utilisation through the calculation of U1 (ratio of actual over planned output), U2 (ratio of planned over technical output) and U3 (ratio of actual over technical number of shifts or time utilisation).

This investigation led to the conclusion that inputs were inefficiently used in all public enterprises studied and, by and large in the Algerian public industrial sector. According mainly to evidence given by the plant managers, raw materials and intermediate inputs were inefficiently used in the vast majority of plants surveyed. The extent of this underutilisation was particularly large in SONIC (pulp and paper industry) and SONACOME (mechanical engineering industry) plants.

As summarized in Figure 12.1, it was also found that fixed capital was underutilised in the various public enterprises studied, reflecting different rates of fixed capital utilisation within plants. The average rate of fixed capital utilisation of the six public enterprises studied was 72.81% and 76.64% for U1 and U2, respectively. In addition, fixed capital was used for less than three quarters of the available time (U3= 71.27%). The rest of the time it remained idle. Simultaneous analysis of U1 and U2 shows that fixed capital was used most efficiently in SONIC and SNIC and least efficiently in SONATRACH (hydrocarbon industry). The calculation of U3 indicates that the actual number of shifts (or time) during which fixed capital was used compared to the technical norm was highest in SONATRACH and lowest in SONACOME. Similarly, based on information given by the plant managers, it has been deduced that labour was underutilised in all plants showing overstaffing. It is important to point out that overstaffing, although it infringes on the performance of the enterprise, was necessary in Algeria, which was characterised by a high rate of unemployment.

The level of capacity utilisation was chosen as a measuring instrument given the critical need to identify the major causes of underutilisation of the different inputs. With respect to this, the study of the six public industrial

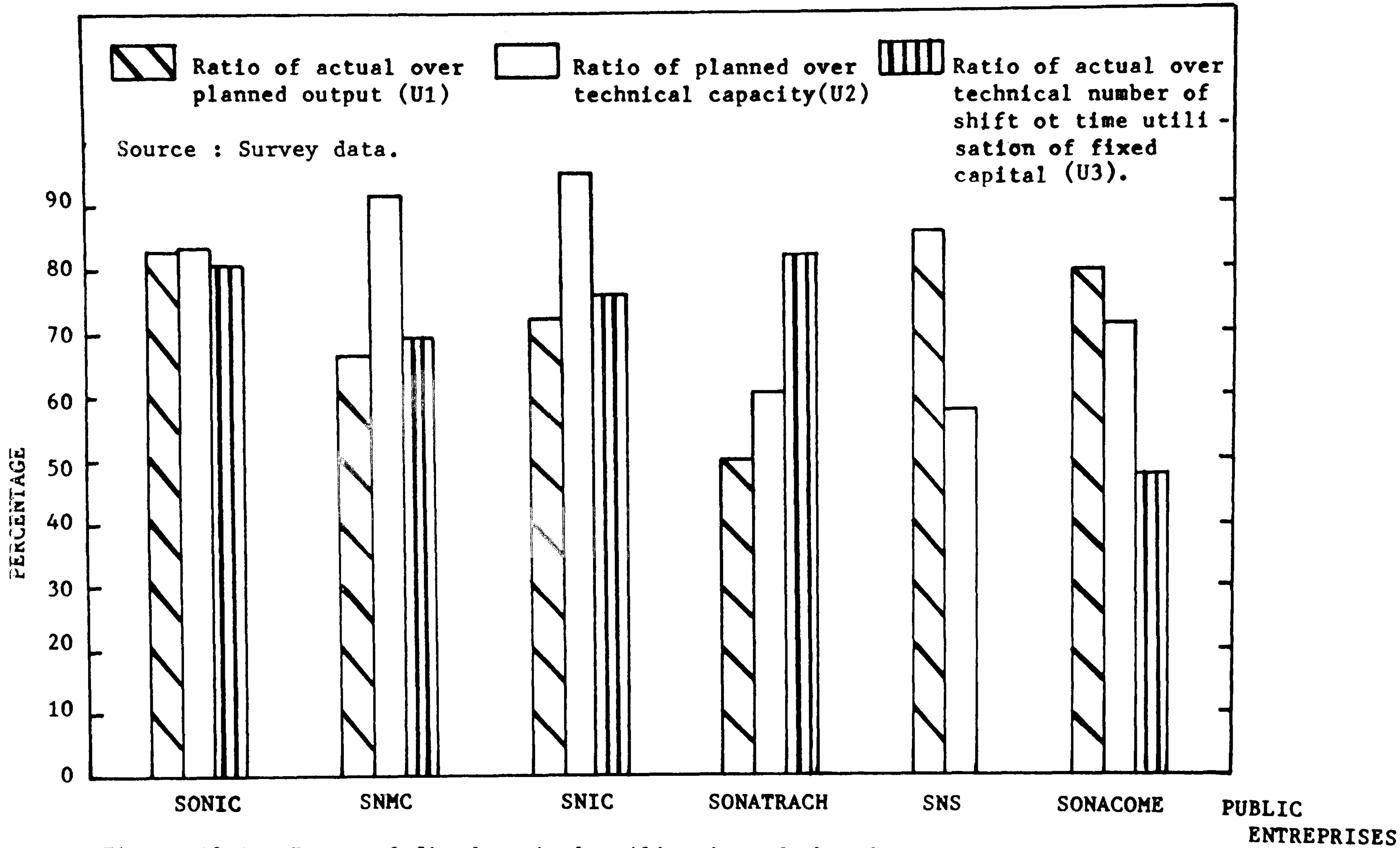


Figure 12.1 : Rates of fixed capital utilisation of the Algerian public industrial enterprises surveyed.

enterprises has shed some light on these causes in the Algerian context. The causes of inefficiency which follow, can then be summarized into four main categories:

1) Organisational causes are related to the economic organisation and environment in which public enterprises operate. They are mainly due to noneconomic factors (social, cultural and institutional), the relationship of the public enterprise to the government, cumbersome bureaucracy and the diversification and large size of the plants and public enterprises.

2) Shortages of inputs from the local and international markets also affected the utilisation of fixed capital and labour. Almost all the plants surveyed were faced with difficulties in obtaining supplies of both raw materials and intermediate inputs provided by the local market. In addition, supplies of water and electricity were particularly inadequate and unreliable. Plants also encountered problems with the collection of inputs and/or removal of outputs, reflecting the shortage of means of transport and infrastructure facilities. More importantly, the lack of a skilled labour force, strongly affected all the plants particularly the technical and supervisory positions on the production lines and in the maintenance area. Similarly, the shortage of imported inputs was one of the major causes of the inefficient utilisation of inputs. This resulted from the rigidity of import regulations, bureaucratic procedures and cumbersome financial, customs and control policies. Finally insufficient working capital resulting from inappropriate project financing procedures and inefficient subsidy distribution systems was also a factor influencing the smooth operation of the plants.

3) Allocative inefficiencies arose from inappropriate government policies in the areas of plant location, adopted technology and level of integration of the plant or complex.

4) Finally, demand shortages, only experienced by a few plants, were mainly due to a decline in international demand (e.g., crude oil) or the adoption of large scale plants in anticipation of future demand and existent technology.

The underutilisation of inputs in Algerian public enterprises is influenced directly by supply and demand conditions and indirectly by economic organisation, environment and government policies.

From the results of this empirical study, it appears that the entire public industrial sector is faced with underutilisation of the different inputs for reasons similar to those deduced for the individual public enterprises studied. This is corroborated by the fact that identical problems are observed in countries such as Turkey and Egypt, which have economic structures similar to Algeria. It is notable that several of the problems encountered are also observed in the public enterprises in some highly developed countries (1).

The overall conclusion emerging from the description and findings of the public enterprises is that capacity utilisation does not reach its desired level. The alleviation, if not elimination, of inefficiencies surrounding the use of raw materials, intermediate inputs, fixed capital and labour would lead to a significant increase in output, employment and, eventually, to the achievement of higher rates of capacity utilisation and economic growth.

On the basis of the identified causes of inefficiency, some general suggestions regarding increases in output and employment as well as efficiency in the different public enterprises may be proposed. Although many of the parameters that will allow plants to achieve higher input utilisation are obtained implicitly from the causes themselves, some additional comments are called for. Certain constraints may be more pervasive and require long term policies while others may be easy to solve. The policy recommendations which follow can be divided into four categories: organisational factors, supply bottlenecks, government policies and external markets.

1) Organisational factors

A considerable gain in efficiency would be achieved if public enterprises were encouraged to operate on a commercial rather than bureaucratic basis. Greater emphasis would be placed on profit as a criterion of performance. This could only be accomplished if economic decisions were clearly separated from business planning and operations. This in fact suggests restructuring the present Algerian industrial organisation and defining clearly the public enterprise objectives (2). Ideally a system that holds management accountable for results while giving it the autonomy to achieve them is desirable. This would imply a transfer of supervisory functions from the ministry to the public enterprise head office, concentration of corporate management in a limited number of plants and strengthening of the managing director position at these plants or complexes. The public enterprise head office would be the top administrative organ for plants engaged in similar types of economic activities while acting, at the same time, as a link with the highest authorities.

Experience shows, however, that structural changes only are not sufficient to alter the underlying balance of power. A beneficial impact may only be expected if some additional reforms are also undertaken. The most important reforms would be to require public enterprises to pay for the opportunity cost of their capital, end their monopoly position resulting in the use of market prices (this implies that prices are correct and not distorted), the use of shadow prices to calculate the economic rate of return and account for public profit. This would greatly promote the idea of holding managers accountable for results by encouraging them to maximize profit. A criterion on which they could be judged.

The reorganisation, which is currently underway, does not aim at defining clearly the public enterprise objectives and does not favour the operation of public enterprises on commercial rather than bureaucratic principles. These policy recommendations would provide stronger administration at the level of plant management, effective coordination and cooperation between plants and public enterprises and an efficient incentive system.

In addition, adequate studies should be carried out to solve organisational inefficiencies such as the condition and the organisation of production and workers. These studies would provide an efficient technical layout, workers management, control system, cost accounting, working methods, maintenance and handling systems (3).

2) Supply bottlenecks

Supplies of local raw materials and intermediate inputs are assumed to be adequate. In this study, however, it has been shown that unreliable and insufficient supplies of these inputs are encountered in a large number of public enterprises. For example, the shortage of esperto grass combined with its poor quality was one of the major problems encountered in one of the SONIC (pulp and paper) plants.

Recommendations to improve this situation take us beyond the field of industry to that of agriculture and forestry (better organisation of the sector, price related to its real cost and an improvement in the system of collecting raw materials and intermediate inputs).

Shortages of electricity and water could only be alleviated and eventually eliminated by adopting more rational and realistic policies. The ultimate solution would lie in the improvement of common supplies of electricity and water from SONELGAS and the water authorities and not with reducing the dependence on these inputs by installing standby generators in complexes and plants.

Improvement of transport and infrastructure facilities could only be carried out successfully through general planning and measures that reduce port and airport congestion and decrease administrative delays, damage and loss. This would obviously imply large expenditures on public works of all kinds: roads, railways, bridges, dams, airports and ports. Equally great is the need for large scale social expenditures, particularly in the form of housing.

The shortage of a skilled labour force, which necessitates a long term programme, could be solved by two complementary policy recommendations. The first improvement may be made by reallocating managers from the head office of public enterprises to the plants where they could monitor public enterprise performance directly. A second recommendation would be to initiate training programmes at the technical level, organise vocational training courses for young workers and adopt a more appropriate educational system than the one in practice (long run). These measures should not prevent the government from adopting incentives to attract skilled workers in small towns as well.

Improving the availability of imported goods could be achieved by liberalising the policies on imported raw materials, intermediate inputs and spare parts or by reducing foreign trade procedures. Special funds could be made available on a yearly basis for urgent unplanned imports. More efficient banking and customs controls in relation to import policy will improve the situation greatly.

Finally, the lack of working capital would not be a problem if credit was made available on time and subsidies were efficiently distributed to plants. This would lead to the realisation of profits and, therefore, its distribution to labour force as advocated by the Socialist Management's Charter (see Chapter Four), and eventually to a more efficient incentive system. Infrastructure expenditures should be taken charge of by the state in order to reduce the plant's financial burden.

3) Government policies

Problems related to allocative inefficiencies (location, product, level of integration and techniques) are more difficult to solve. Some, however, could be improved through large financial outlays. This could be done, for example, by renovating part of the machinery, building additional workshops to correct imbalances in capital equipment or expanding storage capacities for inputs and outputs. The government should guarantee supplies of raw materials, electricity, water and labour training, liberalise import, customs, banking and control policies and take charge of the expenditures on infrastructure facilities. There is a serious need for a more equitable income policy in order to decrease the high rate of labour turnover. A more efficient system of distribution of subsidies would greatly improve the financial situation of a number of public enterprises. Increasing the number of shifts in existing plants would permit an increase in industrial output and reduction of disguised employment. Improvements could be achieved at the investment planning level (selection, financing and execution) by the development of national design and execution capabilities, the adoption of more advanced methods of preparing investment projects and the adoption of more appropriate credit reimbursement terms, to name only a few.

4) External markets

Local demand could be boosted if the attitudes of managers were more market-oriented. This is particularly relevant for new products. The international market could also be used to stimulate demand by setting up more aggressive and organised marketing services to compensate for the low domestic demand. Growth of demand is also linked to development in other plants or sectors. The development of the hydrocarbon industrial sub-sector, for example, as a whole would permit an increase in semi-finished and finished exports which would make up for the excess capacity that presently exists in SONATRACH plants. In SNMC (construction materials), such development is the result of an ambitious housing programme (which, in fact, is urgently required) which would be resolved by an efficient housing programme and aggressive export promotion to neighbouring countries.

The suggestions, which are very broad recommendations, are derived from the problems encountered. They, therefore, offer a valuable area for future research of a detailed nature.

## References

1 For example, English or French public enterprises. See Pryde, R.: The Nationalised Industries: Policies and Performance since 1968 (Martin Roberson, Oxford, England, 1981).

2 This is confirmed by the article by Shirley, M.M.: Managing State-Owned Enterprises, World Bank Staff Working Papers, No. 577, Management and Development series No. 4, The World Bank, Washington, D.C., USA.

3 These actions were also carried out in countries like Egypt, Pakistan and India after the I.L.O. expert recommendations. See I.L.O. Productivity Missions to Underdeveloped Countries: I and II, International Labour Review, Vol. 76, July and August 1957, pp 1-29 and 139-166, respectively.

Table A.1 : Planned and programmed cost and realised investment #

as a Percentage of total investment in billions of AD

| | 1967-69 | | | 1970-73 | | | 1974-77 | | | 1978 | | 1967-78 actualised 31-12-78 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (1) | (2) | (3) | (1) | (2) | (3) | (4) | (3) | (5) | (3) | (6) |
| hydrau.,agricul.& fishing | 17.9 | 9.6 | 20.5 | 17.8 | 13.8 | 12.0 | 15.2 | 10.1 | 7.4 | 4.0 | 7.9 | 9.2 | 8.8 | 9.6 |
| -Hydraulic | 3.9 | 3.1 | 5.3 | 6.9 | 5.3 | 3.7 | 4.2 | 4.7 | 2.5 | 1.9 | 3.2 | 4.0 | 2.9 | 5.0 |
| -Agriculture | 13.9 | - | 15.2 | 10.5 | 8.2 | 8.1 | 10.9 | 5.3 | 4.8 | 2.1 | 4.7 | 5.1 | 5.8 | 4.5 |
| -Fishing industry | 0.1 | - | - | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | - | - | 0.1 | 0.1 | 0.1 |
| Industry | 59.6 | 71.5 | 53.5 | 44.8 | 53.2 | 57.2 | 43.5 | 53.9 | 61.2 | 58.4 | 61.2 | 54.6 | 60.3 | 49.4 |
| -Hydrocarbons | 25.1 | 23.7 | 27.5 | 16.5 | 23.3 | 26.9 | 17.7 | 21.2 | 29.7 | 35.7 | 27.9 | 24.3 | 28.7 | 20.2 |
| -Manufacturing industries | 29.4 | 40.8 | 21.2 | 23.1 | 26.0 | 24.3 | 23.4 | 29.9 | 27.7 | 17.7 | 29.9 | 26.7 | 27.4 | 26.2 |
| -Mining and other energy | 5.1 | 6.9 | 4.8 | 5.2 | 3.9 | 6.0 | 2.4 | 2.9 | 3.8 | 5.0 | 3.9 | 3.6 | 4.2 | 3.0 |
| Building & public works | - | - | - | - | 1.2 | 1.8 | 2.5 | 1.9 | 2.8 | 2.5 | 2.1 | 2.0 | 2.4 | 1.6 |
| Tourism | 3.8 | 1.5 | 2.0 | 2.5 | 2.5 | 2.1 | 1.4 | 1.0 | 1.0 | 0.3 | 0.6 | 0.9 | 1.2 | 0.8 |
| Transportation | - | 0.4 | 0.8 | 2.9 | 2.0 | 3.1 | 5.9 | 3.3 | 4.3 | 2.9 | 2.3 | 3.1 | 3.5 | 2.8 |
| Housing | 3.8 | 2.1 | 2.6 | 5.5 | 5.3 | 4.2 | 7.5 | 11.0 | 7.0 | 14.1 | 9.3 | 11.2 | 7.0 | 15.1 |
| Economic infrastructure | 1.3 | * | 1.2 | 1.3 | 2.0 | 1.9 | 2.3 | 3.3 | 3.1 | 2.7 | 2.7 | 3.3 | 2.7 | 3.7 |
| Other infrastructure | 3.8 | 5.3 | 3.1 | 4.1 | 3.0 | 3.3 | 3.4 | 2.6 | 2.7 | 2.2 | 2.6 | 2.6 | 2.8 | 2.5 |
| Education & training | 8.9 | 5.3 | 9.2 | 11.9 | 9.9 | 8.4 | 9.0 | 7.6 | 4.9 | 8.7 | 5.6 | 7.9 | 5.8 | 9.8 |
| Miscellaneous | 1.0 | 4.3 | 7.1 | 9.2 | 7.1 | 5.9 | 9.3 | 5.3 | 5.6 | 4.2 | 5.2 | 5.2 | 5.5 | 4.7 |
| Total investment ** | 9.06 | 19.58 | 9.16 | 27.75 | 68.56 | 36.31 | 110.22 | 314.3 | 121.23 | 93.63 | 52.65 | 453.4 | 219.4 | 234.05 |

Source: La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. p 7.

Legend:
# The programme costs are actualised at the end of each period.
* Telecommunications are included in communications.
** In billions of AD.

1 Planned investment.
2 Programmed cost of investment.
3 Realised investment.
4 Investment and reevaluation.
5 Global cost.
6 Left to be realised.

Table A.2 : Programmed and realised public investment by sector 1978-1984

(millions of AD)

| | Intermediary period(1) Budget plans 1978 | Budget plans 1979 | Final cost 1978 | Final cost 1979 | Fourth Plan 1980-84 Starting plan evaluation | Carry-over projects in % |
|---|---|---|---|---|---|---|
| Hydrocarbons | 34400 | 20100 | 14705 | 17570 | 63000 | 45.00 |
| Heavy, light & Mines & energy industries | 21250 | 15440 | 17800 | 15658 | 91500 | 55.08 |
| Agriculture & fisheries | 2000 | 3295 | 2475 | 2264 | 24100 | 28.63 |
| Water development | 1770 | 2129 | 1669 | 2017 | 23000 | 46.95 |
| Tourism | 310 | 330 | 328 | 270 | 3400 | 50.00 |
| Transportation | 2680 | 1861 | 1189 | 824 | 13000 | 21.57 |
| Economic infrastructure(2) | 5580 | 3576 | 2753 | 2485 | 37900 | 52.50 |
| Construction | 2350 | 3941 | 1093 | 2319 | 20000 | 17.00 |
| Housing | 14180 | 6539 | 4933 | 4509 | 60000 | 58.00 |
| Education & training | 8140 | 3760 | 2966 | 3511 | 42200 | 71.56 |
| Social, administrative infrastructure & others | 3970 | 3734 | 2751 | 2194 | 22500 | 32.88 |
| Total | 96630 | 64705 | 52662 | 53621 | 400600 | 42.36 |

Sources: Ministry of Planning and Ministry of Finance.

1 1978 & 1979 are the Ministry of Finance estimates.
2 Economic infrastructure includes highways, ports, airports, railways, telecom., industrial estates and trade infrastructure

Table A.3 : Gross domestic product by industrial origin
At Current Prices
(millions of AD)

| | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Agriculture | 2,216.1 | 2,427.8 | 2,616.9 | 2,828.1 | 2,728.2 | 3,419.7 | 4,967.0 | 5,314.8 | 5,353.5 | 6,737.6 | 7,840.0 | 9,845.5 |
| Hydrocarbon | 2,954.4 | 3,214.3 | 2,290.4 | 4,451.6 | 6,452.2 | 18,418.2 | 15,561.5 | 19,630.4 | 23,585.6 | 24,472.0 | 33,700.0 | 50,426.7 |
| Mining & quarrying | 108.8 | 130.8 | 161.2 | 173.1 | 193.5 | 372.8 | 341.8 | 328.7 | 358.3 | 315.6 | 410.0 | 540.0 |
| Other energy & water | 263.8 | 329.4 | 388.1 | 437.4 | 507.3 | 603.8 | 675.2 | 867.6 | 1,031.0 | 1,265.9 | 1,540.0 | 1,710.0 |
| Manufacturing | 2,778.4 | 3,366.4 | 3,466.8 | 4,087.4 | 4,776.5 | 5,202.8 | 5,733.2 | 7,427.9 | 8,354.6 | 10,604.9 | 14,280.0 | 17,180.0 |
| Food proc.& tobacco | 984.6 | 1,069.2 | 1,180.0 | 1,357.7 | 1,530.8 | 1,558.8 | 1,762.5 | 2,180.1 | 2,504.9 | 2,797.0 | 3,600.0 | 4,325.0 |
| Steel, mechanical electrical | 533.4 | 802.7 | 613.6 | 854.6 | 998.3 | 1,065.6 | 1,176.0 | 1,646.1 | 1,798.4 | 2,620.1 | 4,350.0 | 5,225.0 |
| Chemicals | 218.1 | 266.2 | 315.3 | 329.0 | 507.3 | 531.3 | 616.8 | 813.9 | 892.2 | 840.0 | 890.0 | 1,080.0 |
| Textiles & leather | 574.0 | 684.5 | 747.7 | 838.7 | 1,039.2 | 1,162.7 | 1,197.6 | 1,414.2 | 1,509.5 | 2,292.6 | 2,820.0 | 3,360.0 |
| Construct. materials | 166.0 | 202.3 | 239.4 | 293.8 | 253.1 | 338.5 | 390.0 | 600.2 | 742.4 | 1,149.8 | 1,490.0 | 1,900.0 |
| Miscellaneous | 302.3 | 341.5 | 370.8 | 413.6 | 447.2 | 545.9 | 590.3 | 773.4 | 907.2 | 905.4 | 1,130.0 | 1,290.0 |
| Construction | 2,019.3 | 2,229.0 | 2,642.1 | 3,459.9 | 4,014.0 | 5,406.7 | 6,633.7 | 8,569.5 | 10,032.7 | 13,373.5 | 16,220.0 | 18,520.0 |
| Sub total industry | 8,124.0 | 9,269.9 | 8,948.6 | 12,609.4 | 15,943.5 | 30,004.3 | 28,945.4 | 36,824.1 | 43,362.2 | 50,031.9 | 66,150.0 | 88,376.7 |
| Transportation & communications | 1,045.3 | 1,263.2 | 1,359.4 | 1,479.4 | 1,767.0 | 2,515.2 | 2,820.3 | 3,241.0 | 4,122.7 | 4,760.8 | 5,256.0 | 5,839.0 |
| Trade | 3,669.1 | 4,266.0 | 4,839.6 | 5,213.9 | 5,292.1 | 4,838.2 | 5,382.8 | 7,230.7 | 8,998.3 | 12,884.8 | 15,650.0 | 19,111.0 |
| Other services | 2,182.9 | 2,331.1 | 2,417.6 | 2,539.1 | 2,754.0 | 3,065.1 | 3,435.8 | 3,633.3 | 4,365.2 | 6,594.0 | 7,325.0 | 8,600.0 |
| Subtotal services | 6,897.3 | 7,860.3 | 8,616.6 | 9,232.4 | 9,813.1 | 10,418.5 | 11,638.9 | 14,105.0 | 17,486.2 | 24,239.6 | 28,240.0 | 33,550.0 |
| Total VA (1) | 17,237.4 | 19,558.0 | 20,182.1 | 24,669.9 | 28,484.8 | 43,842.5 | 45,551.3 | 56,243.9 | 66,201.9 | 81,009.1 | 102,230.0 | 131,772.2 |
| Import duties | 1,236.9 | 1,652.2 | 1,446.1 | 1,887.9 | 2,047.2 | 3,749.6 | 4,423.6 | 4,490.0 | 6,551.0 | 8,491.8 | 5,730.0 | 7,360.0 |
| Gross domestic production | 18,474.3 | 21,210.2 | 21,628.2 | 26,557.8 | 30,532.0 | 47,592.1 | 49,974.9 | 60,733.9 | 72,752.9 | 89,500.9 | 107,960.0 | 139,132.2 |
| Government services | 2,570.5 | 2,862.1 | 3,294.6 | 3,855.4 | 4,061.1 | 4,841.3 | 6,741.1 | 7,241.1 | 8,693.5 | 11,122.8 | 12,870.0 | 15,633.1 |
| Gross Domestic Product | 21,044.8 | 24,072.3 | 24,922.8 | 30,413.2 | 34,593.1 | 52,433.4 | 56,716.1 | 67,975.0 | 81,446.4 | 100,623.7 | 120,830.0 | 154,765.3 |

Source: Ministry of Planning

1 Excluding government services.

Table A.4 : Average rate of growth of GDP (current prices)

(in percent)

| | 1969-1970 | 1970-1971 | 1971-1972 | 1972-1973 | 1970-1973 | 1973-1974 | 1974-1975 | 1975-1976 | 1976-1977 | 1974-1977 | 1977-1978 | 1978-1979 | 1979-1980 | 1977-1980 | 1969-1980 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross domestic product | 14 | 3.75 | 21.6 | 13 | 12.78 | 50 | 8 | 9 | 31.6 | 16.2 | 23.5 | 20 | 27.5 | 23.66 | 20 |
| Agriculture | 9.5 | 7.78 | 8 | -3.5 | 4.09 | 25.3 | 45.2 | 7 | 0.7 | 17.6 | 25.8 | 16.36 | 25.58 | 22.58 | 15.25 |
| Industry | 14.1 | -3.4 | 40.9 | 26.4 | 21.3 | 88.2 | -3.5 | 27.2 | 17.7 | 13.8 | 15.4 | 32.2 | 33.6 | 27.06 | 26.25 |
| -Hydrocarbons | 8.8 | -31 | 94 | 45 | 36 | 185 | -16.5 | 25.7 | 20 | 9.73 | 3.8 | 37 | 58 | 32.93 | 39.07 |
| -Manufacturing | 21.2 | 2.9 | 18 | 16.8 | 12.56 | 8.9 | 10.2 | 29.5 | 12.5 | 17.4 | 27 | 34.6 | 20.3 | 27.3 | 18.3 |
| -Construction | 10.4 | 18.5 | 30.9 | 16 | 21.8 | 34.7 | 22.7 | 29.2 | 17 | 22.96 | 33.3 | 21.3 | 14.2 | 22.93 | 25.26 |
| Services | 14 | 9.6 | 7.14 | 6.28 | 7.67 | 6.1 | 11.7 | 21.1 | 23.9 | 18.9 | 38.6 | 16.5 | 18.8 | 24.63 | 15.79 |

Source: Table A.3.

Table A.5 : Percentage of GDP by sectoral origin (at current prices)

| | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total GDP (billion AD) | 21.05 | 24.07 | 24.92 | 30.41 | 34.59 | 52.43 | 56.71 | 61.97 | 81.44 | 100.62 | 120.83 | 154.76 |
| Agriculture | 10.53 | 10 | 10.5 | 9.2 | 7.8 | 6.5 | 8.7 | 8.57 | 6.57 | 6.69 | 6.4 | 6.3 |
| -Hydrocarbons | 14 | 13.35 | 9.18 | 14.6 | 18.6 | 35.1 | 27.4 | 31 | 28.9 | 24.32 | 27.9 | 32.5 |
| -Mining and quarrying | 0.5 | 0.5 | 0.64 | 0.56 | 0.5 | 0.7 | 0.6 | 0.5 | 0.4 | 0.3 | 0.34 | 0.3 |
| -Other energy and water | 1.25 | 1.36 | 1.55 | 1.4 | 1.4 | 1.15 | 1.19 | 1.40 | 1.26 | 1.2 | 1.2 | 1.1 |
| -Manufacturing | 13.2 | 14 | 14 | 13.4 | 13.8 | 9.9 | 10 | 11.98 | 10.2 | 10.5 | 11.8 | 11.1 |
| -Food process.& tobacco | 4.6 | 4.4 | 4.7 | 4.4 | 4.4 | 2.9 | 3.1 | 3.5 | 3 | 2.7 | 3 | 2.8 |
| -Steel, mechanical & electrical | 2.5 | 3.3 | 2.4 | 2.8 | 2.8 | 2 | 2 | 2.6 | 2.2 | 2.6 | 3.6 | 3.3 |
| -Chemicals | 1 | 1.1 | 1.26 | 1 | 1.4 | 1 | 1 | 1.3 | 1 | 0.8 | 0.7 | 0.7 |
| -Textiles & leather | 2.72 | 2.8 | 3 | 2.7 | 3 | 2.2 | 2.1 | 2.2 | 1.8 | 2.2 | 2.3 | 2.2 |
| -Construction materials | 0.7 | 0.84 | 0.96 | 0.96 | 0.7 | 0.6 | 0.6 | 0.9 | 0.9 | 1.14 | 1.2 | 1.2 |
| -Miscellaneous | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1 | 0.9 | 1.2 | 1.1 | 0.89 | 0.9 | 0.8 |
| -Construction | 9.6 | 9.2 | 11.8 | 11.3 | 11.6 | 10.3 | 11.6 | 13.8 | 12.3 | 13.3 | 13.4 | 12 |
| Total industry | 38.6 | 38.5 | 36 | 41.4 | 46 | 57.2 | 51 | 59.4 | 53.2 | 49.7 | 54.7 | 57.1 |
| -Transport & communicat. | 5 | 5.2 | 5.4 | 4.8 | 5.1 | 4.7 | 4.9 | 5.2 | 5 | 4.7 | 4.3 | 3.8 |
| -Trade | 17.4 | 17.7 | 19.4 | 17.1 | 15.3 | 9.2 | 9.4 | 11.6 | 11 | 12.8 | 13 | 12.3 |
| -Other services | 10.3 | 9.6 | 9.7 | 8.3 | 7.9 | 5.8 | 6 | 5.8 | 5.3 | 6.5 | 6.1 | 5.6 |
| Total services | 32.7 | 32.6 | 34.5 | 30.3 | 28.3 | 19.8 | 20.5 | 22.7 | 21.4 | 24 | 23.4 | 21.7 |

Source: Table A.3.

Table A.6 : Industrial value added by sub-sector from 1967 to 1978 (millions of AD constants 1978)

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hydrocarbons | 14181 | 15808 | 16807 | 18123 | 13017 | 19874 | 21181 | 19847 | 18871 | 20833 | 22532 | 24472 | 25019 | 22571 |
| Water-energy | 217 | 233 | 275 | 347 | 411 | 469 | 515 | 623 | 764 | 975 | 1157 | 1266 | 1540 | 1710 |
| Mining | 135 | 167 | 214 | 239 | 295 | 310 | 284 | 339 | 295 | 301 | 315 | 316 | 395 | 452 |
| Iron & steel | | | | | | | | | | | | | | |
| mech./elec. eng. | 669 | 798 | 1017 | 1477 | 1069 | 1397 | 1594 | 1581 | 1920 | 1953 | 2097 | 2620 | 4092 | 4548 |
| Constr. material | 208 | 234 | 306 | 356 | 386 | 468 | 346 | 425 | 511 | 688 | 800 | 1150 | 1402 | 1656 |
| Agr./food ind. | 1348 | 1475 | 1647 | 1774 | 1952 | 2277 | 2580 | 2712 | 2969 | 3035 | 2962 | 2797 | 3387 | 3768 |
| Textiles, leather | 1004 | 1143 | 1131 | 1207 | 1263 | 1372 | 1706 | 1768 | 1502 | 1747 | 1739 | 2293 | 2653 | 2926 |
| Chemicals, wood | | | | | | | | | | | | | | |
| miscellaneous | 702 | 752 | 903 | 1021 | 1085 | 1101 | 1342 | 1438 | 1512 | 1820 | 1946 | 1745 | 1900 | 2060 |
| Sub-total manufacturing industries | 3931 | 4402 | 5004 | 5838 | 5755 | 6615 | 7568 | 7924 | 8414 | 9243 | 9544 | 10605 | 13434 | 14958 |
| Cons. pub. works | 3301 | 3661 | 3953 | 3972 | 4156 | 4460 | 4762 | 5632 | 6000 | 6277 | 7664 | 9184 ) | | |
| | | | | | | | | | | | | | )15448 | 16571 |
| Petroleum pub. works | 1347 | 1477 | 2092 | 2865 | 2307 | 3317 | 2375 | 2141 | 2802 | 3702 | 3973 | 4190 ) | | |
| Total | 23112 | 25438 | 28345 | 31384 | 25941 | 35045 | 36685 | 36606 | 37146 | 41331 | 45185 | 50033 | 55836 | 56208 |
| Total excl. CPW | 18464 | 20600 | 22300 | 24547 | 19478 | 27268 | 29548 | 28833 | 28344 | 31352 | 33548 | 36659 | 40388 | 39637 |

Source: Ministry of Planning.
* 1980 figures are the Ministry of Planning estimates.

Table A.7 : Evolution of petroleum revenues

compared to total revenues

(Billions of AD)

| Years | Total revenues | Petroleum revenues | Petroleum revenues as % of total revenues |
|---|---|---|---|
| 1967 | 4.025 | 0.88 | 21.8 |
| 1968 | 4.567 | 1.134 | 24.8 |
| 1969 | 5.689 | 1.32 | 23.2 |
| 1970 | 6.306 | 1.35 | 21.4 |
| 1971 | 6.919 | 1.648 | 23.8 |
| 1972 | 6.178 | 3.278 | 53.05 |
| 1973 | 11.067 | 4.114 | 37.17 |
| 1974 | 23.438 | 13.399 | 57.16 |
| 1975 | 25.093 | 13.462 | 53.6 |
| 1976 | 26.215 | 14.237 | 54.3 |
| 1977 | 33.479 | 18.019 | 53.8 |
| 1978 | 36.782 | 17.365 | 47.2 |

Sources: Several Annuaires Statistiques de L'Algerie (1970, 1974, 1976 and 1979), op cit.; La Synthese du Bilan Economique et Social de la Decennie 1967-78, op cit. and 1982 Internationnal Financial Statistics Yearbook, U.N.

Table B.1 : Actual (1967-79) and planned (1980-84) investments (in millions of AD)

| Industrial Branches | 3-Year plan 1967-69 actual | 3-Year plan 1967-69 proportions (%)(1) | 4-Year plan 1970-73 actual | 4-Year plan 1970-73 proportions (%)(1) | 4-Year plan 1974-77 actual | 4-Year plan 1974-77 proportions (%)(1) | Interplan 1978-79 actual | Interplan 1978-79 proportions (%)(1) | 5-Year plan 1980-84 actual | 5-Year plan 1980-84 proportions (%)(1) |
|---|---|---|---|---|---|---|---|---|---|---|
| Hydrocarbons | 2521.1 | 51.3<br>- | 9776.0 | 47.0<br>- | 35999.0 | 48.5<br>- | 32285.0 | 47.6<br>- | 63000.0 | 40.8<br>- |
| Energy | 249.4 | 5.1<br>10.4 | 1528.6 | 7.3<br>13.9 | 3551.1 | 4.8<br>9.4 | 3491.9 | 5.6<br>9.8 | 14500.0 | 9.4<br>15.8 |
| Mining | 189.5 | 3.9<br>7.9 | 654.8 | 3.1<br>5.9 | 1064.4 | 1.4<br>2.8 | 807.4 | 1.2<br>2.3 | 2500.0 | 1.6<br>2.7 |
| Iron & steel | 935.0 | 19.0<br>39.1 | 2885.8 | 13.9<br>26.2 | 7416.7 | 10.0<br>19.4 | 6889.4 | 10.2<br>19.4 | 12600.0 | 8.2<br>13.8 |
| Mech./elec. engineer. | 101.6 | 2.1<br>4.2 | 1773.0 | 8.5<br>16.1 | 6745.2 | 9.1<br>17.7 | 8562.6 | 12.6<br>24.1 | 18000.0 | 11.7<br>19.7 |
| Chemicals | 495.0 | 10.1<br>20.7 | 953.3 | 4.6<br>8.6 | 5542.0 | 7.5<br>14.5 | 3768.5 | 5.6<br>10.6 | 8000.0 | 5.2<br>8.7 |
| Constr. materials | 31.8 | 0.6<br>1.3 | 1166.0 | 5.6<br>10.6 | 6959.3 | 9.4<br>18.2 | 3024.7 | 4.5<br>8.5 | 9000.0 | 5.8<br>9.8 |
| Agri/food industries | 156.8 | 3.2<br>6.6 | 668.0 | 3.2<br>6.1 | 1775.2 | 2.4<br>4.7 | 2802.2 | 4.1<br>7.9 | 11200.0 | 7.2<br>12.2 |
| Textiles | 125.1 | 2.5<br>5.2 | 474.4 | 2.3<br>4.3 | 2576.8 | 3.5<br>6.8 | 3831.9 | 5.7<br>10.8 | 7400.0 | 4.8<br>8.1 |
| Leather | 44.0 | 0.9<br>1.8 | 63.0 | 0.3<br>0.6 | 256.4 | 0.3<br>0.7 | 203.1 | 0.3<br>0.6 | 800.0 | 0.5<br>0.9 |
| Wood, paper, misc. | 16.6 | 0.3<br>0.7 | 744.8 | 3.6<br>6.8 | 1801.2 | 2.4<br>4.7 | 1200.0 | 1.8<br>3.4 | 4500.0 | 2.9<br>4.9 |
| Local & craft. ind. | 46.0 | 0.9<br>1.9 | 99.6 | 0.5<br>0.9 | 439.0 | 0.6<br>1.2 | 910.0 | 1.3<br>2.6 | 3000.0 | 1.9<br>3.3 |
| General studies | - | -<br>- | 23.7 | 0.1<br>0.2 | 29.0 | 0<br>0 | 18.0 | 0<br>0 | ... | ..<br>.. |
| Total | 4911.8 | 100.0 | 20803.0 | 100.0 | 74155.3 | 100.0 | 67794.7 | 100.0 | 154500.0 | 100.0 |
| Total excl. hydroc. | 2390.7 | 100.0 | 11027.0 | 100.0 | 38156.3 | 100.0 | 35509.7 | 100.0 | 91500.0 | 100.0 |

Source: Ministry of Planning.
1 The first line indicates the percentage according to the total;
the second line indicates the percentage according to the total excluding hydrocarbons.
- Not applicable.
.. Not available.

Table B.2 : Salaried employment by industrial sub-sector (1000 jobs)

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mines & quarries | 12.1 | 14.3 | 12.5 | 14.8 | 17.2 | 15.5 | 15.5 | 15.5 | 16.8 | 19.0 | 19.7 | 20.6 | 22.6 | 24.2 |
| Hydrocarbons | 7.3 | 8.6 | 10.2 | 16.2 | 16.6 | 22.1 | 31.7 | 39.7 | 48.6 | 59.6 | 73.9 | 82.3 | 85.8 | 92.4 |
| Electricity | 5.8 | 5.7 | 6.1 | 6.3 | 6.5 | 6.5 | 7.6 | 8.2 | 9.1 | 10.7 | 16.6 | 18.5 | 21.5 | 24.5 |
| Agricul. food industry | 20.2 | 27.4 | 27.3 | 28.0 | 28.1 | 31.3 | 30.6 | 32.6 | 37.2 | 41.6 | 43.8 | 46.0 | 56.5 | 64.2 |
| Textiles and leather | 15.0 | 24.6 | 29.9 | 32.0 | 34.9 | 35.3 | 35.1 | 35.8 | 38.2 | 40.3 | 41.1 | 43.8 | 59.6 | 71.8 |
| Chemicals | 6.3 | 7.1 | 7.5 | 7.4 | 8.3 | 8.5 | 7.6 | 8.6 | 12.4 | 13.9 | 14.7 | 15.2 | 25.1 | 32.8 |
| Construction materials | 7.5 | 8.0 | 8.8 | 8.4 | 12.7 | 12.9 | 15.4 | 15.9 | 19.6 | 21.7 | 22.9 | 24.1 | 28.0 | 27.7 |
| Iron and steel | 3.9 | 4.6 | 6.3 | 9.0 | 9.4 | 12.3 | 15.1 | 19.9 | 22.4 | 26.4 ) | | | | |
| | | | | | | | | | | | ) 82.7 | 85.5 | 92.0 | 97.0 |
| Mech. & elec. enginer. | 15.3 | 17.3 | 19.0 | 22.6 | 22.4 | 24.0 | 35.5 | 39.7 | 44.7 | 49.9 ) | | | | |
| Wood, paper & misc. | 14.9 | 15.8 | 17.1 | 16.5 | 16.2 | 16.9 | 17.3 | 21.6 | 24.9 | 27.5 | 30.6 | 32.6 | 34.1 | 36.0 |
| Total manufactur. ind. | 88.9 | 110.5 | 122.0 | 130.2 | 138.5 | 147.7 | 164.2 | 182.3 | 208.5 | 232 | 252.4 | 265.7 | 316.8 | 354.0 |
| Construction public works(1) | ... | ... | ... | ... | ... | ... | 190.0 | 216.7 | 250.6 | 203.4 | 364.0 | 398.5 | 402.0 | 430.0 |
| Total | ... | ... | ... | ... | ... | ... | 401.4 | 454.2 | 524.5 | 514.0 | 710.0 | 767.1 | 827.2 | 900.6 |
| Total excl. CPW | 108.3 | 133.4 | 144.7 | 161.2 | 172.3 | 185.3 | 211.4 | 237.5 | 273.9 | 310.6 | 346.0 | 368.6 | 425.2 | 470.6 |
| Total excl. CPW & hydrocarbons | 101.0 | 124.8 | 134.5 | 145.0 | 155.7 | 163.2 | 179.7 | 197.8 | 225.3 | 251.0 | 272.1 | 286.3 | 339.4 | 378.2 |

Source: Statistiques 1967-78, Ministry of Planning, Algiers.

1 For construction and public works, statistics available as of 1973.
... Not available.

Table B.3 : Change in import structure within the industrial sector (millions of AD 1980)

| | 1967 | | 1970 | | 1974 | | 1978 | | Average annual growth rate 1967-1978 |
|---|---|---|---|---|---|---|---|---|---|
| | Imports | % | Imports | % | Imports | % | Imports | % | |
| Total imports | 10,013.0 | 100.0 | 16,546.3 | 100.0 | 30,983.6 | 100.0 | 40,564.4 | 100.0 | 13.6 |
| Industrial sector Imports (1) | 7,699.8 | 76.9 | 14,074.0 | 85.1 | 27,089.3 | 87.4 | 36,049.3 | 88.9 | 15.1 |
| -Food products | 1,959.5 | 19.6 | 1,106.6 | 6.7 | 4,914.9 | 15.9 | 4,422.1 | 10.9 | 7.7 |
| -Basic | 1,440.4 | 14.4 | 617.3 | 3.7 | 3,504.6 | 11.3 | 2,586.2 | 6.4 | 5.5 |
| -Processed | 519.1 | 5.2 | 489.3 | 3.0 | 1,410.3 | 4.6 | 1,835.9 | 4.5 | 12.2 |
| -Other imports | 5,740.3 | 57.3 | 12,967.4 | 78.4 | 22,174.4 | 71.6 | 31,627.2 | 78.0 | 16.8 |
| -Capital goods | 2,417.9 | 24.1 | 6,509.6 | 39.4 | 9,749.1 | 31.5 | 19,053.8 | 47.0 | 20.0 |
| -Equipment | 1,733.1 | 17.3 | 4,834.6 | 29.2 | 7,043.3 | 22.7 | 13,515.1 | 33.3 | 21.0 |
| -Machinery | 1,401.8 | 14.0 | 3,961.6 | 23.9 | 5,696.0 | 18.4 | 10,234.2 | 25.2 | 19.8 |
| -Spare parts | 331.2 | 3.3 | 873.0 | 5.3 | 1,347.3 | 4.3 | 3,280.9 | 8.1 | 24.0 |
| -Transport. mater. | 149.1 | 1.5 | 815.3 | 4.9 | 1,804.1 | 5.8 | 3,297.1 | 8.1 | 32.0 |
| -Parts for transp. materials | 535.7 | 5.3 | 859.7 | 5.2 | 901.7 | 2.9 | 2,241.6 | 5.5 | 13.9 |
| -Supply | 3,322.4 | 33.2 | 6,457.8 | 39.0 | 12,425.3 | 40.1 | 12,573.4 | 31.0 | 12.9 |
| -Basic products | 290.9 | 2.9 | 402.9 | 2.4 | 902.5 | 2.9 | 968.5 | 2.4 | 11.6 |
| -Processed prod. | 3,031.6 | 30.3 | 6,055.0 | 36.6 | 11,522.9 | 37.2 | 11,604.9 | 28.6 | 13.0 |

Source: Comptes Economiques 1967-78, Ministry of Planning, Algiers.
1 These figures include industry in general, hydrocarbons and Building/Public Works. Included also are farm machinery (relatively marginal), and spare parts for non-industrial transportation materials (also of little importance).

Table B.4 : Export by major group, volume and value
millions of AD: f.o.b., thousands of tons for groups 2, 3, 4 and 5

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Foodstuffs | | | | | | | | | | | |
| value | 985 | 521 | 536 | 910 | 664 | 687 | 627 | 551 | 534 | 431 | 459 |
| volume | .. | .. | 905 | 1,394 | 1,172 | 661 | 746 | 578 | 557 | 334 | 118 |
| 2. Oil and oil products | | | | | | | | | | | |
| value | 3,505 | 3,149 | 4,815 | 6,205 | 16,470 | 15,662 | 19,380 | 23,125 | 23,349 | 33,255 | 50,916 |
| Volume | .. | .. | 49,183 | 49,456 | 46,702 | 42,859 | 49,643 | 52,001 | 54,020 | 62,481 | 50,916 |
| 3.4. Raw materials | | | | | | | | | | | |
| value | 151 | 150 | 171 | 119 | 311 | 215 | 495 | 212 | 190 | 261 | 200 |
| volume | .. | .. | 2,883 | 1,648 | 3,557 | 1,968 | 2,535 | 2,329 | 2,273 | 3,513 | 2,135 |
| 5. Semi-manufactured goods | | | | | | | | | | | |
| value (1) | 339 | 388 | 332 | 128 | 231 | 222 | 173 | 172 | 190 | 188 | 245 |
| volume | .. | .. | 350 | 245 | 252 | 270 | 197 | 244 | 206 | 200 | 244 |
| 6. Capital goods for agriculture | | | | | | | | | | | |
| value (2) | .. | .. | .. | 1 | 1 | 4 | 1 | 1 | 2 | 1 | 45 |
| volume | .. | .. | .. | 78 | 43 | 154 | 4 | 1 | 0 | 0 | 51 |
| 7. Capital goods for industry | | | | | | | | | | | |
| value (2) | .. | .. | .. | 75 | 80 | 135 | 11 | 18 | 6 | 4 | 4 |
| volume | .. | .. | .. | 7,289 | 8,081 | 3,408 | 1,643 | 1,905 | 126 | 30 | 0 |
| 8. Consumer goods | | | | | | | | | | | |
| value (2) | .. | .. | .. | 41 | 46 | 27 | 17 | 11 | 12 | 4 | 4 |
| volume | .. | .. | .. | 2,502 | 3,132 | 1,518 | 735 | 351 | 462 | 123 | 0 |
| Total merchandise exports | 4,980 | 4,208 | 5,854 | 7,479 | 17,803 | 16,952 | 20,704 | 24,089 | 24,283 | 34,144 | 51,873 |

Source: Direction des Douanes, Ministry of Finance, Algiers.

* Provisional.
1 1970-72: Capital goods and consumer goods included.
2 1970-72: Included under semi-manufactured goods.

Table B.5 : Direction of trade

(millions of AD)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980* |
|---|---|---|---|---|---|---|---|---|---|
| Imports (c.i.f.) from | | | | | | | | | |
| E.E.C. | 4533 | 5936 | 10168 | 14916 | 13229 | 18047 | 18727 | 19607 | 24487 |
| USA | 468 | 722 | 1680 | 2624 | 2632 | 2561 | 2365 | 2066 | 2879 |
| Other countries | 1693 | 2202 | 4964 | 6133 | 6261 | 8867 | 13337 | 9762 | 11181 |
| Total imports | 6694 | 8860 | 16821 | 23673 | 22122 | 29475 | 34429 | 31435 | 38547 |
| Exports (f.o.b.) to | | | | | | | | | |
| E.E.C. | 3646 | 4836 | 9668 | 8395 | 9395 | 9232 | 9146 | 13117 | 19862 |
| USA | 495 | 828 | 4363 | 3696 | 8790 | 12489 | 12312 | 17095 | 25517 |
| Other countries | 1713 | 1815 | 3772 | 4861 | 2219 | 2368 | 2825 | 3932 | 6494 |
| Total exports | 5854 | 7479 | 17803 | 16952 | 20704 | 24089 | 24283 | 34144 | 51873 |

Source: Direction des Douanes, Ministry of Finance, Algiers.

* Provisional.

## APPENDIX B.1.: Algerian private firms in 1962

The different private firms that existed in 1962 in the iron and steel, metal, mechanical and electrical industries were : Acilor -producing steel and coils; ENCN -boiler work and tubes; UMA -agricultural materials; Renault and Berlier -assembly of cars; Durafour -metallic frames; SNUF -railway materials; Altemel, Cablaf and Philips -electrical and transformation of aluminum...(1). In the chemical and paper industries, the colonial inheritance was quite large consisting of: Veuve Cote, Duco, Astral, Freitag, Ripolin, Willemer, Fepe, Norcolor, Unilever & Detersal (2) producing detergent, glass, mirrors, paints, varnish and household cleaning products. There was also a plant producing fertiliser and plants producing paper bags, pulp and writing and printing paper. Algeria also inherited two oil pipelines: the Haoud-El-Hamra Bejaia and the In-Amenas-La Skhirra pipeline (Tunisia). Some of the plants were still under construction at independence. These were, for instance, the steel making plant of El-Hadjar and CAMEL LNG plant (part of the Constantine plan).

### References

1 See Benachenou, A.: Planification et Developpement en Algerie 1962-80 (Press de l'EN Imprimerie Commercial, Algiers, 1980) p 15.

2 Refer to Schnetzler, J.: Le developpement Algerien, op cit. pp 121 & 122 for more details.

## APPENDIX B.2: The restructuring of Algerian public industrial enterprises

The public industrial enterprises are planned to be restructured into a certain number of public enterprises as follows:

SONATRACH : 13 new public enterprises which will all be related to hydrocarbons

1) Public enterprise of refinement and distribution
2) Public enterprise of plastic and rubber
3) Public enterprise of petroleum works
4) Public enterprise of civil engineering
5) Public enterprise of geophysics
6) Public enterprise of LNG
7) Public enterprise of engineering
8) Public enterprise of petrochemicals and fertilisers
9) Public enterprise of maintenance
10) Public enterprise of pipelines
11) Public enterprise of well works
12) Public enterprise of well services
13) Public enterprise of drilling.

SNMETAL : 4 new public enterprises which will all be related to metallurgy

1) Public enterprise of capital goods
2) Public enterprise of railway materials
3) Public enterprise of metallic construction
4) Public enterprise of smelting products.

SNS : 9

1) Public enterprise of metallic containers
2) Public enterprise of industrial gas
3) Public enterprise of promotion of steel products
4) Public enterprise of salvage products (3)
5) Public enterprise of transformation of long products
6) Public enterprise of iron and steel
7) Public enterprise of local works (4)
8) Local study bureaus (3)
9) Public enterprise of transformation of tubes and flat products.

SONACOME : 11

1) Public enterprise of hydraulic equipment
2) Public enterprise of machine tools
3) Public enterprise of nut, bolt & screw and cutlery
4) Public enterprise of distribution of industrial equipment
5) Public enterprise of cars, cycles & motorcycles
6) Public enterprise of public works materials
7) Public enterprise of engineering
8) Public enterprise of industrial vehicles
9) Public enterprise of agricultural machines
10) Public enterprise of distribution of cars
11) Public enterprise of building and construction.

SONAREM : 2
1) Public enterprise of mine exploration
2) Public enterprise of development and exploitation.

SONELEC : 8
1) Public enterprise of cables
2) Public enterprise of electrotechniques
3) Public enterprise of electrochemicals
4) Public enterprise of electronics
5) Public enterprise of lift services
6) Public enterprise of distribution of electrical products
7) Public enterprise of telecommunications
8) Public enterprise of electrical appliances.

SNERI : 5
1) Public enterprise of engineering (EDIL)
2) Public enterprise of technical setting up
3) Three public enterprises of building and construction.

SNIC : 4
1) Public enterprise of paints
2) Public enterprise of detergent and household cleaning products
3) Public enterprise of glass and abrasives
4) Public enterprise of earthenware.

SNLB : 4
1) Public enterprise of cork
2) Public enterprise of wood transformation and furniture
3) Public enterprise of carpentry and unit construction
4) Public enterprise of hardware.

SNMC : 4
1) Public enterprise of red brick and tile
2) Public enterprise of hydraulic binder material
3) Public enterprise of ceramics
4) Public enterprise of distribution.

SNSEMPAC : 5
Five regional public grain processing enterprises.

SONIPEC : 3
1) Public enterprise of first stage processing goods
2) Public enterprise of manufactured goods
3) Public enterprise of distribution.

SONITEX : 6
1) Public enterprise of cotton
2) Public enterprise of wool
3) Public enterprise of industrial textiles
4) Public enterprise of silk
5) Public enterprise of ready-to-wear
6) Public enterprise of distribution.

Source: Comite National pour la Restructuration des Entreprises: Location des Sieges des Nouvelles Entreprises (MPAT, Algiers, March 1982).

# APPENDIX C.1: DIFFERENT FORMS OF CONTRACTS IN ALGERIA

Due to the lack of skilled labour and, more importantly, the shortage of Algerian entrepreneurship, the only option open to Algeria with regard to the construction of the various projects which were part of its ambitious industrial development plans, was reliance on foreign contractors. The various contractual forms used for plant construction were the decomposed, turnkey, product-in-hand (or run-in) and cost-plus-fee contracts. The most commonly used form is the turnkey contract; currently, however, the product-in-hand form has become more popular. The different forms of contract are described below.

## 1.The decomposed contract

In this type of contract, a line is drawn between the supply of equipment and the supply of services. As indicated in Figure C.1.1, the project is divided into different subcontracts with distinct suppliers and is characterised by the individualisation of the different phases. Thus, the realisation of each phase, from engineering, equipment supply, the setting up of installations, technical assistance and the training of personnel or sometimes a combination of several subcontracts, is given to a distinct supplier. The realisation of the project, the setting up of production lines and the coordination of the whole operation are the responsibility of the public enterprise. An example of this type of contract is the vast iron and steel industrial complex of El-Hadjar (SNS). This type of contract seems to be favoured by foreign contractors who are not required to provide numerous guarantees. Experience is crucial to effectively realise this

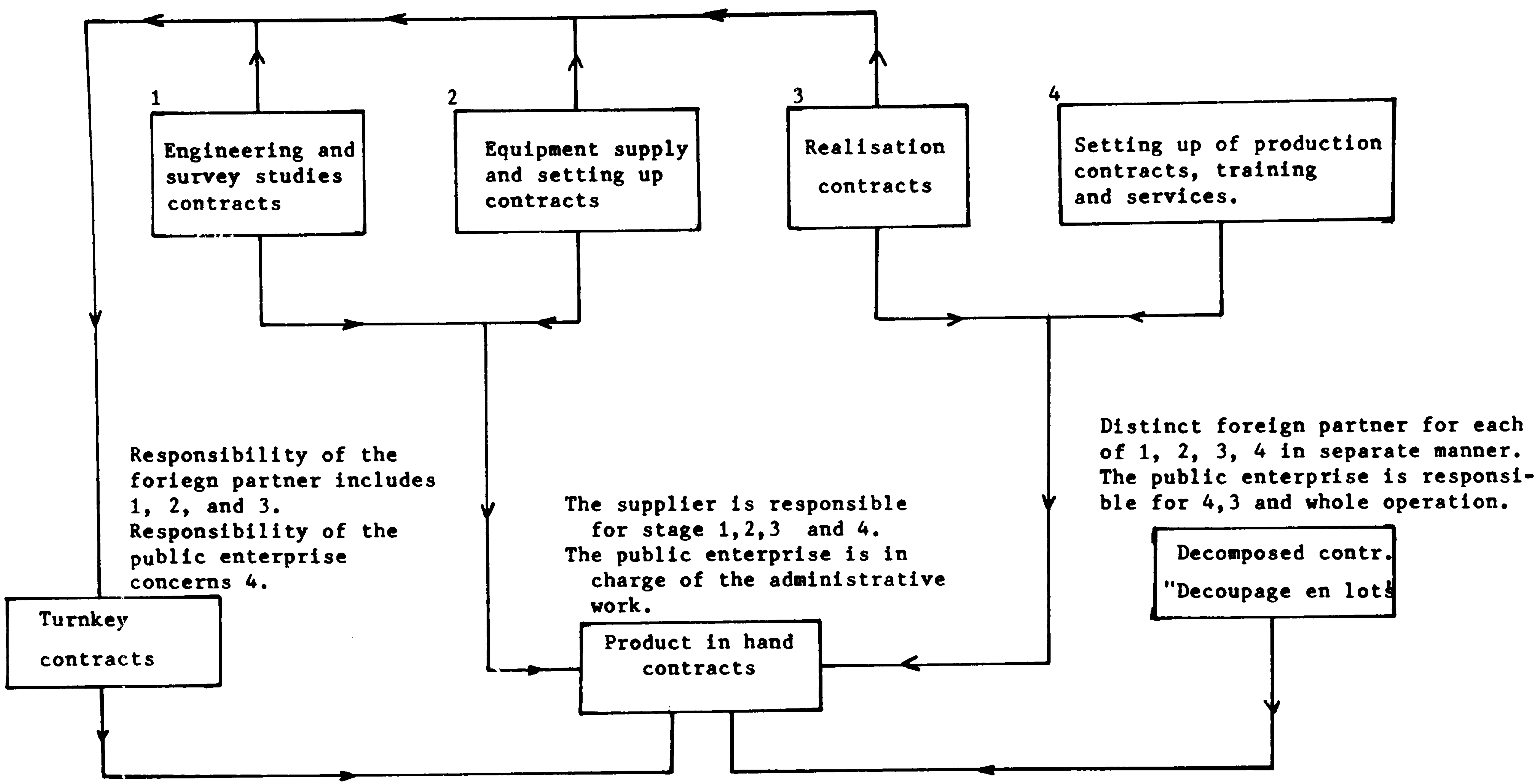


Figure C.1.1 : Diagram of contractual forms : The case of Algeria.

Source : Survey data.

type of contract. The different advantages of this form of contract are control of the situation by the public enterprise, the experience gained by the Algerian managers and the saving realised by the public enterprise. In addition, the public enterprise has a choice between the different offers. The disadvantages, on the other hand, include the risks of malpractice and overlapping of responsibilities. The reasons for the relative failure of this type of contract are the lack of skilled labour in Algeria and the inexperience of the public enterprise in these matters (1). In addition, the nature of this contract can lead to various inefficiencies which have direct consequences on plant performance. This type of contract is expected to become more common in the future when an industrial base will be well established.

2.The Turnkey contract

The relative failure of the decomposed contract (as in the El-Hadjar complex (2)) led the Algerian authorities to adopt the turnkey contract -one which is used to establish a plant in a green field site. It is a combination of the complementary projects which are used in underdeveloped and developed countries. In this sort of contract, the contractor agrees to build a plant for a predetermined price over a given time period. The turnkey contract does not isolate the supply of services from that of equipment. It foresees the reproduction of a plant as it exists and functions abroad. As illustrated in Figure C.1.1, engineering studies, which include design engineering, are under the entire responsibility of one contractor. The contractor is, in addition, held responsible for supervising the setting up of the building site, civil engineering of the various construction phases, and the purchase and supply of materials. The contractor is also in charge of the choice of equipment, the testing of the plant, the initiation of production and the supply of licenses, patents and manufacturing processes of the plant. The public enterprise becomes responsible for the plant only after a team of experts, consisting of members on both the contracting and public enterprise sides, has decided and agreed that plant construction is completed. The point of this type of contract is to alleviate any constraints on the public enterprise (lack of skilled labour) by placing responsibility for all construction operations on the contractor. A turnkey contract is designed to easily and rapidly pinpoint the responsibilities on the part of the supplier and to determine deviations from the contractual specifications for which the contractor can be held responsible (3).

The major advantage of a turnkey contrat is that a plant is built, an essential step in the process of laying an industrial bases in an underdeveloped country such as Algeria, without mastering the techniques of design, implementation, control and coordination. In addition, the whole operation is more cohesive since there is only one foreign partner, shortening, to a certain extent, delays in delivery. The main drawbacks of this type of contract, besides its expense, are an absence of guarantees covering normal operation of the plant and, more importantly, a lack of public enterprise participation. This situation can be somewhat prejudicial since the contractor, who is only concerned with delivery time and not the quality and quantity of outputs produced, decides on the cost, the choice of technology and the production processes to be adopted. In addition, not only does the public enterprise lose much needed industrial experience, but it is left with the entire responsibility for training the labour force. The numerous cases of misuse and abuse, resulting from the total lack of control by the public enterprise, led to the development of a new form of contract which follows.

3.The product-in-hand contract

The availability of financing and the shortage of competent personnel and technicians in the field of industrial engineering have prompted Algerian planners, who were not satisfied with turnkey contract, to choose another method of industrial transfer. This has resulted in the launching of a new form of contract called product-in-hand.

The contractor is committed under this contract to deliver a plant in working order with price and plant specifications fixed at the time the contract is signed. The product-in-hand contract, as indicated in Figure C.1.1, unlike the turnkey contract, requires a deep commitment from the foreign partner (4). This commitment is not limited to a certain period but is spread out over a long period of time. It is an equipment and service contract where high managerial skills and services are required. The contractor is required to deliver a turnkey plant with the additional stipulation that the training of Algerian personnel in Algeria and abroad is guaranteed. In addition, the contractor would provide the necessary technical assistance for the proper functioning of the plant and the initial management until production reaches its planned level (in terms of both quantity and quality). By the time the plant is built, all the records and licenses of manufacturing, know-how and show-how should be communicated to the public enterprise. Theoretically, this formula is ideal; despite the appreciable practical advantages, however, it presents some disadvantages as well (5).

The advantages of such a contract are obvious. Continuity between the implementation and initial production stages and the final results (quality and quantity of outputs) is guaranteed by the contractor. In addition, the product-in-hand contract specifies in great detail the penalties in case of delays in delivery or malfunctioning of the plant. Another advantage is the financial participation of the international firms in the construction of the plant (6). It is still premature to fully appreciate the product-in-hand contract, but it seems to be adapted to the Algerian case. On the other hand, it is possible to outline some disadvantages related to contract cost which are common to both the product-in-hand and turnkey contracts. They are the result of the lack of participation by the public enterprise's managers during the design and implementation phases. It is also the case that, despite the preventive measures taken in the development of this type of contract, some abuses and misuses have also been encountered.

4.Cost-plus-fee contract

In the cost-plus-fee contract, used mainly in the hydrocarbon industries, the contractor guarantees implementation of the plant according to a predetermined date ordered by the public enterprise in return for payment of the real cost of the project and its fees. Since the contractor is not submitted to any pressure as a result of additional unplanned financial cost, there is hardly any conflict of interest between the two partners. This situation has all the necessary conditions for normal realisation of a project. It is not in the interest of the contractor to minimise losses and to supply equipment and materials of bad quality. In most cases the fee, which includes contractor profit, is a fixed part of the total cost of the project, although sometimes the fee is a percentage of the cost. Among the numerous advantages presented by this form of contract is the precise evaluation of the potential financial risks at the beginning of the project. Such an evaluation, however, requires a complete set of engineering studies, which may delay initiation of the project, but the advantage of such a procedure outweighs this inconvenience. Regarding equipment selection, the contractor inquires as to its availability among the various suppliers and recommends the type best suited for the plant accordingly. The final decision, however, rests with the public enterprise. This process allows more active participation of the public enterprise which leads to a more appropriate transfer of technology. Higher public enterprises participation may be regarded as disadvantageous because of the shortage of skilled workers, but it can be argued that the experience gained outweighs this problem.

In conclusion, Table C.1.1 indicates the number of contracts signed during the different plans and their evolution. The number of contracts signed increased sharply during the two successive four-year development plans. The number of decomposed contracts decreased relative to the increase in the number of turnkey and product-in-hand contracts. In addition, a slight increase in the number of cost-plus-fee contracts can be noticed. The Algerian government's change of attitude can only be explained by the experience gained as a result of the problems encountered in adopting one form of contract or another.

Irrespective of the form a contract takes, each has its

Table C.1.1: Evolution of the contractual forms in

the different branches of industry.

| Different forms of contract / Branches of industry | Engineering & survey studies | | | Decomposed Equipment supply & setting up | | | Realisation | | | Total decomposed | | | Turnkey | | | Product in hand | | | Cost plus fee | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Petroleum | 1 | | | 1 | | | 2 | 1 | | 4 | 1 | | 1 | 4 | 6 | | | 1 | 5 | 5 | 5 |
| Gas | 3 | 5 | 3 | 1 | | | 2 | 4 | | 6 | 9 | 3 | | 9 | 10 | | | | | | |
| Petrochemistry | | | | | | | | | | | | | 3 | 5 | 8 | | | | | | 1 |
| Iron and steel industry | 4 | 5 | 5 | 9 | 13 | 7 | 1 | | | 14 | 18 | 12 | | 1 | 1 | | | 1 | | | 1 |
| Construction materials | | 2 | | | 7 | 2 | | | | | 9 | 2 | 1 | 3 | 12 | | | 2 | | | |
| Mechanical engineering | | | | | | | | | | | | | 1 | 3 | 3 | | 1 | 2 | | 1 | |
| Electrical engineering | | | 1 | | | | | | | | 1 | | | 2 | 1 | | | 4 | | | |
| Textiles | 1 | 2 | 1 | 7 | 5 | | | | | 8 | 7 | 1 | | | 4 | | | 6 | | 1 | |
| Food processing | 1 | | | 7 | 1 | 4 | 1 | 3 | 2 | 9 | 4 | 6 | | | 4 | | | | | | |
| Light chemicals | 1 | | | | | | 4 | 2 | | 1 | 4 | 2 | | | 6 | | | | | | |
| Wood industry | | | | 1 | | | | 5 | | | 1 | 5 | | | 3 | | | | | | |
| Mining | 3 | 1 | 3 | 1 | 3 | 2 | 6 | | | 10 | 4 | 5 | | | | | | | .. | | 1 |
| Energy (electricity & gas) | 2 | 1 | | 3 | 5 | 6 | 2 | | | 7 | 6 | 6 | | | | | | | | | |
| Total | 16 | 16 | 13 | 30 | 34 | 19 | 18 | 15 | 2 | 64 | 65 | 34 | 6 | 27 | 58 | 0 | 1 | 16 | 5 | 7 | 8 |

1 1967-1969 three year development plan
2 1970-1973 first four year development plan
3 1974-1977 second four year development plan

Source: Yachir, F. : Les Flux d'Importation de Technologie dans le Sector Public Industrial en Algerie, RASJEP, Vol. XVII, no. 4, Algiers, 1980 p 647.

advantages and disadvantages. The main differences are in the training of personnel, the responsibilities of the contractor and the cost. The fact that a plant is built under a decomposed, turnkey, product-in-hand or cost-plus-fee contract has different consequences on the functioning of a plant, its number of skilled workers and eventually, on its performance. The outcomes of adopting each of the various contractual forms are detailed in Chapters Four through Ten.

## References


1 Refer to Democratic and Popular Republic of Algeria Memorandum, Annex VI "Legal Relationship Between Companies in the Third World and Companies in the Developed Countries" submitted by Algeria to the Conference of Sovereigns and Heads of State of OPEC member countries (Algiers, March 1975).

2 See Bouguerra, K. et Michel M.:Essai de Developpement par Consomation Massive de Technologies: Le Cas de L'Algerie, Annuaire de L'Afrique du Nord, Vol. 15 (1976), Aix-En-Provence, France pp 123-134.

3 For more details, see Salem, M. et Sanson, M.A.: Les Contracts Produit en Main et les Contracts Cle en Main: Technologie et Vente de Developpement, LITEC (Literature Technique), Paris, 1979; Talha, L. et all in : La Strategie des Matieres Premieres au Maghreb, CNRS, Paris 1976 pp 148-151 and Bouguerra, K. et Hubert, M.: Essai de Developpement par Consomation Massive de Technologies: Le Cas de L'Algerie, op cit. pp 129-130.

4 See Le Monde of the 11th of October, 1975 in the article about the French-Arab Seminar in Paris 16 June 1975.

5 See, for more details on the product-in-hand contract Said Amar, T.: Le Developpement Industrial de L'Algerie, op cit. pp 78 to 102.

6 Ibid pp 109-111.

## APPENDIX C.2: THE BANKING SYSTEM IN ALGERIA

Financing policies of public investments are based on the present banking system and credit policies. In contrast to the Soviet Union where a single central bank controls the banking system, Algeria's present banking system is based on the existence of various banking organisations which have specialised functions as described below.

1-The Algerian Treasury was established in 1963 and assumes the function of gathering the revenues obtained from regular and exceptional taxes, such as the oil and gas tax. Treasury resources come mainly from petroleum taxes, treasury bonds, deposits from the postal checking system (local government and private individuals) and external borrowings. These resources are used not only to finance the recurrent budget but also the capital budget.

2-The Central Bank of Algeria (BCA) was founded in early 1963 (the same year as the Treasury). This organisation, which assumes the function of issuing money, is required to formulate overall monetary and credit policies according to the economic and financial guidelines advocated by the government (1). It also guards the national and currency reserves. In addition to working as an issuing bank, the BCA acts as a banker and financial agency for the government and as a banker for the depository institutions. As a result of these activities, the BCA has the power to use various monetary policy instruments such as open market operations, liquidity ratios and discount ceilings. The bank, however, makes little use of these instruments, with the exception of discount ceilings.

3- The Algerian Development Bank (BAD) was also created in 1963 and was initially called the Algerian Development Fund. Its role was originally to administer and control government expenditures and supervise the execution of projects financed by foreign credit. Since 1971, its role has been extended to the management of long term loans granted by the Treasury to public enterprises and the mobilisation of foreign loans through direct long term borrowing and floating loans on the international financial market. The BAD does not manage the capital budget which is the responsibility of the Ministry of Finance. The BAD finances investments in all sectors of the economy except in the agricultural and housing construction sectors. Its activities allow it to finance projects in the private sector as well.

4-The Commercial Banks (the Algerian Foreign Bank (BEA), the Algerian National Bank (BNA) and the Algerian Popular Bank (CPA)) are in charge of financing medium term loans. These banks are allowed to automatically discount their credit at the BCA when they have insufficient resources. Prior agreement with the BAD, however, is necessary to utilise this service. The activities of the Primary Banks are, in fact, subject to strict control before they reach such a point. The BNA, the BEA and the CPA are all state-owned depository institutions which handle all external financial transactions and conduct all banking activities in conjunction with the postal checking system. The National Bank of Algeria (BNA) is in charge of the industrial and trade sectors and has a monopoly on banking services for the socialist farm sector. It supervises the allocation of credit to the industrial, trade and socialist farm sectors as well as controls their financial flows in accordance with their expenditure programmes (2). The role of the Algerian Popular Bank (CPA) is to promote and develop the industrial, craft, tourism and fishery sectors. This bank only deals with small and medium size firms (3).

The Algerian Foreign Bank (BEA) is essentially involved in foreign transactions. The commercial banks have expanded rapidly since 1971 and make a considerable contribution to economic development.

5-Other financial institutions, such as the Credit Council, Technical Committee of Banking Institutions, Insurance Council, Postal Checking System, National Saving Funds and Insurance Companies also play an important role in the Algerian banking system. The most important are the Credit Council and the Technical Committee. The Credit Council is in charge of the examination and advice on all matters related to monetary and credit policies. It studies the volume and cost of credit in the framework of the development programmes and identifies ways of mobilising and centralising financial resources. The Technical Committee is in charge of studying problems related to the banking system as well as coordinating financial activities, such as the extension of credit. In addition, it proposes measures for more efficient execution of public enterprise production and investment objectives and promotes the standards of banking practices.

The Algerian banking system is mainly oriented towards the financing of public investments made by the government and the public enterprises. Moreover, its role is to manage Treasury lending and credits from the BAD, whose resources originate from Treasury credits and international financial markets. It also exerts financial control on the current operations of public enterprises, investment financing and foreign transactio

References

1 Benissad, M.E.: Economie du Developpement de L'Algerie: Sous-developpement et Socialisme (OPU, Algiers, 1979) p 207.

2 Ibid p 208.

3 Ibid.

# APPENDIX D : SAMPLE INTERVIEW QUESTIONNAIRE

Name of the public enterprise:
Address of plant visited:
Date:
Respondent(s) name(s) and title(s):

1.Plant characteristics
1.1 Product(s): % of sale abroad:
1.2 " "
1.3 " "
1.2 Process of production :Is it one ,two or n stages of production ? Quick explanation of the process of production. (Visit of the plant).
Is it a capital intensive or labor intensive technology ?
1.3 When was the plant built ? Last major expansion ?
1.4 Suppliers of the technology ?
Country of origin ? Who choose the contractor ?
How long did it take to build the plant ?
any delays ?
Cost: how much was it estimated to cost? How much did it cost?
Type of contract: Turnkey ? Product-in-hand ? Decomposed ?
Cost-plus-fee ?
Did it include training ?
Did the contract enclose any clause to sanction the contractor in case of delays ?
1.5 Size of the plant ?

2.Labour force
Number of workers ?
Rate of absenteeism ?
Any overstaffing ?
What are the qualifications of the labour force ?
Is there any lack of skilled labour force ?
If yes, in which functions: management, engineers, technicians...?
What is the turnover of the labour force ?
What is the productivity ratio ?

3.The level of utilisation of fixed capital
3.1 What is the planned capacity output by products ?
3.2 What is the actual output ?
3.3 What is the technical or contractor capacity by output ?
3.4 Number of shifts by output ?
3.5 Technical number of shifts ?
3.6 Does the plant work on Thursdays and Fridays ?
How many hours a day ? a week ?
3.7 Excess capacity
At what percentage did the plant or line of production operate last year (%) ?
Was the actual operation last year different from the planned level ?
Why ? list reasons given for each output. Give % if possible?
3.8 Does the plant encounter any particular problems ?

4.Inputs
4.1 Raw materials and intermediate inputs:
Origin of the inputs ?
Within the public enterprise, local and international markets?

Are there enough inputs ?
Are the inputs imported ?
If yes, which one(s) ? percent of the total ?
Is there any stock management of inputs ? scientific?
4.2 Spare parts
Explanation of the process of AGI ?
Are there delays in allocation of the AGI ?
Do you bargain ? or obtain what you have requested ?
Who allocates spare parts ?
Management of stock is based on what ?
Are there delays ? Why ?
Shortages ? Why ?
How many suppliers ?
Is there a loss of references ?
At what underutilisation of capacity ratio do you estimate the shortage of spare parts ?
At what underutilisation of production capacity ratio do you estimate the shortage of imports ?

5.Sales revenue
What was the sales revenue for last year ?
What were the financial charges as a percentage of the sales revenue ?
The intermediate inputs as a percent of the sales revenue ?
Do you calculate production costs ?
Variable and fixed charges ?
Do you calculate the break even point ?
Estimation for last year ?
Did the plant make a profit or a loss last year ?
How much as a percent of the sales revenue ?
Was there a distribution of profit to the workers last year ?

6.Do you know the internal demand for the outputs produced by the plant in Algeria?
Is production sufficient to satisfy local demand ?
Do you export ? Are you planning or did you plan to export ?
What is the proportion of exports to the total production ?
Did you encounter any international competition ?

7.Commercialisation: trade mechanism
National ?
International ?

8.Transport
Does the plant have its own park ? or public enterprise ?
Does the plant use SNTR facilities ? In what proportion ?
Are there delays in deliveries due to lack of means of transport ? of inputs, imported inputs, spare parts....?

9.Customs
What are the customs regulations ?
Are they difficult to implement and/or
Are they too cumbersome because they are too long ?

10.Quality of the outputs
Is the quality of the inputs and outputs up to standard ?
Is there a quality control system ?

11.Maintenance
Is there a sufficient number of staff ? of tools ?
Is there a sufficient number of spare parts ?

Do you service the machines regularly or only when they break down ?

12.Planning
Does the plant have targets of production to meet ?
Are they obligatory or indicative targets ?
Who set them ?
If the targets are not met, what are the consequences ?
Does the plan contain output targets ?
cost of production targets ? Labor productivity indices ?
are the resources lacking to meet the targets ?

13.Control
Who controls what and whom ?
What is controlled by the head office and ministries ?

14.Financial autonomy
Does the plant have financial autonomy ?

15.Decision making process
Is there overcentralisation of decision making ?
What is the extent of the authority of the plant managers ?
What are the responsibility of the management staff ?
Who makes the decisions concerning everyday management ?
Who makes the decisions concerning long term management ?

16.Communication
Do you think that there is an efficient or extensive communication system ?

17.Price
Are prices fixed ?
If prices are fixed, who fixed them ?
On what criteria ?
Is the price equal to the production cost ?
Does the plant receive any subsidies ?

18.Salary: Incentives, bonus
What is the salary basis ?
What are the indemnities, premiums....? What is their percentage compared to basic wages ?
Are the workers satisfied with the present system ?
Is there a bonus system ?
Who decides about the wage system ?
Is there a standardized wage system for all public enterprises?

19.Organisational structure
Is there a clear chart ?
Is there a description of job, of position, of responsibility and of procedures....etc. ?
Is it difficult to coordinate workers ?
Is it difficult to control workers ?

20.Relations with the banks
What are the relations with the bank ?
Does the plant have problems with the working capital ?
Is the working capital financed with short, medium or long term credit ?
Does the plant receive credit easily ?
On what basis is the credit allocated ?
What are the different rates of interest ?

Is credit accepted on the order of the Ministry of Finance ?
How are investments financed ? The State ?
The public enterprise itself ? Foreign investment ?
If different, which one and in what proportions ?

21.Relations with the head office
What are the relations of the plant with the head office ?
Cooperation ? Orders ? Participation ? etc.

22.Relations with the supervisory ministry
What are the relations of the plant with the supervisory ministry ?

## Head office of public enterprise

1.General information
1.1 Number of plants ?
1.2 Number of distributions centres ?
1.3 Number of maintenance units ?
1.4 Number of public works owned by the public enterprise ?
1.5 Number of mixed plants, if any ?
1.6 Number of projects under construction and planned ?

2.Project level
Who chose the contractor ?
On what criteria ?
Description of the investment policy ?

3.Do all the plants produce the same outputs ?
Do they encounter problems ?
Do they have similar problems ?
Can you describe them briefly ?

4.What are the problems encountered by the head office ?

5.At what level are decisions concerning the plants taken ?
Plant head office, ministry, etc.
Who takes the final decision ?

6.How many persons are working in the head office ?

7.What are the functions of the head office ?

## Supervisory ministry level

1.Organisation of the ministry ?
2.What are the objectives and tasks of the ministry ?
3.What are the different departments of the ministry ?
4.How many persons work in the ministry ?
5.In which matters does the ministry take decisions concerning the plant and public enterprise ? Long, medium, short term ?

## Ministry of Planning

At the Ministry of Planning, first are the five questions described above and then the questions specific to the MPAT:

1. Who chose the project and on what basis ?
2. Who chose the location and on what basis ?
3. Does planning encourage large, medium or small scale ?
4. What are the methods of planning ?
5. Is planning indicative or authoritarian ?
6. Who decides which sector to develop ?
7. Who decides which output to produce ?
8. Does the MPAT impose targets for the existing public enterprises to reach concerning their production, their outputs, their inputs ?
9. Does the role of planning stop when the plant enters production ?
10. Who decides on the level of integration ?
11. Who decides on the technology to import ?

Table E.1: Sonic plants, outputs and their fixed capital utilisation for 1980 and 1981.

| Plants and outputs | Year of entry | Unit | Production | | | | | Fixed capital utilisat. | | | | Number of shifts | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1980 | | 1981 | | 1980 | | 1981 | | | | |
| | | | Technical | Planned | Actual | Planned | Actual | U1% | U2% | U1% | U2% | 1 | 2 | 3 |
| The Mostaganem pulp & paper plant | | | | | | | | 137.8 | 20 | 82.2 | 41 | | | |
| -Esparto pulp | 1974 | Tons | 66,200 | 8,000 | 8,547 | 24,000 | 9,205 | 106 | 12 | 38 | 36 | 3 | 3 | 3 |
| -Printing & writing paper | 1975 | Tons | 33,000 | 16,000 | 9,370 | 18,000 | 13,716 | 58 | 48 | 76 | 55 | 3 | 3 | 3 |
| -Exercice-book | 1980 | $10^3$ unit | 15,300 | 1,380 | 3,788 | 6,000 | 9,561 | 274 | 9 | 159 | 39 | 3 | 1 | 2 |
| -Chlorine | 1976 | Tons | 12,000 | 1,875 | 2,364 | 4,500 | 3,100 | 126 | 15 | 69 | 37 | 3 | 3 | 3 |
| -Soda | 1976 | Tons | 13,200 | 2,115 | 2,654 | 5,070 | 3,510 | 125 | 16 | 69 | 38 | 3 | 3 | 3 |
| The Baba Ali pulp & paper plant | Nat. 1950 | | | | | | | 80.7 | 83.7 | 82.75 | 79.2 | | | |
| -Esperto pulp | | Tons | 14,000 | 14,000 | 10,585 | 11,952 | 9,918 | 75 | 100 | 83 | 85 | 3 | 3 | 3 |
| -Printing & writing paper | | Tons | 21,846 | 17,500 | 16,629 | 16,717 | 18,036 | 95 | 80 | 107 | 76 | 3 | 3 | 3 |
| -Chlorine | | Tons | 9,000 | 7,000 | 5,309 | 7,063 | 4,973 | 76 | 77 | 70 | 78 | 3 | 3 | 3 |
| -Soda | | Tons | 10,150 | 7,900 | 6,128 | 7,967 | 5,702 | 77 | 78 | 71 | 78 | 3 | 3 | 3 |
| The Souk Ahras household & sanitary paper plant | 1975 | | | | | | | 77.5 | 84.9 | 93.35 | 87 | | | |
| -Hard tissue paper | | Tons | 6,500 | 6,400 | 6,263 | 7,000 | 8,295 | 97.8 | 98.5 | 118 | 107 | 3 | 2 | 3 |
| -Soft tissue paper | | Tons | 3,500 | 2,500 | 1,433 | 2,350 | 1,615 | 57.3 | 71.4 | 68.7 | 67 | 3 | 3 | 3 |
| The Saida wrapping & packaging paper & board p. | 1976 | | | | | | | 91.66 | 68.3 | 82.33 | 76.66 | | | |
| -Straw pulp | | Tons | 26,400 | 13,000 | 15,036 | 17,000 | 12,164 | 115 | 49 | 71 | 64 | 3 | 3 | 3 |
| -Wrapping paper | | Tons | 33,000 | 24,000 | 19,072 | 20,500 | 21,068 | 79 | 73 | 102 | 62 | 3 | 3 | 3 |
| -Corrogated cardboard | | Tons | 19,000 | 16,000 | 13,010 | 20,000 | 14,874 | 81 | 83 | 74 | 104 | 3 | 2 | 2 |
| The El-Harrach wrapping & packaging board plant | 1947 Nat.* | | | | | | | 70.7 | 79 | 57.4 | 76.3 | | | |
| -Brown paper | 1947 | Tons | 9,600 | 8,500 | 7,095 | 7,500 | 705** | 83.5 | 88.5 | 9.4 | 78 | 3 | 3 | 3 |
| -Kraft paper | 1973 | Tons | 21,500 | 19,000 | 17,973 | 19,000 | 17,117 | 94.6 | 88.4 | 90 | 88.4 | 3 | 3 | 3 |
| -Solid box | 1974 | Tons | 25,000 | 15,000 | 5,081 | 16,000 | 11,744 | 34 | 60 | 73 | 64 | 3 | 3 | 3 |

(Table continues on the following page.)

Table E.1 (Continued)

| Plants and outputs | Year of entry | Unit | Production 1980 Technical | Production 1980 Planned | Production 1980 Actual | Production 1981 Planned | Production 1981 Actual | Fixed capital utilisat. 1980 U1% | Fixed capital utilisat. 1980 U2% | Fixed capital utilisat. 1981 U1% | Fixed capital utilisat. 1981 U2% | Number of shifts 1 | Number of shifts 2 | Number of shifts 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| The Bouarrerridj packaging board plant | 1976 | | | | | | | 70.5 | 87.5 | 80 | 83 | | | |
| -Sack kraft paper | | Tons | 15,000 | 15,000 | 12,619 | 13,750 | 13,856 | 84 | 100 | 100 | 91 | 3 | 1 | 1 |
| -Folding boxe | | Tons | 10,000 | 7,500 | 4,262 | 7,500 | 4,493 | 57 | 75 | 60 | 75 | 3 | 1 | 1 |
| The El-Arba kraft paper p. | 1947 | | | | | | | 103 | 93 | 69 | 93 | | | |
| -Wrapping paper | Nat. | Tons | 750 | 700 | 721 | 700 | 487 | 103 | 93 | 69 | 93 | 3 | 1 | 2 |
| The Oran grocery bag p. | Nat. | | | | | | | 104 | 98 | 106 | 101 | | | |
| -Grocery bag | | Tons | 4,600 | 4,500 | 4,708 | 4,665 | 4,953 | 104 | 98 | 106 | 101 | 1 | 1 | 1 |
| The Oued smar sack kraft paper plant | 1961 Nat.* | | | | | | | 99 | 91 | 99 | 98 | | | |
| -Sack kraft paper | | Tons | 14,600 | 13,400 | 13,321 | 14,400 | 14,348 | 99 | 91 | 99 | 98 | 3 | 2 | 2 |
| The recovery plant | Nat. | | | | | | | 94 | 80 | 77 | 96 | | | |
| -old paper & waste cardb. | | Tons | 25,000 | 20,000 | 18,896 | 24,000 | 18,531 | 94 | 80 | 77 | 96 | 1 | 1 | 1 |
| Total SONIC | | | | | | | | 92.88 | 78.5 | 82.90 | 83.11 | | | |

Source: Survey data.

* Nationalised but extended later on.
** The ceiling fall down accidentally.
1 Technical.
2 Actual 1980.
3 Actual 1981.

Table E.2: Origin of the technology and type of contract signed in SONIC

| SONIC Plants | Origin of the technology | Type of contract | Delay in implementation |
|---|---|---|---|
| Mostaganem pulp & paper complex | Great Britain | Decomposed | 2 years |
| -Electrolyse workshop | Italy | Turnkey | ... |
| Baba Ali pulp & paper plant | France | Nationalised | - |
| Saida wrapping & packaging paper & board plant | France & Great britain | Decomposed | 9 months |
| Ain El Hadjar kraft paper plant | France | Nationalised | - |
| El Arba kraft paper plant | France | Nationalised | - |
| El Harrach wrapping & packaging plant | France | Nationalised | - |
| -Extention of El-Harrach plant | Great Britain | Decomposed | 2 years |
| Souk Ahras househ. & sanitary paper plant | Great Britain | Decomposed | 2 years |
| Bouarrerridj packaging board plant | Italy | Turnkey | .... |
| Oran grocery bag plant | France | Nationalised | - |
| Oued Smar sack kraft paper plant | France | Nationalised | - |
| Recovery plant | France | Nationalised | - |

Source: Survey data.

# APPENDIX F

Table F.1: SNMC plants, outputs, their fixed capital utilisation and personnel in 1980.

| Plants/output | Year of entry production | Production thousand tons or % Technical | planned | actual | U1 | U2 | U3 | Personnel Tech/plan. | unit actual | Rate of overstaffing |
|---|---|---|---|---|---|---|---|---|---|---|
| Cement | | 8,300 | 6,200 | 4,158.3 | 69.4 | 75.3 | 100 | 3,515 | 4,648 | 33.6 |
| Rais Hamid | Nat.1946 | 460 | 350 | 323.2 | 92.3 | 76.0 | 100 | 300 | 397 | 32.0 |
| Zahana | 1948/1977 | 1,440 | 1,000 | 552.0 | 55.0 | 69.4 | 100 | 600 | 808 | 34.6 |
| H. Soud | 1973/1975 | 900 | 650 | 455.4 | 70.0 | 72.2 | 100 | 500 | 681 | 36.2 |
| Meftah | 1975 | 1,000 | 700 | 476.1 | 70.0 | 70.0 | 100 | 450 | 588 | 30.6 |
| El Asnam | 1978/1980 | 2,000 | 1,500 | 1,065.2 | 73.0 | 75.0 | 100 | 613 | 752 | 22.6 |
| A. E. Kebera | 1978 | 1,000 | 800 | 387.1 | 50.0 | 80.0 | 100 | 302 | 571 | 89.0 |
| Benissaf | 1979 | 1,000 | 800 | 613.2 | 75.0 | 80.0 | 100 | 450 | 535 | 19.0 |
| Saida | 1979 | 500 | 400 | 286.1 | 70.0 | 80.0 | 100 | 300 | 316 | 5.3 |
| Plaster, Gypsum & lime | | 522 | 470.1 | 343.6 | 76.5 | 92.6 | 85.24 | 524 | 550 | 3.52 |
| Djemila plaster | Nat. | 12 | 12 | 6.1 | 49.0 | 100.0 | 100 ) | ) | ) | |
| Djemila gypsum | Nat. | 5 | 5 | 8.5 | 86.0 | 100.0 | 100 ) | 60 ) | 61 ) | 1.6 |
| Ghardaia plaster | Nat. | 25 | 21 | 18.8 | 87.0 | 84.4 | 100 | 55 | 73 | 32 |
| Medea Gypsum | Nat. | 82 | 82 | 62.4 | 76.0 | 100.0 | 100 | 92 | 58 | -37 |
| Fleurus plaster | 1978 | 230 | 184 | 99.6 | 55.0 | 80.0 | 26.2) | ) | ) | |
| Fleurus gypsum | 1978 | 150 | 150 | 135.7 | 90.0 | 100.0 | 26.2) | 260 ) | 297 ) | 14 |
| Chettaba lime | Nat. | 18 | 16 | 12.5 | 78.0 | 88.8 | 100 | 57 | 61 | 7 |
| Red products(1) | | 1,890.5 | 1,585 | 1,051.3 | 72.33 | 93.4 | 68.26 | 4,524 | 5,077 | 16.4 |
| El Mokhania | Nat. | 63.5 | 61 | 35.4 | 58.0 | 96.0 | 100 | 200 | 341 | 70.5 |
| Quatre Chemins | Nat. | 20 | 20 | 5.2 | 26.0 | 100.0 | 100 | 147 | 176 | 19.7 |
| mers El Kebir | Nat. | 54 | 54 | 48.6 | 90.0 | 100.0 | 100 | 250 | 326 | 30.4 |
| Tounane | Nat. | 40 | 37 | 30.7 | 83.0 | 92.5 | 100 | 156 | 157 | 0.6 |
| Tiarret no. 1 | Nat. | 12 | 11 | 10.4 | 95.0 | 91.6 | 100 | 76 | 72 | -5.0 |
| Colonel Amirouch | Nat. | 20 | 20 | 22 | 114.0 | 100.0 | 100 | 127 | 147 | 15.0 |
| Lagare | Nat. | 28 | 32 | 25.3 | 79.0 | 114.0 | 100 | 150 | 152 | 1.3 |
| Bouzherea | Nat. | 17 | 17 | 15 | 88.0 | 100.0 | 100 | 88 | 89 | 1.0 |
| Mezzaia | 1973 | 44 | 44 | 29.5 | 67.0 | 100.0 | 52.4 | 130 | 149 | 14.0 |
| Batna no.1 | 1972 | 18 | 15 | 15.5 | 103.0 | 83.0 | 52.4 | 90 | 177 | 96.0 |
| El Khemis no. 1 | Nat | 44 | 44 | 32.5 | 74.0 | 100.0 | 100 | 282 | 314 | 11.0 |
| El Khemis no. 2 | 1976 | 100 | 100 | 71.0 | 71.0 | 100.0 | 52.4 | 215 | 215 | 0.0 |
| Skikda | 1974 | 44 | 40 | 25.6 | 64.0 | 91.0 | 52.4 | 120 | 139 | 15.8 |
| Baraki | 1974 | 44 | 44 | 33.4 | 76.0 | 100.0 | 52.4 | 145 | 149 | 2.7 |
| Hadjout | 1975 | 44 | 44 | 25.5 | 58.0 | 100.0 | 52.4 | 130 | 159 | 14.6 |
| Meftah | 1975 | 44 | 44 | 37.4 | 85.0 | 100.0 | 52.4 | 132 | 140 | 6.0 |
| Boufarik | 1974 | 44 | 44 | 30.4 | 69.0 | 100.0 | 52.4 | 130 | 126 | -3.0 |
| Boudj Menaid | 1974 | 60 | 60 | 44.4 | 74.0 | 100.0 | 52.4 | 140 | 197 | 40.7 |
| Remchi | 1976 | 100 | 100 | 71.0 | 71.0 | 100.0 | 52.4 | 190 | 309 | 59.4 |
| Mers El Kebir | 1976 | 100 | 100 | 56.0 | 56.0 | 100.0 | 52.4 | 190 | 244 | 28.0 |
| Batna no. 2 | 1977 | 100 | 70 | 71.4 | 102.0 | 70.0 | 52.4 | 190 | 191 | 0.5 |

Table F.1. (Continued)

| Plants/output | Year of entry production | Technical | Production thousand tons or % planned | actual | U1 | U2 | U3 | Personnel Tech/plan. | unit actual | Rate of overstaffing |
|---|---|---|---|---|---|---|---|---|---|---|
| El Achour | 1978 | 100 | 74 | 51.8 | 70.0 | 74.0 | 52.4 | 190 | 217 | 14.0 |
| Berrahmoune | 1979 | 100 | 61 | 42.7 | 70.0 | 61.0 | 52.4 | 190 | 226 | 19.0 |
| Medea | 1979 | 100 | 49 | 34.8 | 71.0 | 49.0 | 52.4 | 190 | 205 | 7.8 |
| Saida | 1978 | 100 | 100 | 43.0 | 43.0 | 100.0 | 52.4 | 100 | 106 | 6.0 |
| Setif | 1978 | 100 | 100 | 50.0 | 50.0 | 100.0 | 52.4 | 100 | 65 | -35.0 |
| Bechar | 1978 | 50 | 50 | 23.0 | 46.0 | 100.0 | 52.4 | 86 | 96 | 11.0 |
| Mila | 1980 | 100 | - | - | - | - | - | 100 | 66 | - |
| Besbes | 1980 | 100 | - | - | - | - | - | 190 | 127 | - |
| Didouche Mourad | 1980 | 100 | - | - | - | - | - | 100 | 27 | - |
| Ceramic tile | | 2,650 | 2,650 | 1,790.6 | 68.4 | 100.0 | 52.4 | 664 | 760 | 21.0 |
| Remchi | 1976 | 1,000 | 1,000 | 714.2 | 71.0 | 100.0 | 52.4 | 250 | 217 | -13.0 |
| El Achour | 1976 | 1,000 | 1,000 | 574.5 | 57.0 | 100.0 | 52.4 | 164 | 282 | 72.0 |
| Ibn Ziad | 1972 | 650 | 650 | 502.0 | 77.0 | 100.0 | 52.4 | 250 | 261 | 4.0 |
| Ceramic sanitary fitting* | | 1,700 | 1,630 | 1,068.5 | 62.0 | 96.0 | 52.4 | 1,262 | 1,521 | 20.5 |
| El Milia* | 1975 | 500 | 500 | 340.9 | 65.0 | 100.0 | 52.4 | 400 | 476 | 19.0 |
| Ghazaouet* | 1978 | 600 | 600 | 433.8 | 72.0 | 100.0 | 52.4 | 435 | 518 | 19.0 |
| Tenes* | 1978 | 600 | 530 | 293.7 | 49.0 | 88.0 | 52.4 | 427 | 527 | 23.4 |
| Granulat.aggregate | | 7,531 | 5,713 | 2,472.1 | 43.5 | 82.3 | 48.34 | 1,374 | 1,480 | -3.2 |
| Baba Ali | Nat. | 500 | 550 | 353.3 | 64.0 | 110.0 | 100 | - | 129 | - |
| East quarry | Nat. | 780 | 730 | 394.2 | 52.0 | 93.5 | 100 | 371 | 589 | 58.7 |
| Weast quarry | 1975 | 200 | 200 | 48.9 | 24.0 | 100.0 | 26.2 | 85 | 83 | -2.0 |
| El Maden | Nat | 33 | 33 | 23.5 | 67.0 | 100.0 | 100 | 53 | 53 | 0.0 |
| Chabet El Lhou | 1978 | 1,000 | 700 | 329.8 | 46.0 | 70.0 | 26.2 | 118 | 116 | -1.0 |
| Tizi_ouzou | 1978 | 1,000 | 700 | 269.2 | 36.0 | 70.0 | 26.2 | 118 | 92 | -22.0 |
| El Khroub | 1978 | 1,000 | 700 | 209.3 | 27.0 | 70.0 | 26.2 | 128 | 92 | -28.0 |
| Sidi Ali Benyoucef | 1980 | 1,000 | 700 | 154.0 | 22.0 | 70.0 | 26.2 | 118 | 97 | -17.0 |
| Ben Azzouz | 1979 | 1,000 | 700 | 270.0 | 37.0 | 70.0 | 26.2 | 144 | 119 | -17.0 |
| Ain Touta | 1978 | 1,000 | 700 | 420 | 60.0 | 70.0 | 26.2 | 110 | 110 | 0.0 |
| Conglomerate | | 2,463 | 2,457 | 1,879.6 | 80.46 | 99.75 | 68.37 | 1,457 | 1,283 | -9.3 |
| Oran | Nat. | | | | 95.3 | 101.0 | 100 | 220 | 238 | 8.0 |
| -Concrete bridge | | 140 | 140 | 126 | 90.0 | 100.0 | 100 | | | |
| -Concrete block | | 35 | 36.3 | 34.8 | 96.0 | 103.0 | 100 | | | |
| -Cement pipe | | 55 | 55 | 55.0 | 100.0 | 100.0 | 100 | | | |
| Annaba | Nat. | | | | 86 | 97.3 | 100 | 145 | 146 | 0.6 |
| -Tilling** | | 100 | 92 | 72.7 | 79.0 | 92 | 100 | | | |
| -Cement pipe | | 60 | 61 | 76.9 | 126.0 | 101.0 | 100 | | | |
| -Concrete block | | 10 | 9.9 | 5.2 | 53.0 | 99.0 | 100 | | | |

(Table continues on the following page.)

Table F.1. (Continued)

| Plants/output | Year of entry production | Production thousand tons or % Technical | planned | actual | U1 | U2 | U3 | Personnel unit Tech/plan. | actual | Rate of overstaffing |
|---|---|---|---|---|---|---|---|---|---|---|
| Bedjaia | Nat. | | | | 85.5 | 100.0 | 100 | 62 | 62 | 0.0 |
| -Tilling** | | 68 | 68 | 59.8 | 88.0 | 100.0 | 100 | | | |
| -Cement pipe | | 70 | 70 | 58.1 | 83.0 | 100.0 | 100 | | | |
| Oued Smar | Nat | | | | 91.0 | 100.0 | 100 | 250 | 195 | -22.0 |
| -Small beam | | 325 | 325 | 334.7 | 103.0 | 100.0 | 100 | | | |
| -Cement pipe | | 16 | 16 | 12.0 | 75.0 | 100.0 | 100 | | | |
| -Concrete blocks | | 42 | 42 | 39.9 | 95.0 | 100.0 | 100 | | | |
| Tizi-Hgeniff | 1975 | | | | 71.7 | 100.0 | 26.2 | 260 | 200 | -23.0 |
| -Cement pipe | | 50 | 50 | 46.5 | 93.0 | 100.0 | 26.2 | | | |
| -Tiling** | | 250 | 250 | 132.6 | 53.0 | 100.0 | 26.2 | | | |
| -Small beam | | 170 | 170 | 158.1 | 93.0 | 100.0 | 26.2 | | | |
| -Concrete block | | 44 | 44 | 21.1 | 48.0 | 100.0 | 26.2 | | | |
| Berrouaghia | 1975 | | | | 61.0 | 100.0 | 26.2 | 260 | 185 | -28.0 |
| -Cement pipe | | 50 | 50 | 34.5 | 69.0 | 100.0 | 26.2 | | | |
| -Tiling** | | 250 | 250 | 85.0 | 34.0 | 100.0 | 26.2 | | | |
| -Small beam | | 170 | 170 | 176.8 | 104.0 | 100.0 | 26.2 | | | |
| -Concrete blocks | | 44 | 44 | 16.3 | 37.0 | 100.0 | 26.2 | | | |
| Hennaya | 1975 | | | | 72.75 | 100.0 | 26.2 | 260 | 257 | -1.0 |
| -Cement pipe | | 50 | 50 | 54.5 | 109.0 | 100.0 | 26.2 | | | |
| -Tiling** | | 250 | 250 | 130.0 | 52.0 | 100.0 | 26.2 | | | |
| -Small beam | | 170 | 170 | 124.0 | 73.0 | 100.0 | 26.2 | | | |
| -Concrete block | | 44 | 44 | 25.0 | 57.0 | 100.0 | 26.2 | | | |
| Cement asbestos | | 194.5 | 196.8 | 102.4 | 49.2 | 96.76 | 100 | 1,782 | 1,782 | 6.9 |
| Cheikh Belhadad | Nat. | 38.1 | 42 | 32.4 | 77.0 | 110.0 | 100 | 561 | 588 | 2.8 |
| Zahana | Nat. | 6.5 | 4.8 | 1.5 | 33.0 | 73.8 | 100 | 120 | 139 | 16.0 |
| Meftah | 1977 | 50 | 50 | 21.0 | 42.0 | 100.0 | 100 | 330 | 340 | 3.0 |
| B. Bouarreridj | 1976 | 50 | 50 | 21.0 | 42.0 | 100.0 | 100 | 340 | 409 | 20.0 |
| Zahana | 1977 | 50 | 50 | 26.5 | 53.0 | 100.0 | 100 | 330 | 306 | -7.2 |
| Plastic construction products | | | | | 69.3 | 116.66 | 26.2 | 740 | 760 | 2.3 |
| Siporex Meftah | 1974 | 162 | 162 | 115 | 71.0 | 100.0 | 26.2 | 380 | 392 | 3.0 |
| Setif plastic tube | 1973 | 2.4 | 3.6 | 3.6 | 100.0 | 150.0 | 26.2 | 180 | 187 | 3.0 |
| Tile floor Setif** | 1975 | 1,600 | 1,600 | 592.0 | 37.0 | 100.0 | 26.2 | 180 | 181 | 1.0 |
| Head office | | | | | | | | | 2,543 | |
| Others(2) | | | | | | | | | 5,718 | |
| Total SNMC | | | | | 66.67 | 91.97 | 69.35 | | 26,122 | 11.2 |

Legend:
The unit is the thousand metric tons, if it is not stated otherwise. If it is marked by * the unit is a thousand number of output and by ** the unit is a thousand square meters ($m^2$).
1 Red products: red tile and brick.
2 Others includes projects, training, distribution, transport and transit.
- Not available or applicable.
Source: Survey data.

Table G.1: SNIC plants, outputs and their fixed capital utilisation in 1980

| Plants in production/ outputs | Year of entry | Unit | Production 1980 Technical | Planned | Actual | In percent U1 | U2 | U3 |
|---|---|---|---|---|---|---|---|---|
| Paint sector | | Tons | 73,441 | 81,615 | 82,444 | 88.91 | 104.75 | 72.07 |
| -The paint plant of Oued-Smar | Nat. | Tons | 25,831 | 26,763 | 25,727 | 83.14 | 103 | 35.89 |
| -Building paint | | Tons | - | 15,506 | 16,304 | 105 | - | - |
| -Industrial paint | | Tons | - | 4,947 | 4,249 | 86 | - | - |
| -Auto. body paint | | Tons | - | 2,720 | 1,850 | 68 | - | - |
| -Varnish | | Tons | - | 1,147 | 942 | 82 | - | - |
| -Solvent | | Tons | - | 2,443 | 2,382 | 98 | - | - |
| -PVC | | Tons | - | 4,592 | 3,847 | 84 | - | - |
| -Glue | | Tons | - | 902 | 529 | 59 | - | - |
| -The paint plant of Lakhdaria | 1975 | Tons | 23,859 | 23,928 | 25,194 | 79 | 100 | 52.40 |
| -Building paint | | Tons | - | 18,860 | 21,242 | 113 | - | - |
| -Industrial paint | | Tons | - | 2,575 | 1,874 | 73 | - | - |
| -Auto. body paint | | Tons | - | 1,270 | 1,250 | 96 | - | - |
| -Varnish | | Tons | - | 293 | 86 | 29 | - | - |
| -Solvent | | Tons | - | 930 | 777 | 84 | - | - |
| -The paint plant of Cheraga | Nat. | Tons | 13,714 | 13,852 | 15,595 | 112 | 101 | 100.00 |
| -Building paint | | Tons | - | 13,852 | 15,595 | 112 | - | - |
| -The paint plant of Oran | Nat. | Tons | 10,037 | 11,578 | 11,752 | 81.50 | 115 | 100.00 |
| -building paint | | Tons | - | 11,468 | 11,685 | 102 | - | - |
| -solvent | | Tons | - | 110 | 67 | 61 | - | - |
| Large consumption sector | | | | | | 70.96 | - | 78.57 |
| -Household cleaning products | | $10^3$ AD | - | 46,996 | 37,004 | 59 | - | 92.06 |
| -The household cl. p. p. of Lakhdaria | 1979 | " " | - | 31,930 | 28,911 | 91 | - | 76.20 |
| -The household cl. p. p. of Hussain-Dey | Nat. | " " | - | 11,427 | 7,285 | 64 | - | 100.00 |
| -The household cl. p. p. of Oran | Nat. | " " | - | 3,639 | 808 | 22 | - | 100.00 |
| -The detergent plants | | Tons | 51,845 | 56,000 | 33,750 | 58.66 | 108 | 100.00 |
| -The Rouiba plant | 1980 | | - | - | - | - | - | 100.00 |
| -The Reghaia plant | Nat. | | - | - | - | - | - | 100.00 |
| For both plants | | | | | | | | |
| -"Isis" detergent | | Tons | - | 49,850 | 29,949 | 60 | - | 100.00 |
| -"Teldj" detergent | | Tons | - | 3,450 | 3,099 | 90 | - | 100.00 |
| -"Nada"scourer powder | | Tons | - | 2,700 | 702 | 26 | - | 100.00 |
| -The earthenware plant of Guelma | 1972 | Tons | 3,100 | 3,100 | 2,430 | 78 | 100 | 39.30 |

(Table continues on the following page.)

Table G.1. (Continued)

| Plants in production/ outputs | Year of entry | Unit | Production 1980 | | | In percent | | |
|---|---|---|---|---|---|---|---|---|
| | | | Technical | Planned | Actual | U1 | U2 | U3 |
| -The blade plant of Rouiba | Nat.* | $10^3$ Unit | 84,296 | 80,775 | 80,322 | 99 | 95 | 52.40 |
| -The cosmetic plant of Belcourt | Nat. | $10^3$ AD | - | 77,833 | 68,277 | 83.33 | 88(1) | 39.30 |
| -Shampo | | " " | - | 21,565 | 17,997 | 84 | - | - |
| -Alcohol for perfums | | " " | - | 34,017 | 38,740 | 114 | - | - |
| -Sundry items | | " " | - | 22,251 | 11,540 | 52 | - | - |
| -The insecticides plant of Algiers | Nat | Tons | - | 73,600 | 61,888 | 84 | - | 100.00 |
| Glass and maize sector | | | | | | 55.42 | 73.61 | 75.40 |
| -The glass plant of Oran | 1962 | Tons | 92,060 | 58,777 | 36,791 | 84.28 | 75.85 | 100.00 |
| -Hollow glass | 1962* | Tons | 76,800 | 44,480 | 26,995 | 77 | 58 | 100.00 |
| -Bottle | | Tons | - | 38,075 | 25,291 | 66 | - | - |
| -Case-bottle | | Tons | - | 0 | 239 | - | - | - |
| -Tumbler | | Tons | - | 6,305 | 1,392 | 22 | - | - |
| -Crystal glass | | Tons | - | 51 | 73 | 143 | - | - |
| -Flat glass | 1976/77 | Tons | 15,260 | 14,297 | 9,796 | 89.75 | 93.7 | 100.00 |
| -3 mm | | Tons | - | 6,156 | 2,569 | 42 | - | - |
| -4 mm | | Tons | - | 2,564 | 5,876 | 229 | - | - |
| -6 mm | | Tons | - | 1,540 | 1,353 | 88 | - | - |
| -Polished glass | | Tons | - | 4,037 | 0 | 0 | - | - |
| -The mirror plant of Thenia | 1977 | $m^2$ | 578,000 | 549,216 | 218,781 | 46 | 95 | 26.20 |
| -Cutting up & shaping | | | | 462,830 | 166,524 | 36 | - | - |
| -Silvering | | " | | 95,451 | 52,257 | 56 | - | - |
| -The maize plant of Maghnia | 1980 | Tons | 65,100 | 32,550 | 15,027 | 36(2) | 50 | 100.00 |
| -Starch | | Tons | - | 7,800 | 3,347 | 43 | - | - |
| -Glucose | | Tons | - | 10,500 | 5,083 | 48 | - | - |
| -White & wellow dextrin | | Tons | - | 0 | 935 | - | - | - |
| -Germ-oil | | Tons | - | 750 | 96 | 12 | - | - |
| -Glutin | | Tons | - | 1,800 | 368 | 20 | - | - |
| -Breeding food | | Tons | - | 6,000 | 2,706 | 45 | - | - |
| -cracked maize | | Tons | - | 4,500 | 2,178 | 48 | - | - |
| -Maize germs | | Tons | - | - | 308 | - | - | - |
| Total SNIC (2) | | | | | | 72.53 | 94.90 | 76.35 |

Source: Survey data.
* Extended.
- Not applicable or available.
1 88% was obtained by dividing 3,646 tons (planned output) by 4,144 tons (technical output).
2 Figure calculated for the available figures.

Table H.1: SONATRACH (1) plants, outputs and their fixed capital utilisation in 1980.

| SONATRACH Plants/outputs | Year of entry production | Unit | Production 1980 Technical | Planned | Actual | U1 (in percent) | U2 | Time utilisation of fixed capital (days) Technic. | Actual | U3% |
|---|---|---|---|---|---|---|---|---|---|---|
| LNG plants | | | | | | 57.37 | 89 | | | 84 |
| Arzew LNG no. 1 | 1978 | $10^3 m^3$ | 10,500 ) | 17,531 | 5,081 ) | 29 | ) 83 | 330 | 277 | 84 |
| Arzew LNG no. 2 | 1979 | " | 10,500 ) | | ) | | ) | 330 | 277 | 84 |
| -LPG | | Tons | - | 17,980 | 17,980 | 100 | - | 330 | - | - |
| Arzew LNG no. 4 | 1964 | $10^3 m^3$ | 2,400 | 2,718.6 | 2,338 | 86 | 100 | 330 | 277 | 84 |
| Skikda LNG no. 1 | 1972 | " " | 16,500 | | | 50 | 90 | 330 | 277 | 84 |
| -LNG | | " | - | 14,444 | 5,200 | 36 | - | - | - | - |
| -LPG | | $10^3$ tons | - | 556 | 355.84 | 64 | - | 330 | - | - |
| Total LNG output | | $10^3 m^3$ | 52,100 | 34,693 | 12,636 | 45 | 91.5(2) | | | 84(2) |
| Total LPG output | | $10^3$tons | _ | 574 | 375 | 82 | - | - | - | - |
| Refineries | | | | | | 52.79 | - | - | - | - |
| Arzew RA no.1 | 1972 | $10^3$tons | 2,500 | | | 69.78 | - | - | - | - |
| -LPG | | " | _ | 105.4 | 89.6 | 85 | - | 330 | - | - |
| -Motorfuel | | " | | 2,458 | 2,451 | 99.7 | - | 330 | - | - |
| -Lubricant | | tons | 60,000 | 77,650 ) | 52,800 ) | 68 ) | 129 ) | 250 ) | 250 ) | 100 |
| -Conditionnement | | | | ) | | | | | | |
| of lubricant | | " | | 16,000 ) | | | | | | |
| -Road bitumen | | " | 101,310 | 112,000 ) | 59,000 ) | 49 ) | 108 ) | 250 ) | - ) | - |
| -Oxid bitumen | | " | 20,130 | 20,000 ) | | | | | | |
| Algiers RA | 1964 | $10^3$tons | 2,700 | | | 92 | - | 330 | - | - |
| -LPG | | " | _ | 90.4 | 80.5 | 89 | - | 330 | - | - |
| -Motorfuel | | " | | 2,618 | 2,487 | 95 | - | 330 | - | - |
| Skikda RA | 1976 | $10^3$tons | 15,000 | | | 11.35 | - | | | - |
| -LPG | | " | - | 558 | 0 | 0 | - | 330 | - | - |
| -Motorfuel | | " | - | 14,007 | 5,603 | 40 | - | 330 | - | - |
| -Road bitumen | | " | 120 ) | 110 ) | 3 ) | 2.7 ) | 75.8 ) | 330 ) | - ) | - |
| -Oxid bitumen | | " | 25 ) | | | | | | | |
| Hassi Messaoud RA | 1974 | $10^3$tons | 1,000 | | | 45.66 | - | - | - | - |
| -LPG | | tons | - | 6,550 | 1,965 | 30 | - | 330 | - | - |
| -Separation unit | | " | - | 166,600 | 49,980 | 30 | - | - | - | - |
| -Motorfuel | | $10^3$tons | - | 653 | 503 | 77 | - | 330 | - | - |
| In Amenas RA | | | | | | 33 | 60 | | | - |
| -Motorfuel | | " | 300 | 181 | 60 | 33 | 60 | 330 | - | - |
| Arzew RA no. 2 | | | | | | 65 | 99 | | | - |
| -Separation unit | | " | 1,000 | 994.9 | 646.6 | 65 | 99 | - | - | - |
| Total LPG | | | | | | 61.33 | - | | | - |
| Total motorfuel | | | | | | 67.00 | - | | | - |
| Total lubricant | | | | | | 68.00 | 129 | | | - |
| Total road & oxide bitumen | | | | | | 25.85 | 90 | | | - |

(Table continues on the following page.)

Table H.1. (Continued)

| SONATRACH Plants/outputs | Year of entry production | Unit | Production 1980 Technical | Planned | Actual | U1 | U2 (in percent) | Time utilisation of fixed capital (days) Technic. | Actual | U3% |
|---|---|---|---|---|---|---|---|---|---|---|
| Fertiliser plants | | | | | | 16.65 | - | | | - |
| Arzew nitrate | | | | | | | | | | |
| fertiliser no.1 | 1970/71 | | | | | 5 | - | - | - | - |
| -Ammoniac | 1971 | $10^3$ Tons | 330 | - | 0 | 0 | - | 330 | - | - |
| -Ammonitrate | 1971 | " " | 165 | 165 | 33 | 20 | 100 | 330 | - | - |
| -Urea | 1970 | " " | 132 | - | 0 | 0 | - | 330 | - | - |
| -Nitrate acid | 1970 | " " | 132 | - | 0 | 0 | - | - | - | - |
| Arzew nitrate | * | | | | | | | | | |
| fertiliser no.2 | | | | | | - | - | - | - | - |
| -Ammonitrate | | | _ | _ | 0 | - | - | - | - | - |
| Annaba nitrate | | | | | | | | | | |
| fertiliser | 1981 | $10^3$ tons | 550 | | - | - | | - | - | - |
| -Ammonitrate | | | | | | - | - | 330 | - | - |
| -Ammoniac | | | | | | - | - | 330 | - | - |
| Annaba phosphatic | | | | | | | | | | |
| fertiliser | 1970 | $10^3$ tons | 350 | - | - | 28.3 | 69 | 330 | 307 | 93 |
| -TSP | | " " | 290.4 | 300 | 19.8 | 6.6 | 103 | 330 | 300 | 91 |
| -NPK | | " " | 603.9 | 314.8 | 157.4 | 50 | 35 | 330 | 315 | 95.45 |
| Petrochemical plants | | | | | | 27.7 | 79.37 | | | - |
| Arzew petrochemical | | | | | | 39 | 92.75 | 330 | - | - |
| -Methanol | 1974 | $10^3$ tons | 115 | 100 | 49 | 49 | 87 | 330 | - | - |
| -Resin | 1976 | " " | 14 | 13.8 | 4 | 29 | 98.5 | 330 | - | - |
| Skikda petrochemic. | 1975 | | | | | 16.25 | 66 | 330 | 139 | 42 |
| -Ethylene | 1978 | " " | 120 | 118.8 | 26 | 22 | 99 | 330 | 144 | 43.6 |
| -PVC | 1976 | " " | 35 | 34.9 | 15 | 43 | 99.6 | 330 | 274 | 83 |
| -Pebd | | " " | 48 | | 0 | 0 | - | 330 | - | - |
| -Chlorine | | " " | 36 | - | 0 | 0 | - | - | - | - |
| Plastic plants | | | | | | 59.4(2) | 31.64(2) | | | 84.35(2) |
| -Algiers plants | | $10^3$ tons | 30 | 30 | 17.4 | 58 | 100 | 330 | 312 | 94.5 |
| -Setif plants | f 1973 | " " | 26.7 | 1.17 | 0.7 | 60 | 4.3 | 250 | 250 | 100 |
| -El Asnam plants | f 1981 | " " | 18.64 | _ | _ | - | - | 250 | 150 | 60 |
| -Dra Elmizen s.g.p. | 1981 | " " | 1 | _ | _ | - | - | 250 | - | - |
| -Medea films plant | 1981 | " " | 2 | _ | _ | - | - | 250 | - | - |
| Total SONATRACH (1) | | | | | | 50.04(2) | 60.26(2) | | | 82.35(2) |

Sources: Survey data, El-Moudjahid 13th January, 1982 and Schnetzler, J.: Le Developpement Algerien, op cit.
1 Without interpetroleum and gas units.
2 Calculated for only the figures available.
* In reneval process.
- Not available or applicable.
f From

Table H.2: Liquefied natural gas and

natural gas export contracts in 1983

| Main contracts | Quantities Billion $m^3$ | Planned delivery date | Period of contract (years) |
|---|---|---|---|
| 1 Operating contracts | | | |
| -British Gas Council (Canvey Island) | 1.11 | 1964 | 15 |
| -Gas de France (Le Havre) | 0.56 | 1972 | 25 |
| -Gas de France (FOS) | 3.70 | 1972 | 25 |
| -Distrigas USA (Boston) | 1.20 | 1978 | 20 |
| -Enagas (spain) | 4.76 | 1980 | 23 |
| Sub-total 1 | 11.33 | | |
| 2 Contacts signed & approved | | | |
| -Frunkline-Panhandle (USA) | 4.76 | 1982 | 20 |
| -Thyssengas/Brigitta (West Germany) | 4.23 | 1984 | 20 |
| -Ruhrgas/Salzgitter (West Germany) ) -Ferngas/Gasunie (The Netherlands) ) | 11.90 | 1983 | 20 |
| -Distrigas-Belgium (Zeebruge) | 5.29 | 1980 | 20 |
| -Gas de France (Montoire) | 5.45 | 1980 | 20 |
| Sub-total 2 | 31.63 | | |
| -ENI Gas pipeline | 13.07 | 1982 | 20 |
| -Tunisia Gas pipeline | 1.20 | 1982 | 20 |
| Total contracts signed & approved | 45.90 | | |
| Total 1 & 2 | 57.23 | | |
| 3 Contract signed but stoped (1980) | | | |
| -El-Paso 1 (USA) | 10.95 | | |

Sources: Ministry of Energy and Hydrocarbons, Sutton, K.: The Algerian Natural Gas Industry, op cit and press releases.

# APPENDIX J

Table J.1: SNS plants, outputs and their fixed capital utilisation in 1981

| SNS plants | Year of entry | Unit | Production 1981 Technical | Planned | Actual | Fixed capital utilisation U1 | U2 |
|---|---|---|---|---|---|---|---|
| El Hadjar complex | | | | | | 89.46 | 53.71 |
| -Cast iron no.1&2 p. | | | | | | 93.66 | 64 |
| -Coke | 1980 | Tons | 1,230,000 | 318,977 | 449,035 | 141 | 26 |
| -Conglomerate | 1980 | $10^3$ tons | 2,300 | 2,216.3 | 1,509 | 68 | 96 |
| -Liquid cast iron | 1969/81 | " " | 1,760 | 1,236.3 | 897.1 | 72 | 70 |
| -Oxygen steelmill no.1 | 1972 | | | | | 168.5 | 31.5 |
| -Liquid steel | | Tons | 1,400,000 | 686,605 | 418,205 | 60 | 49 |
| -Blooms | | Tons | 1,300,000 | 184,800 | 418,205 | 277 | 14 |
| -Oxygen steelmill no.2 | 1981 | | | | | 16.5 | 38 |
| -Liquid steel | | Tons | 700,000 | 268,958 | 41,859 | 15 | 38.4 |
| -Billettes | | Tons | 600,000 | 227,513 | 41,859 | 18 | 38 |
| -Electrical steelmill | 1975 | | | | | 80 | 59.5 |
| -Liquid steel | | Tons | 180,000 | 97,823 | 72,704 | 74 | 54 |
| -Iron ingot | | Tons | 123,000 | 80,523 | 69,704 | 86 | 65 |
| -Hot rolling mill | 1972* | Tons | 1,330,000 | 546,699 | 331,919 | 60.7 | 41 |
| -Coils | | Tons | - | 510,715 | 320,289 | 62 | - |
| -Thick iron sheet | | Tons | - | 35,984 | 11,630 | 31 | - |
| -Cold rolling mill | 1974 | Tons | 750,000 | 187,115 | 180,288 | 96 | 25 |
| -Iron sheets | | Tons | - | 100,429 ) | | ) | ) |
| -Galvanised iron sheet | | Tons | - | 86,686 ) | 180,288 | ) 96 | ) - |
| -Wire & round mill | 1978 | Tons | 540,000 | 512,230 | 392,482 | 76.6 | 94.8 |
| -Rim for wire drauwing | | Tons | - | 82,817 ) | | ) | ) |
| -Rim for round | | Tons | - | 230,955 ) | 238,300 | ) 76 | ) - |
| -Rounds in bars | | Tons | - | 198,458 | 154,182 | 77 | - |
| -Seamless tubes mill | 1977 | Tons | 70,000 | 46,738 | 40,461 | 86 | 67 |
| -Cast | | Tons | - | 37,241 ) | | ) | ) |
| -Pipelines | | Tons | - | 9,497 ) | 40,461 | ) 86 | ) - |
| -Welded tubes mill | 1969 | | | | | 123 | 52 |
| -Welded tubes | | Tons | 100,000 | 51,833 | 63,987 | 123 | 52 |
| Transformation group | | | | | | 81.35 | 65.89(1) |
| Tubes and flat products division | | | | | | 85 | 81.41 |
| -Reghaia big tubes p. | Nat. | Tons | 100,000 | 56,177 | 54,208 | 95.5 | 56.17 |
| -Tube & welded tube | | Tons | - | 22,890 | 21,154 | 92 | - |
| -Coated tube | | Tons | - | 33,287 | 33,054 | 99 | - |
| -Reghaia small tube p. | Nat. | Tons | 35,000 | 33,903 | 30,078 | 89.5 | 96.86 |
| -Gas tube | | Tons ) | | 24,499 | 21,354 | 87 | ) - |
| -Thin tube | | Tons ) | 35,000 | 9,404 | 8,724 | 92 | ) 96.86 |

(Table continues on the following page.)

Table J.1. (Continued)

| SNS plants | Year of entry | Unit | Production Technical | 1981 Planned | Actual | Fixed capital U1 | utilisation U2 |
|---|---|---|---|---|---|---|---|
| -Reghaia cold steelmill | 1975 | Tons | - | 181,193 | 144,179 | 89 | 78.5 |
| -Thin iron sheet | | Tons | 130,000 | 119,622 | 92,622 | 77 | 92 |
| -Welded tube | | Tons | - | 1,891 | 2,055 | 108 | - |
| -Sundry items | | Tons | 93,000 | 60,070 | 49,502 | 82 | 65 |
| -Ghardaia spiral tube | 1977 | | | | | 66 | 94 |
| -Welded iron tube | | Tons | 110,000 | 103,615 | 68,714 | 66 | 94 |
| Long products division | | | | | | 72.72 | 65.29 |
| -Oran steelmill | Nat. | Tons | 110,000 | 104,303 | 94,287 | 93 | 85.58 |
| -Iron ingot | | Tons | 31,500 | 29,303 | 24,998 | 85 | 93 |
| -Round | | Tons | 80,000 | 67,000 | 61,240 | 94 | 83.75 |
| -Welded wire mesh | | Tons | 10,000 | 8,000 | 8,049 | 100 | 80 |
| -Oued Smar electrode p. | Nat. | | | | | 69 | 23.2 |
| -Electrode | | Tons | 300,000 | 99,960 | 69,613 | 69 | 23.2 |
| -Sig nail plant | 1979 | Tons | 27,120 | 26,792 | 17,980 | 77.66 | 66.16 |
| -Wire drawing | | Tons | 13,000 | 14,451 | 8,925 | 61 | 111 |
| -Nail | | Tons | 15,000 | 12,210 | 8,925 | 72 | 81 |
| -Clip | | Tons | 2,000 | 131 | 130 | 100 | 6.5 |
| -Annaba welded wire mesh & metallic beam p. | 1979 | | | | | 71.66 | 94.5(1) |
| -Welded wire mesh | | Tons | 14,000 | 12,063 | 12,002 | 100 | 86 |
| -Metallic beam | | Tons | 12,000 | 12,407 | 992 | 41 | 103 |
| -Nail | | Tons | - | 1,013 | 750 | 74 | - |
| -Reghaia welded wire mesh & metalic beam p. | 1979 | | | | | 60 | 65 |
| -Mettalic beam | | Tons | 6,000 | 4,788 | 1,017 | 21 | 80 |
| -Welded wire mesh | | Tons | 20,000 | 9,934 | 9,800 | 99 | 50 |
| -El Eulma electrode p. | 1979 | | | | | 65 | 57.33 |
| -Electrode | | Tons | 260,000 | 100,000 | 59,422 | 59 | 38 |
| -Extruded wire | | Tons | 32,000 | 27,255 | 20,371 | 74 | 85 |

(Table continues on the following page.)

Table J.1. (Continued)

| SNS plants | Year of entry | Unit | Production 1981 Technical | Planned | Actual | Fixed capital utilisation U1 | U2 |
|---|---|---|---|---|---|---|---|
| Metallic contains division | | | | | | 83.23 | 54.2 |
| -Kouba packaging p. | Nat. | Tons | 50,239 | 33,683 | 32,189 | 101.66 | 60 |
| -Barrel | | Tons | 6,135 | 1,519 | 1,736 | 114 | 25 |
| -Preserve can | | Tons | 36,000 | 25,232 | 23,622 | 93 | 70 |
| -Gas bottle | | Tons | 8,104 | 6,932 | 6,831 | 98 | 85 |
| | | Unit | - | 649,600 | 568,339 | 87 | - |
| -Arzew packaging p. | 1976 | | | | | 97 | 51 |
| -Packaging containers | | Tons | 19,169 | 9,886 | 9,623 | 97 | 51 |
| -Kouba aluminum p. | Nat. | Tons | 4,434 | 2,453 | 1,987 | 83 | 55 |
| -Kitchen utensile | | Tons | | 924 | 876 | 94 | - |
| -Other goods | | Tons | 4,434 | 1,529 | 1,111 | 72 | - |
| -Batna packaging p. | 1979 | | | | | 98 | 92 |
| -Gas bottle | | Tons | 10,611 | 9,774 | 9,689 | 98 | 92 |
| | | Unit | - | 773,600 | 705,359 | - | - |
| -Mascara packaging p. | 1980 | | | | | 36.5 | 13 |
| -Small gas bottle | | Tons | 11,512 | 1,642 | 568 | 34 | 14 |
| -Other items | | Unit | 5,000,000 | 620,000 | 240,500 | 39 | 12 |
| Salvage division | | | | | | 90.66 | - |
| -Central salvage p. | Nat. | Tons | - | 291,265 | 288,682 | 99 | - |
| -East savage p. | Nat. | Tons | - | 60,306 | 61,933 | 101 | - |
| -West salvage p. | Nat. | Tons | - | 37,843 | 27,786 | 72 | - |
| Non ferrous transformation group | | | | | | 90.81 | 48(1) |
| -Ghazaouet zinc electrolysis plant | 1975 | Tons | 150,350 | 85,091 | 80,824 | 92.13 | 48(1) |
| -Zinc ingot | | Tons | 40,150 | 33,000 | 35,696 | 106 | 82 |
| -Cadmium | | Tons | 200 | 91 | 85 | 93 | 45 |
| -Sulphur acid | | Tons | 90,000 | 50,000 | 43,372 | 86 | 55 |
| -Zamac | | Tons | 20,000 | 2,000 | 1,671 | 83.55 | 10 |
| -Prosider p. | | | | | | 89.5 | - |
| -Cold rolled flat iron | | Tons | - | 4,375 | 3,700 | 86 | - |
| -Various products | | Tons | - | 3,893 | 3,600 | 93 | - |

(Table continues on the following page.)

Table J.1. (Continued)

| SNS plants | Year of entry | Unit | Production 1981 Technical | Planned | Actual | Fixed capital utilisation U1 | U2 |
|---|---|---|---|---|---|---|---|
| Industrial gas group | Nat. | | | | | | |
| By outputs | | | | | | 91.18 | 40(1) |
| -Acetylene | | $10^3$ $m^3$ | 2,704 | 1,327 | 1,799 | 135 | 49 |
| -Oxygen | | " " | 18,720 | 4,760 | 4,507 | 94 | 25 |
| -Liquid oxygen | | " " HL | 15,193 | 11,040 | 6,534 | 59 | 73 |
| -Nitrous oxide | | Tons | 360 | 120 | 111 | 92 | 33 |
| -Nitrogen gas | | $10^3$ $m^3$ | 12,192 | 154 | 252 | 163 | 1.26 |
| -Liquid nitrogen | | HL | 22,311 | 17,958 | 20,942 | 114 | 80 |
| -Hydrogen | | $10^3$ $m^3$ | 280 | 77 | 70 | 90 | 27 |
| -Carbon dioxide | | Tons | 48,800 | 4,956 | 5,644 | 113 | 10 |
| -Argon | | $10^3$ $m^3$ | - | 68 | 60 | 88 | - |
| -Liquid argon | | $10^3$ L | 194 | 120 | 67 | 55 | 62 |
| -Compressed air | | $10^3$ $m^3$ | - | 18 | 0 | 0 | - |
| Total SNS (1) | | | | | | 85.61 | 57.69 |

Sources: Survey data; Evolution de la Production des Unites 1978-80 (SNS, Algeria, 1981); and Annuaires Statistiques, op cit., 1962 to 1978.

* Extended.
(1) Calculated for the available figures.

Table J.2: Origin of the technology in SNS complex and plants

| Plants | Contractors & their origin | Type of contract |
|---|---|---|
| **Plants in operation** | | |
| El Hadjar complex | | |
| -Coking plant | KOPPERS-France | |
| | USSR | Turnkey |
| -Cast iron no. 1 plant | SOFRESID-France | Engineering |
| | SIDL & CAFF-France | Realisation |
| -Cast iron no.2 plant | TIAJPROMEXPORT-USSR | Turnkey |
| -Oxygen steelmill no.1 | LENGIRROMELZ-Sweeden ) | Engineering |
| | TIAJPROMEXPORT-USSR ) | Supply of |
| | ) | equipment |
| -Electrical steelmill | SOFRESID-France ) | Engineering |
| | ASEA-Sweeden ) | Supply |
| | KUTTNER-GFR** ) | of |
| | CLARK CHAPMAN-GB* ) | equipment |
| | LLIMEX-GDR*** ) | |
| -Hot rolling mill | SOFRESID-France ) | Engineering |
| | INNOCENTI-Italy ) | supply of |
| | MARELLI-Italy ) | equipment |
| -Cold rolling mill | DAVI & UNITED-GB* ) | engineering |
| | VOEST-Austria ) | supply |
| | DEMAG-GDR+ ) | of |
| | STEIN Roubaix-Belgium) | equipment |
| -Galvanised and tin | ) | Supply & |
| plating plant | WEAN-GB* ) | setting up of |
| | ) | equipment |
| -Spirale tube plant | HOESCH-GFR** ) | Supply & |
| | ) | setting up of |
| | ) | equipment |
| -wire & round mill | TIAJPROMEXPORT-USSR | Turnkey |
| -Seamless tube plant | SOFRESID-France ) | Enginnering |
| | INNOCENTI-Italy ) | Supply & |
| | & MARELLI-Italy ) | setting up |
| | | equipment |
| Transformation group | | |
| Tube & flat division | | |
| -Gardaia spiral tube p. | HOESCH-GFR** ) | Supply & |
| | ) | setting up |
| | ) | equipment |
| -Reghaia cold steelmill | COMEC-France | Nationalised |
| -Reghaia big tube plant | France | Nationalised |
| -Reghaia small tube pla. | France | Nationalised |
| Metallic container division | | |
| -Arzew packaging plant | KRUPP-GFR** ) | Supply |
| | SABATIER-France ) | of |
| | FMI-MELFOND-Italy ) | equipment |
| | SOUDRONIC-Switzerlan ) | |
| -Kouba packaging plant | France | Nationalised |

(Table continues on the following page.)

Table J.2. (Continued)

| Plants | Contractors & their origin | Type of contract |
|---|---|---|
| -Kouba kitchen utensile plant | France | Nationalised |
| -Batna gas bottle plant | SMG-GFR** | ) Supply of ) equipment |
| -Mascara gas bottle p. | SMG-GFR** | ) Supply of ) equipment |
| Long products division | | |
| -Oran steelmill | France | Nationalised |
| -Oued Smar electrode p. | France | Nationalised |
| -El Eulma electrode p. | ATKINS & GKN-GB* HOESCH-GFR** | ) Engineering ) supply of ) equipment |
| -Sig nail plant | France | Nationalised |
| Salvage plants | France | Nationalised |
| Non ferrous transformat-ion group | | |
| -Ghazaouet zinc electrilysis plant | MECHIN, Vielle Montagne, FABRICOM-Belgium & COCEI, Jeumont Schneider-France | ) Engineering ) Supply of ) equipment ) ) |
| -Industrial gas plants | France | Nationalised |
| <u>Plants under construction</u> | | |
| -Welded wire mesh plant in El Hadjar complex and Algiers welded wire mesh plant | HOESCH-GFR** EVC/KATZENBERGER -Austria | ) Supply of ) equipment ) ) |
| -Extention of the rolling mills of El Hadjar complex | 11 Different firms of which: C.ITOH & ITACHI-JAPAN (40%), & DEMAG-GFR** | ) Setting up ) equipment ) ) |
| -M'Sila aluminum plant | USSR | Product-in-hand |

* GB: Great Britain
** GFR: West Germany
*** GDR: East Germany.
Sources: Collected from different sources in particular:
-Dersa : <u>L'Algerie en Debat: Luttes et Developpement</u> (Francois Maspero, Paris, 1981);
-Annuaire de L'Afrique du Nord, <u>CNRS</u>, France, different volumes;
-Chauleur, P.: <u>L'Afrique Industrielle</u> (GP, Maisonneuve et la Rose, Paris, 1979) and
-Survey data.

Table J.3: SNS personnel (1980)

| Skill categories / Plants and head office | Managers (1) | Managers (2) | Technicians/ supervisors (1) | Technicians/ supervisors (2) | Semi-skilled/ unskilled (1) | Semi-skilled/ unskilled (2) | Total (1) | Total (2) |
|---|---|---|---|---|---|---|---|---|
| El Hadjar complex | 533 | 2.9 | 2,339 | 12 | 14,685 | 80 | 18,166 | 46.8 |
| -Total plants | 414 | 77.6* | 1,775 | 76* | 14,383 | 98* | 16,572 | 92* |
| -Complex head office | 119 | 22.3* | 564 | 24* | 302 | 2* | 985 | 8* |
| Transformation group | 274 | 3.2 | 1,022 | 11.9 | 7,287 | 84.9 | 8.583 | 22.1 |
| Long products division | 85 | 3.7 | 250 | 11 | 1,895 | 83.5 | 2,267 | 5.8 |
| -Oran steelmill | 48 | 5.6 | 114 | | 652 | | 854 | |
| -Oued Smar electrode p. | 1 | 0.9 | 9 | | 101 | | 111 | |
| -El Eulma electrode p. | 20 | 3.1 | 65 | | 544 | | 629 | |
| -Sig nail p. | 5 | 1.4 | 32 | | 309 | | 351 | |
| -Reghaia welded wire mesh & metallic beam p. | 6 | 3.7 | 18 | | 138 | | 162 | |
| -Annaba welded wire mesh & metallic beam p. | 5 | 3.1 | 12 | | 151 | | 160 | |
| Tube and flat products division | 102 | 4.1 | 367 | 14.9 | 1,972 | 80.4 | 2,451 | 6.3 |
| -Ghardaia spiral tube p. | 25 | 3.3 | 118 | | 606 | | 749 | |
| -Reghaia big tube p. | 26 | 3.7 | 95 | | 563 | | 687 | |
| -Reghaia cold steelmill | 24 | 4.6 | 88 | | 406 | | 521 | |
| -Reghaia small tube p. | 27 | 5.4 | 66 | | 397 | | 494 | |
| Metallic container division | 73 | 2.5 | 336 | 11.5 | 2,505 | 85 | 2,915 | 7.5 |
| -Kouba alum.ustensile p | 9 | 2.5 | 45 | | 304 | | 358 | |
| -Batna gas bottle p. | 20 | 5 | 48 | | 377 | | 445 | |
| -Algiers metallic container p. | 30 | 1.8 | 190 | | 1,421 | | 1,642 | |
| -Arzew metallic container p. | 7 | 3.1 | 18 | | 194 | | 219 | |
| -Mascara gas bottle p. | 7 | 2.7 | 35 | | 209 | | 251 | |
| Salvage division | 14 | 1.4 | 69 | 6.9 | 915 | 91 | 998 | 2.5 |
| -Central salvage p. | 6 | 1.4 | 37 | | 388 | | 431 | |
| -East salvage p. | 5 | 1.2 | 21 | | 368 | | 394 | |
| -West salvage p. | 3 | 1.7 | 11 | | 159 | | 173 | |
| Non ferrous transformation group | 24 | 3 | 104 | 12 | 692 | 84 | 820 | 2.1 |
| -Ghazaouet zinc electrilysis plant | 24 | 3 | 104 | 12 | 692 | 84 | 820 | 2.1 |
| Industrial gas group | 22 | 2.8 | 151 | 19 | 612 | 78 | 785 | 2 |
| -Algiers indust. gas p. | 5 | 1.4 | 63 | | 271 | | 339 | |
| -Annaba indust. gas p. | 3 | 3.4 | 12 | | 71 | | 86 | |
| -Constantine indust.g.p. | 4 | 5.5 | 9 | | 59 | | 72 | |

(Table continues on the following page.)

Table J.3. (Continued)

| Skill categories<br>Plants and head office | Managers (1) | Managers (2) | Technicians/ supervisors (1) | Technicians/ supervisors (2) | Semi-skilled/ unskilled (1) | Semi-skilled/ unskilled (2) | Total (1) | Total (2) |
|---|---|---|---|---|---|---|---|---|
| -Oran industrial gas p. | 7 | 3.2 | 54 | | 156 | | 217 | |
| -Ouargla indust. gas p. | 3 | 4.2 | 13 | | 55 | | 71 | |
| Distribution group | 74 | 4.1 | 170 | 9.6 | 1,526 | 86 | 1,770 | 4.5 |
| -Central unit | 36 | 4.5 | 67 | | 683 | | 786 | |
| -East unit | 20 | 3.5 | 50 | | 501 | | 571 | |
| -West unit | 18 | 4.3 | 53 | | 342 | | 413 | |
| SNS administrative department | 483 | 24.6 | 423 | 21.6 | 848 | 43 | 1,956 | 5 |
| -Training centre | 72 | 20 | 116 | | 165 | | 353 | 0.9 |
| -Oran training c. | 17 | | 28 | | 49 | | 94 | |
| -El Hadjar trainig c. | 55 | | 88 | | 116 | | 259 | |
| Project department | 444 | 7.8 | 901 | 15.8 | 4,284 | 75 | 5,676 | 14.6 |
| Promotion department | 40 | | 54 | | 307 | | 401 | |
| Total SNS | 2,017 | 5.1 | 5,335 | 13 | 30,573 | 78.7 | 38,839 | 100 |
| -Foreigners | 174 | 8.6 | 7 | | 16 | | 197 | 0.5 |

Source: Survey data.

1 Total by skill category in the plant, complex, division, group & SNS as a whole.

2 Percentage of the total by skill category in the plant, complex, division, group & SNS as a whole.

* Percentage of the El Hadjar complex total labour force.

# APPENDIX K

Table K.1: SONACOME complexes and plants in operation, their respective outputs and their fixed capital utilisation in 1981

| SONACOME complexes and plants /outputs | Rate of integration | Year of entry product. | Unit | Production Technical | Planned | Actual | U1 (in percent) | U2 | Number of shifts Techn. | Actual | U3 % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Industrial vehicle division | | | | | | | 93.66 | 78.28 | | | 52.4 |
| -The Rouiba industrial vehicle c. | 70% | 1974 | | | | | 86.5 | 74 | | | 52.4 |
| -Bus and coach | | | Unit | 1,000 | 645 | 577 | 85.5 | 67.5 | 3 | 2 | 52.4 |
| -Lorry | | | Unit | 8,000 | 6,425 | 5,625 | 87.5 | 80.3 | 3 | 2 | 52.4 |
| -The Hussein Dey equipment vehicle p. | 70% | Nat. | | | | | 138 | 73.6 | | | 52.4 |
| -Vehicle body | | Ext. | Unit | 2,500 | 1,840 | 2,557 | 138 | 73.6 | 3 | 2 | 52.4 |
| -The Rouiba equipment vehicle p. | 70% | 1979 | Unit | 10,000 | 8,725 | 6,845 | 56.5 | 87.25* | | | 52.4 |
| -Equipment for vehicles | | | Unit | - | 7,220 | 5,724 | 79 | - | 3 | 2 | 52.4 |
| -Industrial vowing | | | Unit | - | 150 | 0 | 0 | - | 3 | 2 | 52.4 |
| -Semi-vowing | | | Unit | - | 1,055 | 946 | 89 | - | 3 | 2 | 52.4 |
| -Engine carrier | | | Unit | - | 300 | 175 | 58 | - | 3 | 2 | 52.4 |
| Agricultural machinery division | | | | | | | 100.00 | 70.93 | | | 52.4 |
| -The Constantine engine & tractor c. | 58/76% | 1972 | | | | | 76.5 | 91 | | | 52.4 |
| -Wheel tractor | | | Unit | 5,000 | 5,500 | 4,379 | 79 | 110 | 3 | 2 | 52.4 |
| -Caterpilar tractor | | | Unit | 1,000 | 0 | 0 | .. | 0 | | | .. |
| Total tractor | | | Unit | 6,000 | 5,500 | 4,379 | 79* | 91.6* | | | 52.4 |
| -Chain engine | | | Unit | 9,500 | 9,500 | 7,051 | 74 | 100 | 3 | 2 | 52.4 |
| -V-engine | | | Unit | 1,000 | 0 | 0 | .. | 0 | | | .. |
| Total engine | | | Unit | 10,500 | 9,500 | 7,051 | 74* | 90.4* | 3 | 2 | 52.4 |
| -The Bel Abes agricultural material c. | 70/100% | 1976 | Unit | 20,500 | 10,653** | 8,160** | 75 | 52* | | | 52.4 |
| -Harvester-thresher | | | Unit | 550 | 550 | 355 | 64 | 100 | 3 | 2 | 52.4 |
| -Collector gatherer press | | | Unit | 2,000 | 2,000 | 1,539 | 76 | 100 | 3 | 2 | 52.4 |
| -Light plough | | | Unit | - | 753 | 640 | 75 | - | 3 | 2 | 52.4 |
| -Various plough | | | Unit | 3,900 | 750 | 463 | 61 | 19 | 3 | 2 | 52.4 |
| -Rake | | | Unit | - | 2,500 | 1,711 | 68 | - | 3 | 2 | 52.4 |
| -Universal reaper | | | Unit | - | 2,500 | 1,871 | 74 | - | 3 | 2 | 52.4 |
| -Disk-harrow-1oo litres- | | | Unit | 400 | 400 | 440 | 110 | 100 | 3 | 2 | 52.4 |
| -Portable ramp | | | Unit | 400 | 400 | 440 | 110 | 100 | 3 | 2 | 52.4 |
| -Blowing engine | | | Unit | - | 400 | 287 | 71 | - | 3 | 2 | 52.4 |
| -Ramp | | | Unit | - | 400 | 414 | 103 | - | 3 | 2 | 52.4 |
| -Seed-lip | | | $10^3$ unit | - | 150 | 84.3 | 56 | - | 3 | 2 | 52.4 |
| -Discs | | | Unit | - | 30,000 | 9,619 | 32 | - | 3 | 2 | 52.4 |
| -The Rouiba agricultural machinery p. | | Nat. | Unit | 18,000 | 12,570 | 17,529 | 148.5 | 69.8* | 3 | 2 | 52.4 |
| -Vowing | | | Unit | - | 1,600 | 2,570 | 160 | - | 3 | 2 | 52.4 |
| -Tunk | | | Unit | - | 1,900 | 2,183 | 148 | - | 3 | 2 | 52.4 |
| -Agricultural machinery | | | Unit | - | 6,300 | 8,614 | 136 | - | 3 | 2 | 52.4 |
| -Plough | | | Unit | - | 2,770 | 4,162 | 150 | - | 3 | 2 | 52.4 |

(Table continues on the following page.)

Table K.1. (Continued)

| SONACOME complexes and plants /outputs | Rate of integration | Year of entry product. | Unit | Production Technical | Planned | Actual | U1 (in percent) | U2 | Number of shifts Techn. | Actual | U3 % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Industrial equipment division | | | | | | | 76.25 | 76.1(1) | | | 52.4 |
| -The Constantine machine tool p. -ALMO- | 70% | 1975 | Unit | 1,700 | 500 | 317 | 45.75 | 29.4* | 3 | 2 | 52.4 |
| -Turning lathe | | | Unit | - | 50 | 23 | 46 | - | 3 | 2 | 52.4 |
| -Milling machine | | | Unit | - | 20 | 0 | 0 | - | 3 | 2 | 52.4 |
| -Shaper | | | Unit | - | 70 | 0 | 0 | - | 3 | 2 | 52.4 |
| -Drilling machine | | | Unit | - | 70 | 70 | 100 | - | 3 | 2 | 52.4 |
| -Grinding lathe | | | Unit | - | 15 | 2 | 13.3 | - | 3 | 2 | 52.4 |
| -Shapening machine | | | Unit | - | 110 | 90 | 81 | - | 3 | 2 | 52.4 |
| -Saw | | | Unit | - | 165 | 132 | 80 | - | 3 | 2 | 52.4 |
| -The Berrouaghia pump and valve p. | 85% | 1975 | Tons | 13,500 | 10,388 | 7,129 | 68.5 | 77.5 | 3 | 2 | 52.4 |
| -Cast iron | | | Tons | 9,500 | 7,166 | 4,763 | 66 | 75 | 3 | 2 | 52.4 |
| -Valve and junction | | | Tons | 4,000 | 3,212 | 2,366 | 71 | 80 | 3 | 2 | 52.4 |
| -The Ain Oussara small vowing p. | 70% | 1980 | | | | | 61 | 100 | | | 52.4 |
| -Small vowing | | | Unit | 3,000 | 3,000 | 1,830 | 61 | 100 | 3 | 2 | 52.4 |
| -The Oran smelting plant | | Nat. | | | | | 82.5 | - | | | 52.4 |
| -Cast iron | | | Tons | 6,000 | 6,000 | 4,050 | 69 | 100 | 3 | 2 | 52.4 |
| -Special cast iron | | | Tons | 1,000 | 1,000 | 776 | 77 | 100 | 3 | 2 | 52.4 |
| -Sundry items | | | Unit | - | 90,750 | 81,884 | 90 | - | 3 | 2 | 52.4 |
| -Boiler work | | | Unit | - | 69,300 | 65,364 | 94 | - | 3 | 2 | 52.4 |
| -The El-Harrach smelting plant | | Nat. | | | | | 98.5 | - | | | 52.4 |
| -Cast iron | | | Tons | 6,000 | 5,437 | 5,400 | 101 | 90.6 | 3 | 2 | 52.4 |
| -Semi-vowing | | | Unit | - | 31 | 30 | 96 | - | 3 | 2 | 52.4 |
| -The Bakari pump p. | | Nat. | Unit | 6,000 | 5,850 | 4,511 | 101.25 | 97.5* | | | 52.4 |
| -Horizontal pump | | | Unit | - | 5,350 | 3,928 | 86.5 | - | 3 | 2 | 52.4 |
| -Vertical pump | | | Unit | - | 500 | 583 | 116 | - | 3 | 2 | 52.4 |

(Table continues on the following page.)

Table K.1. (Continued)

| SONACOME complexes and plants /outputs | Rate of integra-tion | Year of entry product. | Unit | Production Technical | Production Planned | Production Actual | U1 (in percent) | U2 (in percent) | Number of shifts Techn. | Number of shifts Actual | U3 % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sectoral promotion division | | | | | | | 61.3 | 63.73 | | | 36.68 |
| -The Guelma cycle c. | 64/82% | 1973 | | | | | 101 | 90.66 | | | 52.4 |
| -Engine for motorcycle | 64% | | Unit | 6,000 | 6,000 | 6,029 | 100 | 100 | 3 | 2 | 52.4 |
| -Cycle | 82% | | Unit | 25,000 | 20,000 | 20,500 | 102 | 80 | 3 | 2 | 52.4 |
| -Motocycle | 74% | | Unit | 40,000 | 37,000 | 37,395 | 101 | 92 | 3 | 2 | 52.4 |
| -The Ainsmara scoop and crane p. | 60% | 1980 | | | | | 50.5 | 31.5 | 3 | 2 | 52.4 |
| -Scoop | | | Unit | 700 | 295 | 285 | 97 | 42 | 3 | 2 | 52.4 |
| -Cran | | | Unit | 300 | 64 | 3 | 4.6 | 21 | 3 | 2 | 52.4 |
| -The El-Kerira nut, bolt and screw p. | 92/100% | 1978 | | | | | 59 | 58.5 | | | 26.2 |
| -Nut and screw | 100% | | Tons | 4,400 | 2,800 | 1,789 | 63 | 64 | 3 | 2 | 26.2 |
| -Brass founding and finishing | 92% | | Tons | 1,234 | 660 | 368 | 55 | 53 | 3 | 1 | 26.2 |
| -The Oued-Rhiou nut, bolt and screw p. | 92/100% | 1978 | | | | | 48 | 47 | | | 26.2 |
| -Nut and screw | 100% | | Tons | 4,950 | 2,250 | 1,110 | 49 | 45 | 3 | 1 | 26.2 |
| -Brass founding and finishing | 92% | | Tons | 1,234 | 601 | 287 | 47 | 49 | 3 | 1 | 26.2 |
| -The Cheraga nut,bolt and screw p. | 100% | 1977 | | | | | 48 | 91 | | | 26.2 |
| -Nut, bolt and screw | | | Tons | 1,980 | 1,810 | 878 | 48 | 91 | 3 | 1 | 26.2 |
| Total SONACOME (1) | 70% | | | | | | 79.11 | 71.93 | | | 47.77 |

Source: Survey data.

1 Figures calculated from the available data.
* Figures calculated by dividing total actual output by total planned output or total planned output by total technical output.
** Figures calculated without taking into account the seed-lip and discs outputs.

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