ARAB REPUBLIC OF EGYPT

THE INSTITUTE OF NATIONAL PLANNING

Memo No (1003)

Manpower Planning in Egypt:
Techniques and Major results

By

Dr. Abdel Fattah Nassef

Jan 1972

Aug 1981

Nov1982

جمهورية مصر العربية – طريق صلاح سالم – مدينة نصر – القاهرة – مكتبب ريد رقم ١١٧٦٥

A.R.E Salah Salem St. Nasr City , Cairo P.O.Box : 11765

TABLE OF CONTENTS

LIST OF TABLES

MANPOWER PLANNING IN EGYPT: TECHNIQUES AND MAJOR RESULTS

1. INTRODUCTION:

1.1. The Role of Manpower Planning

Labor force occupies a central role in the prodcutive process. Land and capital are, of course, essential for production, yet it is the human factor that gives them such essential value. Hence, manpower development is a major target in the overall socio-economic development.

The major question in manpower planning is: What can be done to increase the productive capacipty of the labor force? Under this general question many other detailed ones may be asked. For instance, what are the objectives in terms of labor force size and its rate of growth? In what way these objectives be achieved? What are the desired changes in labor force structure? To what extent does the policy intend to increase the degree of manpower utilization through reducing unemployment and underemployment? What are the factors affecting labor productivity, and the actions to be taken to increase its level? What are the measures to be implemented on a short-run basis as against those of a long-run nature and in what way, if any, are the two types of measures interrelated? Is the general objective of policy to match the supply of labor force to its potential demand, or to match demand for labor force to its potential supply? What are the possible effects of the measures of labor force policy on other variables related to overall socio-economic development?

The answers to these and other related questions will always emphasize the fact that labor force is a central variable influencing and being influenced by innumerable and interrelated variables in the matrix of socio-economic life. Thus, manpower planning should be viewed as an important integral part in the total process of socio - eocnomic development.

1.2 The Egyptian Labor Force - A genral Background:

The Egyptian labor force more than doubled within a 53-year period. It grew from about 3.5 million workers in 1907 up to 7.8 million in 1960 with an average rate of growth of about 1.5 percent per year. The contribution of population growth to the changing size of the labor force overshadowed that attributable to the change in socio-economic factors reflected by the rate of participation in economic activities. In fact the latter had a negative effect during the most recent decades.

The proportion of the total population in the labor force has been relatively low, implying a heavy load of dependency. A primary factor in this regard is the youthfulness of the age structure of the population resulting from the high level of fertility.

In addition to the youthful age structure of the population, the low level of the female activity rate makes for a low crude activity rate in the population as a whole. The low female activity rate is due, among other things, to the classical social norms still prevailing in the country. By and large, the principal role of women is considered to be in domestic work at home; a norm which to a varying degree prevailed also in some of the present-day developed countries less than a century ago. Thus, any future improvement in such extremely unfavorable dependency ratio depends on a significant decline in fertility level or an appreciable increase in the female participation rate.

The Egyptian economic structure has been dominated by the agricultural sector. From the turn of this century until 1937 roughly seven out of each ten workers were employed in agriculture, with the exception of an apparent premature decline in the share of agriculture in 1917 due to the conditions of the first World War.

The shift away from agriculture dates back to the late 1930's. The deterioration of the country's terms of trade during the great depression;

the protectionist foreign trade policy after the regaining of fiscal autonomy; the lack of imports and accelerated urban growth during the second World War; and, perhaphs, the concern over the consequences of rapid population growth led to further governmental as well as pioneering private efforts which laid the foundation for economic transformation.

The decline in the percent share of agriculture during the 1937-1960 period was accompanied by increasing shares of both the secondary and terriary sectors, with a leading edge in the rate of increase for the former during the 1947 - 1960 intercensal period. Moreover, the reallocation of economically active population between the broad sectors of the economy was accompanied by significant shifts between the major industries within each sector, as well as shifts between various lines of activities within each major industry. By and large, manpower tended to shift from less productive to more productive industries and lines of activity. Along with these industrial changes, the occupational structure showed a definite trend of increasing proportions of occupations with higher levels of skill and education. Moreover, the 1937-1960 period witnessed modernization in the organizational framework of the economy as reflected in the changing distribution of the labor force by employment status, in varying degrees between different industries. With all these developments, the average productivity of labor increased significantly.

Despite the a forementioned developments, the traditional sector of the economy still employs a sizable portion of the labor force; the proportion of skilled, well-educated workers is relatively small, while family-type interprises and relatively inefficient organization predominate.

The regional picture of labor force exhibits distinctive patterns. A pronounced disparity exists between urban and non-urban governorates. Beside appreciably lower activity rates, urban governorates have more than the lion's share in the non-agricultural sector, in highly skilled workers, and in enterprises organized along modern lines. Among non-urban governorates, those in lower Egypt show somewhat higher proportion of the labor

force in non-agricultural activities and a more favorable occupational structure than those in Upper Egypt do. These differences, however, are small; and they become even smaller when a few exceptional governorates are excluded. Moreover, structural shifts in recent decades have occurred, by and large, on a nearly proportionate basis so that the extent of dissimilarity among governorates in 1960 was not very different from that of 1937.

A sound long-run policy in this regard should aim at decreasing regional dissimilarity in economic conditions. Such a policy not only satisfies the right of the inhabitants of the non-urban governorates to enjoy the fruits of socio-economic development, but also alleviates the increasing problems of housing, transportation, etc. in the major urban centers especially in Cairo and Alexandria.

In short, avoiding undue waste of manpower, alleviating the high dependency ratio, speeding the process of economic transformation in the face of the rapidly increasing man/land ratio, and reducing the regional disparities require a carefully worked-out manpower policy, well coordinated with overall socio-economic development program.(1)

1.3 Efforts in Manpower Planning in Egypt:

Aside from the modest effort connected with the first five-year plan (1960-1965), the principle work in the field of manpower planning in Egypt started in the Institute of National Planning at Cairo (INPC). Realizing the need for investigating various problems of manpower planning, the INPC formed a Research Committee in 1962 for this purpose. The work of the Committee is carried out in successive rounds, three of which have been completed and the fourth is still in progress.

The purpose of this paper is to review this work with some emphasis on the techniques used and the difficulties faced in their application. Major results are given in Appendix A.

2. THE FIRST TWO ROUNDS:

The Committee followed somewhat different approaches in various stages of the research project. The traditional demand-oriented approach was used in the first two rounds, where the objective was centered on estimating future manpower requirements and the needed changes in the educational and training system to meet such requipements. The steps involved are summarized below.

2.1 Economic Projections:

Value added for a relatively large number of sectors for 1959/1960 is given in the general frame of the first five-year plan. In addition, the frame specifies, in detail, the levels of production of different sectors for the year 1964/65; but for 1969/70 less detailed figures are included. Thus, more detailed figures for 1969/70 were estimated by applying the pattern of development of production in individual sectors during the 1959/60-1964/65 period to the somewhat aggregated plan figures for 1969/70.

Estimates for the period 1970-1985 were based on maintaining the target of doubling national income every ten years; a target which is implied in the figures for the 1960-70 period. A relatively simple and rough method was used for estimating the value added by sectors for the years 1975, 1980 and 1985. The method used is essentially an application of a usual or normal growth pattern of growth, determined through international comparison of production structure, to the Egyptian data for 1969/70 year.

The method assumes that the level of output (in terms of value added) in a given sector is explained by two variables, namely the value of per capita income and population size. The equation used may be written as follows:

$$V_i = a_{0i} \; y^{a_{1i}} \; P^{a_{2i}} \quad \ldots\ldots\ldots\ldots (1)$$

where,

i refers to a specific sector, and

V = per capita value added

y = per capita income

P = total population.

When equation (1) for year t is divided by that of the base year, we get

$$\left(\frac{V_t}{V_0}\right)_i = \left(\frac{y_t}{y_0}\right)^{a_{1i}} \left(\frac{P_t}{P_0}\right)^{a_{2i}} \quad \ldots\ldots\ldots (2)$$

This equation indicates that the rate of growth of value added per head depends on the growth rate of income per capita modified by an income elasticity of production (a_{1i}), and the rate of population growth, modified by a population-size elasticity of production (a_{2i}).

The rates of growth of value added per head for each sector were estimated for the period 1970-1985 on the basis of equation (2). The values of the parameters (a_1) and (a_2), for individual sectors, were taken from international cross-section analysis by least squares regression methods, with some modifications for few sectors. The third parameter (a_0) of equation (1) was eliminated because the interest was confined to growth rates, since the absolute level of production was given for the base year.

In addition to an annual rate of increase in the national income of 7.2 percent (implied in doubling the national income every 10 years), the rate of population growth was assumed to be 2.5 percent per year for the whole period 1960-1985. This implies an assumption of about 4.7 percent annual rate of increase in per capita income.

The five-year's rates of growth of value added were calculated through multiplying the per capita value added growth rates by the rate of population growth over the corresponding period. Thus, given the absolute figures for the base year and the anticipated growth rates, value added of each sector for future years was calculated (See Table 1).(2)

2.2 Estimates of Labor Productivity:

Although the rising trend of labour productivity is fairly a general phenomenon which accompanies the process of economic development, yet its rate of increase varies not only among different economic sectors but also differs for the same sector overtime. Therefore, estimates of future levels of labor productivity require a detailed study of the relevant factors.

Needless to say that it is quite different to list precisely a set of relevant factors and to determine exactly the nature of their effect on the level of labor productivity. Of such factors, however, one must recognise, for instance, technical progress, development in organisation, management and structure of production, and the qualitative improvements in the labor force. Under these broad and interrelated factors, numerous sub-factors could be mentioned. Unfortunately, data designed to investigate the effect of such factors on possible changes in labor productivity are laking in most countries. Thus, estimates of future levels of productivity may be made by other methods.

When data are available for several years, past trends may be extrapolated for future years. But the extrapolated figures should be qualified by reasonable judgements as to possible developments in each sector. International comparisons, or inter-firm comparisons within a given country are also very helpful in throwing light on potential changes in labor productivity. In such comparisons, the pattern of changes in labor productivity in a technologically advanced country (or firm) may be chosen as a model for possible changes in another country (or other firms in the same sector), taking the time dimension into account. A combination of these methods was used for estimating labor productivity in Egypt up to 1985.

The investigation of data from different sources on labor productivity, for a number of sectors, over past years showed some inconsistencies in some cases, whereas in other cases the figures in the first five-year plan make past trends unrealistically low as a basis for future estimates. It is worth-noting that a separate study was consulted for estimating productivity in the agricultural sector.

In addition, an international comparison was carried out on a sectorial basis, including countries whose levels of economic development and productivity at selected time periods may prevail in Egypt during the period of estimation (1960-1985). Thus, given the results of these investigations, and in view of the relative importance of each sector in the Egyptian economy in the process of economic development during the 1960-1985 period, conclusions were drawn about the future growth rates of labor productivity. The estimated rates for different sectors vary from 1.6 to 4.8 percent per annum. On the basis of the anticipated growth rates and the absolute figures for the base year, the levels of labor productivity were calculated for future years (See Table 2).(3)

2.3. Estimates of Manpower Requirements by Occupation:

Evidently, after projecting value added and labor productivity, estimates of total manpower requirements for each sector were computed by dividing the former by the latter (See Table 3). However, since the proper planning of manpower should take into account both the quantitative and qualitative aspects of labor supply and demand, the next step was the projection of labor requirements by occupation.

The starting point, in this regard, was the reconstruction of the distribution of labor force by occupation in the base year (1960), in such way as to serve the purpose of the study. In fact, the classification of labor force by occupation in 1960 census was inadequate for the objectives of the research in some respects, among which are the greater number of occupations than what was needed, and the wide differences of educational levels of persons within each occupational group.

Several attempts were made to select a simple and workable occupational classification. Definitions of each occupational category were adopted firstly on the basis of the nature of each occupation, and secondly after investigating the educational level of workers. Such classification includes the following categories:

- Managerial occupations (Managers)
- Higher technical and scientific occupations (High professionals)
- Middle technical and scientific occupations (Technicians)
- Clerical & similar occupations (Clerks)
- Skilled labor occupations (Skilled labor)
- Unskilled labor occupations (Unskilled labor)

Thus, after a number of adjustments the occupational structure in 1960 was reconstructed. (See Appendix B).

As regards future changes in the occupational pattern for each sector, use was made of both historical and cross-sectional international comparisons. This technique was supplemented by several studies on the occupational structure of some of the most technologically advanced enterprises in Egypt. The results obtained from both procedures constituted the basis for determining the potential changes in the relative occupational distribution for different economic sectors during the period of study. Therefore, the total required number of workers from each occupational category for the economy as a whole was simply computed by multiplying the projected relative occupational distributions by total employment requirements for each sector, and summing up the results for the same occupational categories in all sectors (See Table 4).

It goes without saying that other methods such as extrapolating past trends in the occupational distribution, or investigating the effects of possible technical development in each sector were not used because of lacking the necessary information.(4)

2.4. Estimates of Manpower Supply by Educational Level:

The future supply of labor force with a given educational level is a resultant of the number of persons in the labor force in the base year with such level, plus additions from new entrants or re-entrants to the labor force, minus separations from the labor force due to death, retirements or withdrawal for other reasons.

Let,

S_{ri} = Supply of labor force of educational level i at year r

A_{ri} = Additions to labor market of educational level i at year r

D = An overall death rate for the span of working age

R = An overall retirement rate for all voluntary and involuntary reasons.

Thus,

$$S_{ri} = S_{(r-1)i} + A_{ri} - (D+R)\ S_{(r-1)i} \quad \ldots\ldots (3)$$

Graduates from educational level i in a given year (G_{ri}) do not necessarily enter the labor market; some of them continue their education (or training) at higher levels, while others may stay at home particularly in the case of females. Therefore,

$$A_{ri} = G_{ri} \cdot W_{ri} \quad \ldots\ldots\ldots\ldots\ldots (4)$$

where W_{ri} denotes educational specific activity rate, i.e. the ratio of graduates entering the labor market at educational level i and year r to the total number of graduates of the same level and at the same year. It is to be noted that equation (4) neglects the number of re-entrants to the labor force which is usually insignificant; at least this is the case in Egypt.

From equations (3) and (4), we get

$$S_{ri} = S_{(r-1)i} \cdot (1-D-R) + G_{ri} \cdot W_{ri} \quad \ldots\ldots (5)$$

Needless to say that if the age structure is significantly different for various educational levels of the existing labor force, D and R should be estimated separately for each educational level, whenever the required data are available.

Estimates of manpower supply by educational level in Egypt for the 1960-1985 were prepared along these lines. The number of graduates in future years were estimated on the basis of past trends and the policies adopted by the Ministries concerned. In addition, an annual rate of separation from the labor force due to all causes was estimated and applied to the existing numbers in the base year.(5)

2.5. Setting Up a Tentative Plan for Education:

When the educational contents of occupational categories are determined, the estimates of manpower requirements by occupation (Section 2.3) may be translated in educational terms. Similary, manpower supply by educational level (Section 2.4) could be given according to occupational categories. The imbalances (deficits or surpluses) between the supply and demand may, therefore, be derived in either educational or occupational terms.(6)

Estimates of potential manpower imbalances for Egypt show deficits of varying magnitudes between the targeted demand and the estimated supply in all occupational categories other than unskilled workers (Table 5).

Thus, the logical step was to set up a tentative plan for education in such a way as to achieve the matching of future manpower supply and demand taking into consideration the time lag in the implementation of such a plan as well as the factors affecting the number of graduates at every educational level such as those indicated in the preceding section.(7) It is worth noting that since the plan for education in this case is based only on manpower requirements, it is often referred to this procedure as the "manpower approach" of educational planning.

Finally, the cost of implementing the proposed plan, classified according to its broad constituent components, namely capital and current expenditures, was worked out for each type of education. The capital expenditure consists of the costs of required replacements and additional needs, due to expected increase in school enrollment, with regard to building, construction and equipments. The current expenditure, on the other hand, comprises salaries of teaching staff, wages and salaries of non-teaching staff engaged in educational services, and expenditure on materials, repair, etc.

The assessment of additional capital expenditure, to meet the expected increase in school enrollment; as well as current expenditure, required for the estimated total enrollment, were based on the adopted costs per student after consulting the available information and relevant studies. Consideration was given also to the cost of educational missions and training abroad for the teaching staff.

To assure the financial feasibility of the proposed plan, estimates of the cost were related to the national income of the corresponding years and the results were compared with other countries.(8)

3. THE THIRD AND FOURTH ROUNDS:

In the previous two rounds the interest focussed on the adjustment of manpower supply by levels of skill to meet a specified pattern of demand derived from an assumed model of economic growth. In the third round, the Research Committee followed a supply-oriented approach whereby the attention was given to future supply of labor force and the alternative policies of its reallocation among economic sectors with full employment being a principle target. Then, the economic and occupational consequences of such policies were investigated. The following few pages give a summary of the steps followed in this respect.

3.1 Projection of Total Labor Force:

The total labor force (LF) of a country in any given year (r) is obviously the product of total population (P) and crude activity rate (W), i.e, the percentage of the total population which is economically active. Thus,

$$LF_r = P_r \cdot W_r \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Therefore, the projection of total manpower supply requires the estimation of population size and activity rate. However, a more refined method is that which takes into account potential changes in relevant compositional elements of the population such as age, educational level, etc. In this case equation (6) may be rewritten as follows:

$$LF_r = \sum (P_{ir} \cdot W_{ir}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

where (i) refers to the categories of the given element.

The simple method represented by equation (6) was followed in the third round of the research project.[9] It was assumed that population size will grow at a constant annual rate of 2.64 percent, and that the crude activity will rise from 26 to 30 percent between 1965 and 1986 as a result of an expected increase in the participation of females in the

labor force. No indications are given as to how the effects of other important factors such as the growth of school enrolment were dealt with.(10)

3.2 Alternatives of Sectorial Reallocation of Labor Force:

The second step is to find out the possible strategies for the future developments in the allocation of the projected labor force among economic sectors. In this regard, five alternative patterns of growth of the labor force in different sectors were used. The sectorial classification chosen for the analysis in the third round comprised agriculture, manufacturing including mining, electricity, construction, transport, and services including trade.

The rates of growth of labor force in manufacturing and services in the first of these alternatives are, more or less, similar to those observed in the past trends as shown by the follow-up reports of the first five-year plan, in which the rates of growth of manufacturing are appreciably higher than those of services sector. The rates of growth for the two sectors are progressively higher from the first to the fifth alternative. Moreover, it was assumed that rates of increase in electricity, will follow the same pattern as manufacturing, whereas those of construction and transport will follow the pattern of manufacturing and services combined. Since full employment is a common target in all of the five alternatives, the residual labor force was allocated to the agricultural sector. The resulting percent distributions of the labor force are given in Table (6).(11)

3.3 Economic Implications:

After determining alternative policies for reallocating the supply of labor force among various sectors, the next step is to define the economic implications of such policies. First among these implications is the volume and pattern of investment required for each alternative in order

to achieve full employment. Estimates of average investment per worker for the 1960-1965 period were maintained for future years with regard to electricity, transport and services. However, it was assumed that investment per worker will increase in manjfacturing because of the tendency toward heavy industries; and will decrease in constructuon after the completion of the High Dam. Investment in agriculture was estimated assuming that it will be primarily concentrated in land reclamation associated with the High Dam. It is noteworthy that these estimates were made taking into consideration the variation in the construction period among various sectors. See Table (7).

Given the estimates of investment required for each of the employment strategies mentioned above, the values of capital6output ratios for various sectors are needed to study the effect of each alternative on the national income. The available ratios for the period from 1960 to 1965 were maintained in non-agricultural sectors except manufacturing whose ratio was assumed to decrease somewhat in future years. In addition, the value of agricultural product was computed on the basis of an exponential growth in accordance with an estimated increase in the cultivated area from 6.3 to 8.3 million feddans between 1965 and 1985 (See Table 8) Finally, the levels of labor prodcutivity implied in each alternative and the pattern of their growth were calculated (See Table 9).[12]

3.4. Building Up Manpower Balances:

Estimates of manpower supply by occupational categories and educational levels were prepared. These estimates included the remaining numbers in the labor force from the total inventory in the base year and the new entries to the labor force by educational and occupational categories. The methods used for estiamtion are analogous to those described in Sections 2.4 and 2.5. Nevertheless, in the third round, use was made of up-to-date educational statistics and the general trends in the educational plan for the 1960-1965 period which were not fully available during the work in earlier rounds.

For the assessment of required changes in the occupational and educational composition of the labor force in future years two steps were followed. Firstly, two occupational patterns, based on the ratios between various categories, were suggested. Secondly, the educational contents of each category were based on three different assumptions (See Appendix B). These steps were carried for one alternative, thought to be most feasible, for the economy as a whole; not at the sectorial level as was done in the first two rounds. The results are given in Table (10).(13)

3.5 Further Detailed Studies:

Though the work in the fourth round is primarily a continuation of the third one, it is being carried out at a greater degree of elaboration. For instance, the aggregated economic sectors and occupational categories included in the preceding round were reinvestigated in such detail as to cover 52 occupational groups in 33 economic sectors for the base year (1960).(14) The potential requirements from the 52 occupational groups up to 1985 were also assessed at the national level using somewhat different sets of alternative assumptions adopted in the light of the assumptions used in earlier rounds, the results of similar international studies, and additional information on the conditions in some of the leading firms and branches of the Egyptian economy.(15)

In addition, the need was felt as to begin exploring detailed studies on the occupational structure at the branch level for recent periods, whenever the necessary information is available, particularly in the service sector which was dealt with in a highly aggregated form in the previous rounds.(16) Moreover, case studies on manpower requirements for some of these branches were also attempted.(17)

Finally, other pertinent studies were prepared with more recent data and/or with the use of more elaborate procedures.(18)

4. CONCLUDING REMARKS:

In bringing this summary review of research efforts in the field of manpower planning in Egypt to a close, it is worthwhile to add the following few remarks which are closely pertinent to the purpose of this paper.

In the first place, it should be emphasized that the results obtained by these efforts are to be looked upon as to represent, at the best, the order of magnitude of what may be the possible future course of the trends of the related variables. Moreover, these results must always be viewed in the context of the underlying assumptions. Thus, it is true that estimates of manpower deficits and surpluses by occupational categories help to determine the burden on the education and training system during the period of study, and to assess what and when new capacities (e.g. schools, institutes or training centers) are to be added in order to achieve gradually the balance between the estimated supply of and demand for labor force quantitatively and qualitatively. However, the results of the research activities, such as those given in Appendix A, ma may not, as such, be used as a sound basis for detailed policy decisions because, among other things, of the wide range of variation in the employed assumptions. For example, a look to the estimated differences between the expected supply and requirements of various occupations in the first two rounds (Table 5) and those of the third round (Table 10) illustrates this point. Certainly, the significantly different assumptions about the targeted occupational structure and educational contents of the occupational categories (Appendix B) are among the main factors responsible for such differences.

Whatever the involved assumptions, the general picture portrayed by both sets of estimates indicates an expected shortage, of varying degree, in the number of technicians, skilled laborers and semi-skilled

workers; an expected result in a country progressing in the process of industrialization. Thus, the demand for graduates of technical institutes, schools and training centers, the major source of these categories is expected to increase in subsequent years. The projected deficit in the number of technicians, for 1970, in the first two rounds amounts to about 281000. Nevertheless, high proportions of graduates of technical secondary schools, who were assumed to be qualified for this occupation, do not at present get a job except after about three years of their graduation, and are referred to as surpluses. This is also true for the same group of graduates in the estimates of the third round. It may be noted that the total number of these graduates during the last decade is 137000 only, excluding graduates of commercial schools who are prepared for clerical occupations. This paradoxical situation may be attributed to a number of factors, one of which may be the hesitance of employers to change the occupational structure at a rate corresponding to the assumed pattern of change, probably because of an expected increase in wages and salaries, ignoring the potential resulting rise in labor productivity. If this is the case, a closer cooperation between persons engaged in planning activities and those responsible for management in economic sectors is essential so as to achieve the best possible occupational structure which contributes to the improvement in productivity.

Furthermore, the paradox of the estimated shortages against the apparent surpluses of some of the occupational categories may also be the result of discrepancies between the estimated and actual magnitudes of the related economic variables such as investment, value added, etc. due to various factors among which is the notable political situation. Keeping in mind that the realization of manpower plans necessitates the coordination between education and training objectives on the one hand, and other socio-economic targets, on the other, up-to-date data on actual

developments of relevant economic variables are required for possible modifications of earlier estimates of deficits and surpluses in different occupations in the future.

It is not to be understood, however, that the reservations mentioned above or touched upon in the previous sections are meant to belittle the overall value of the research activities in this field. Rather, these efforts should continue with the valuable experience gained in the last eight years but, whenever possible, more recent data and more refined techniques may be used. These efforts may also tackle other related questions in the field of manpower planning. Needless to say that, even with the aforementioned limitations in mind, one cannot but highly acknowledge this pioneering work in a developing country such as Egypt.

FOOTNOTES: *

(1) Sections 1.1. and 1.2 are based on .A. Nassef, The Egyptian Labor Force: Its Dimensions and Changing Structure, 1907-1960, Unpublished Ph.D. Dissertation, University of Pennsylvania, 1969, Section 1.1. and chapter 5.

(2) INPC, Memo No. 285.

(3) INPC, Memo No. 271.

(4) INPC, Memo No. 264, and 277

(5) INPC, Memo No. 287.

(6) Ibid. See also Appendix B

(7) INPC, Memo No. 325 . It may be noted that a separate study was carried out for estimating future teacher requirements (INPC, Memo. No. 349)

(8) INPC. Memo No. 327 and 329.

(9) An attempt was made for projecting the male labor force through the use of population estimates by age and age-specific activity rates calculted for agricultural, semi-industrialized and industrialized countries. However, these projections have not been incorporated with other steps in the research project.

(10) INPC, Memo. No. 612.

(11) Ibid

(12) Ibid

(13) Ibid

(14) INPC, Memo No. 642, Series 15 and 19

(15) INPC, Memo No. 642, Series 27

(16) INPC, Memo No. 642, Series 16,17,18,21 and 23. See also, Memo No. 878,889 and 909.

(17) INPC, Memo No. 642, Series 23

(18) INPC, Memo No. 642, Series 22, 24,25 and 26

---

* Though the results of the first two rounds were revised in Memo No. 431, yet refrence is given here to earlier publications for the sake of the detailed discussions and / or different attempts included therein.

APPENDIX A : REFERENCE TABLES

Table (1) Value Added by Sector, Egypt

1960 - 1985

(Millions of L.E.)

Sectors	1960	1965	1970	1975	1980	1985
Agriculture	399.9	511.7	627	760	922	1118
Mining (excl. oil)	5.5	20.6	35	48	66	91
Oil extraction etc.	34.2	89.7	140	226	365	590
Manuf. industry:						
- Food, Bev. Tobacco	77.3	99.9	140	192	264	362
- Spinning, weaving, etc.	51.1	86.7	138	208	312	470
- Clothes and shoes	10.3	12.2	20	30	46	69
- Wood	7.6	10.6	14	22	35	55
- Paper	1.1	6.6	9	16	29	51
- Printing and publ.	9.5	16.4	22	36	60	99
- Leather	1.4	2.1	3	4	5	7
- Rubber	2.2	3.3	6	10	16	25
- Chemicals (excl. oil)	12.9	46.3	75	121	196	316
- Non-metallic	9.1	12.1	16	23	34	49
- Basic metallic	7.3	48.6	69	127	235	433
- Metallic products	19.9	48.2	68	122	218	391
- Miscellaneous	12.1	13.4	18	31	55	95
Electr. & Publ. Util.	19.1	32.7	40	63	100	158
Construction	52.0	51.0	75	108	154	222
Transport	97.5	117.5	160	237	351	520
Trade & Finance	127.0	161.8	265	362	493	673
Services	325.0	403.6	624	851	1161	1584
Nat. income	1282.0	1795.0	2564	3597	5117	7378

Table (2) Labor Productivity by sector, Egypt,
1960 - 1985

(L.E.'$per worker - in 1959/60 Prices)

Sectors	1960	1965	1970	1975	1980	1985
Agriculture	108.4	122.6	138.6	166.9	200.9	241.9
Mining (excl. oil)	332.6	385.8	447.5	519.1	602.2	698.4
Oil extraction etc.	4092.4	4583.5	5133.4	5749.4	6439.3	7212.0
Manuf. industry:	291.0	341.0	408.3	462.8	531.0	616.3
- Food, Bev. Tobacco	808.0	892.0	984.8	1087.2	1198.1	1320.3
- Spinning, weaving, etc.	291.0	332.6	380.2	434.5	496.7	567.7
- Clothes and shoes	200.3	250.8	314.1	393.3	492.5	616.7
- Wood and Paper	100.6	120.6	144.6	173.4	207.9	249.3
- Printing & publ.	604.0	666.8	736.1	812.7	897.2	990.5
- Leather and Rubber	325.4	381.0	446.2	522.5	611.8	716.4
- Chemicals (excl. oil)	680.3	859.9	1086.9	1373.8	1736.5	2194.9
- Non-metallic	266.2	302.4	343.5	390.2	443.3	503.6
- Basic metallic	500.1	629.2	791.7	996.1	1253.3	1576.9
- Metallic products & Miscellaneous	123.9	147.1	174.5	207.2	245.9	291.9
Electric & Publ. Util.	525.5	618.0	758.0	1194.0	1659.6	2306.9
Construction	335.0	413.4	510.0	629.4	776.6	958.3
Transport	383.1	448.6	525.3	615.2	720.3	843.5
Trade & Finance	207.6	234.8	265.5	300.3	339.7	384.2
Services	260.9	281.5	303.7	335.3	370.2	408.7
Nat. income	189.1	221.9	265.7	324.8	396.1	481.1

Table (3) Manpower Requirements by Sector,
Egypt, 1960 - 1985.

Sectors	1960*	1965	1970	1975	1980	1985
Agriculture	3 689 845	4 174 740	4 523 810	4 554 820	4 587 850	4 620 000
Mining(excl.oil)	16 534	53 400	78 210	92 850	110 100	130 500
Oil extraction etc.	8 357	19 570	27 270	39 330	56 710	81 760
Manuf. industry:	761 981	1 192 550	1 464 510	2 036 680	2 828 900	3 962 660
- Food, Bev. Tobacco	95 668	112 000	142 160	176 700	219 930	273 800
- Spinning, weaving, etc.	175 600	260 670	362 970	477 790	628 550	827 020
- Clothes and shoes	51 423	48 640	63 680	76 790	92 390	111 400
- Wood and Paper	86 481	142 620	159 060	220 300	305 920	426 790
- Printing & publ.	15 728	24 600	29 890	44 670	72 410	99 740
- Leather and Rubber	11 064	14 170	20 170	26 220	34 490	45 640
- Chemicals (excl. oil)	18 962	53 840	69 000	88 150	112 640	143 920
- Non-metallic	34 185	40 010	46 580	59 460	75 800	96 500
- Basic metallic	14 597	77 240	78 160	127 700	178 190	274 270
- Metallic products & Miscallaneous	258 273	418 760	492 840	738 900	1 108 580	1 663 580
Electric & Publ. Util.	36 349	52 910	52 770	53 020	60 310	68 660
Construction	155 256	123 370	147 060	170 960	198 820	231 240
Transport	254 483	261 930	304 590	385 240	487 160	616 120
Trade & Finance	611 801	689 100	992 110	1 203 800	1 451 280	1 750 390
Services	1 245 886	1 433 750	2 054 660	2 538 320	3 135 870	3 874 480
Total	6 780 492	7 999 830	9 650 990	11 075 020	12 917 000	15 335 810

* Data for the base year (1960) are included for comparison.

Table (4) Total Manpower Requirements by Occupation, Egypt, 1960-1985

Occupation	1960 *	1965	1970	1975	1980	1985
Managers & High Prof	154 246	205 536	315 416	436 082	601 572	840 270
Technicians	259 827	380 752	604 420	872 180	1228 649	1790 430
Clerks	258 516	235 775	344 486	490 051	669 716	926 680
Skilled Labor	779 820	1061 654	1481 191	1987 790	2620 840	3627 710
Unskilled Labor	5267 953	6116 113	6905 477	7288 917	7796 223	8150 720
Total	6720 362	7999 830	9650 990	11075 020	12917 000	15335 810

* See footnote below table (3).

Table (5) Estimated Deficits (-) and Surpluses(+) of Labor Force by Occupational Categories, Egypt, 1965 - 1985 *

Occupational Categories	1965		1970		1975		1980		1985	
	number	%	number	%	number	%	number	%	number	%
Managers and High Professionals	+ 2384	1.1	- 33536	-11.9	- 66582	- 18.8	- 134918	- 28.9	- 244300	- 41.0
Technicians	- 85272	-28.9	-281050	-86.9	-519330	-144.4	- 808959	-192.8	-1280300	-251.0
Clerks	61259	+20.6	- 3536	- 1.1	- 96361	- 24.5	- 207436	- 44.9	- 367100	- 65.6
Skilled Labor	-121284	-12.9	-340991	-29.9	-618530	- 45.2	- 969545	- 58.7	-1711390	- 89.3
Unskilled Labor	+250057	+ 3.9	+672243	+ 8.9	+1631843	+ 18.3	+2536852	+ 24.6	3717280	31.3

* The results given here are those of the first two rounds. The percentages are based on the expected supply.

Table (6)- Percent Distribution of Labor Force According to Five Alternatives, by Sector, Egypt, 1965 & 1980.

Sector	1965*	1980				
	%	1 st alternative	2 nd alternative	3 rd alternative	4 th alternative	5 th alternative
Agriculture	50.1	43.9	34.2	41.1	38.0	28.2
Industry	11.6	16.5	20.4	17.8	19.0	21.9
Electricity	0.7	0.8	1.0	1.1	1.2	1.4
Building and Construction	5.2	5.6	6.5	6.1	6.4	6.9
Communication & transportation	3.6	4.0	4.7	4.2	4.4	5.0
Services	28.8	29.2	33.2	29.7	31.0	36.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

* Data for 1965 are included for comparison.

Table (7): Proposed Volume of Investment and Its Annual Rate of Increase According to Five Alternatives, Egypt, 1965-1980

Alternatives	65/ 1970		70/1975		75/1980	
	Total * investment	%	Total * investment	%	Total * investment	%
First	2507	9.2	3266	5.3	4189	5.0
Second	2988	12.8	4153	6.4	5666	6.2
Third	2766	11.4	3810	6.4	4879	5.0
Fourth	2937	12.7	4125	6.8	5413	5.4
Fifth	3322	15.2	4996	8.2	6861	6.4

* In millions of Egyptian pounds (L E)

Table (8): Estimated National Income and Its Annual Rate of Increase According to Five Alternatives, Egypt, 1965-1980

Alternative	1965	1970		1975		1980	
		number *	%	number *	%	number *	%
First	1840	2716	7.54	3770	6.75	5125	6.25
Second	1840	2915	9.20	4448	8.00	6319	7.25
Third	1840	2610	7.00	3748	7.20	5215	6.60
Fourth	1840	2638	7.20	3865	7.60	5476	7.00
Fifth	1840	2840	8.60	4336	8.40	6412	7.80

* In millions of Egyptian pounds (L E)

Table (9). Index Number and Annual Rate of Increase of Labor Productivity According to Five Alternatives, Egypt, 1965-1980

Alternative	1965	1970		1975		1980	
	Index Number	Index Number	Rate of increase %	Index Number	Rate of increase %	Index Number	Rate of increase %
First	100	118.0	3.5	137.0	3.0	154.0	2.3
Second	100	127.0	4.6	163.0	5.0	190.0	3.5
Third	100	114.1	2.8	137.8	3.2	157.8	3.0
Fourth	100	115.3	2.8	142.1	3.6	165.7	3.4
Fifth	100	124.2	4.3	159.4	4.7	194.0	4.4

Table (10)- Estimated Deficits(-) and Surpluses (+) of the labor Force by Occupational Categories, Egypt, 1970-1980.*

Occupational groups	1970		1975		1980	
	number 000's	%	number 000's	%	number 000's	%
Managers & Professionals	- 1	- 0.5	+ 21	+ 7.6	+ 8	+ 2.3
Technicians	-213	-71.0	- 263	- 75.8	- 373	- 91.6
Clerks	-205	-39.8	- 10	- 1.2	+ 160	+ 12.0
Skilled labor	-139	-13.7	- 267	- 24.2	- 759	- 68.2
Semi-Skilled labor	-433	-25.1	- 500	- 24.2	- 656	- 22.9
Unskilled labor	+991	+18.9	+1019	+ 16.8	+ 1620	+ 23.3

* The results given here are those of the third round. The percentages are based on the expected supply.

APPENDIX B: A NOTE ON OCCUPATIONAL STRUCTURE

The role of the occupational structure in building up balances between manpower supply and demand need no further emphasis. The purpose of this appendix is to give some additional notes on the treatment of the problems involved in dealing with the occupational structure in different rounds of the research project.

B.1 The Choice of An Occupational Classification:

The starting issue was to choose a relatively simple occupational classification that services the purpose of the study. To do so, it was necessary to specify the objectives of such classification. These objectives were put as follows:-

(1) To suit and promote economic development in the country and its particularities

(2) Occupational categories should be very clearly defined to eliminate and avoid interference of unnecessary erroneous interpretation and application.

(3) Since one of the main objectives of manpower planning is setting the appropriate educational and training targets, the categories of the proposed occupational structure should be convertable to levels of education and training.

(4) The construction of an occupational structure of the labor force should include categories of occupations comparable at the international level. This is helpful in consulting the course of development of the occupational structure of other countries to define occupational targets in the future.

(5) Since higher categories of occupations require longer periods of education and training, the occupational classification should, where possible, be more detailed at the higher occupational categories.

In view of these objectives, the chosen occupational classification included the following categories:

i) Managerial occupations (managers)

ii) Higher technical and scientific occupations (high professionals)

iii) Middle technical and scientific occupations (technicians)

iv) Clerical and similar assistant occupations (clerks)

v) Skilled labor occupations (skilled laborers)

vi) Semi-skilled labor occupations (semi-skilled laborers)

vii) Unskilled labor occupations (unskilled laborers)

It should be noted that the sixth category (i.e, semi-skilled laborers) was not included in the first two rounds. In the fourth round, however, 52 occupational groups were included grouped under the seven broad categories mentioned above (Memo.642, Series 15 and 26).

B.2 Definitions of the Occupational Categories:

The basic definitions adopted for the seven broad occupational categories are as follows:

(1) Managers: Managers are those who occupy the top ranks in the occupational hierarchy in public administration, industry and other economic activities either within the public or private sector. People engaged in such occupations are those who, through their responsibilities and authority, have the right to take decisions and set policies at different levels. They have the leadership of other people.

These persons should have natural talents and individual gifts and traits which are necessary to enable them to solve problems, make decisions, set policies and lead the others. Most of these traits can be developed through sufficient education and training.

Managers whose responsibilities are mostly of a technical nature other than administration are excluded.

(2) High Professionals: Like managers, this category occupies the top in the occupational hierarchy. It is the principal source of the managerial category and ranks as high concerning the educational levels required.

They are engaged in research work, the application of scientific methods in the different economic, social, industrial and governmental processes and problems. They are engaged also in technical work related to scientific research and technological progress.

(3) Technicians: Technicians are those who occupy an intermediate status between high professionals and skilled laborers. The jobs of this category are mostly of a technical nature carried out under the supervision of the high professionals. They get technical

Knowledge and manual skills at a technical school or institute and occupy technical jobs that help in achieving the objectives of the economic unit whether they are production or services. Besides, they help the high professionals in designing the products and methods of achieving it, also in preparing the scheduale of work.

The foremen lead and train the laborers and carry down instructions to them. They control their implementation of these instructions and direct them to achieve the required level of production or experiences. They are chosen from among the skilled laborers after being trained, or especially prepared for this purpose.

This category should have a minimum of special study below university level and its equivalent, in addition to sufficient in-service training and practical experience.

(4) Clerks: This category comprises all persons whose jobs are mainly of clerical or secretariat activities. The jobs enlisted under the assistant category are of the same nature, so they could be considered as one, under the title of "assistant occupations".

(5) Skilled Laborers: This category is of special importance in the different stages of economic development. It is rather difficult to determine the different levels of skill for the various jobs as there are different grades of skill. The skilled laborers are those who master several skills necessary for their job, in addition to studying related technical subjects.

(6) Semi-Skilled Laborers: They are laborers to whom are assigned jobs that do not need a high degree of skill, and they work under specific supervision. And although they do not need long training they must have a certain amount of gneral knowledge.

(7) Unskilled Laborers: Usually they are those who do not need special training before being engaged in their jobs.

B.3 The Projections of Occupational Structure:

The procedures used in estimating the occupational structure in future years varied at different stages of the research project. In the first two rounds, one alternative was used for projecting the occupational pattern of the labor force on the basis of international comparisons (both historical and cross-sectional) as well as inter-firm comparisons.

In the third round, however, the estimation of occupatio al structure depend on selected alternative sets of ratios between vario s categories. The following two alternatives were suggested :

	Managers & High prof.	Technicians	Clerks	Skilled Labor	Semi-skilled	Unskilled
1st alternative	1	2	2.5	3.9	6.8	25.7
2nd alternative	1	3	5	8	15	20

More attention was given to the local conditions in projecting occupational pattern in the fourth round. This was done through additional studies on leading economic units, and the capacities of the educational system. In addition, the assumptions of earlier rounds, and the results of relevant international studies, such as the relation between the proportion of managers and high professionals and the level of productivity, were viewed. It may be noted that the results of the highest two categories (managers and high professionals) were given together in the first three rounds. In the fourth round, however, separate estimates were given not only for the 7 major categories but also for 52 occupational groups as indicated above.

Table (B.1) The Targeted Occupational Structure of The Labor Force for 1980 in Different Rounds

Category	1st & 2nd Rounds	3rd Round		4th Round		
		1st	2nd alt.	1st.	2nd.	3rd. alt.
Managers				1.18	1.33	1.41
High Professionals	4.81	2.39	1.92	3.03	3.21	3.46
Technicians	9.95	4.77	5.77	7.97	8.59	9.25
Clerks	5.31	5.97	9.62	8.78	8.48	8.48
Skilled Labor	21.21	9.31	15.38	20.52	20.92	21.00
Semi-skilled Labor	-	16.23	28.85	28.77	28.51	28.45
Unskilled Labor	58.72	61.34	38.46	29.75	28.97	27.96
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table B.1 displays the variation in the targeted occupational structure for 1980 in different rounds. It may be observed that the projected pattern of the first two rounds is closer to those of the fourth round than those of the third round.

B.4 The Educational Contents of Occupational Categories:

When reconstructing the available occupational classification for the base year according to the chosen structure, several attempts were made depending on the nature of each occupation reflected by its title. Due to some problems encountered, it was decided to take also the educational contents of each occupation into account. (Memo.No.277).

The determination of educational levels corresponding to various occupations are needed not only for the reconstruction of the inventory in the base year, but also for building up manpower balances in future years and determining educational targets in future years.

The degree of details of education and training levels used and the assumed contents of occupational categories varied appreciably in different rounds. The following are the levels of education and training employed in this respect.

i) Universities (U)

ii) Higher Institutes (HI): similar to university level.

iii) Technical Centers (TC): 2-3 years after secondary schools.

iv) General Secondary Schools (GS)

v) Technical Secondary Schools (TS)

vi) Vocational Training Centers (VT): 3 years after preparatory education

vii) Preparatory Schools plus on-job Short Training Courses (PS+ST)

viii) Primary Education plus on-job Short Training Courses (PE+ST)

ix) Primary Education (PE)

x) Apprenticeship (AP)

Table B.2, on the other hand, gives the varying proposed educational contents of the major categories of occupations in different rounds. Evidently, the wide variation in both table B.1 and B.2 affected the estimated occupational deficits and surpluses as reflected in tables 5 and 10. It goes without saying that such variations call for further elaborate investigation along the lines followed in the fourth round.

Table (B.2) Proposed Educational Contents of Occupational Categories for 1980 in Different Rounds.

Occupational Categories	1st & 2nd Rounds	3rd Round *			4th Round
		1st Alternative	2nd Alternative	3rd Alternative	
Managers High Professionals	U, HI	U, HI	U (88) HI (12)	U (88) HI (12)	U & HI (65) AI (4) I (31) U, HI (100)
Technicians	TS	U, HI	HI (93) TC (7)	HI (85) TC (15)	AI (50) SL (50)
Clerks	GS, TS	U&HI(25) TS (25) GS (50)	U&HI(20) TS (27) GS (53)	U&HI (20) TS (27) GS (53)	U&HI (1) I & AI (25) BI (74)
Skilled Labor	PS+ST, Ap	TC (33) TS (16) VT (50)	TC (64) TS (17) VT (19)	TC (19) TS (17) VT (64)	TS PS + ST Ap.
Semi-skilled Labor	-	TS (36) VT (18) PE+ST(45)	TS (26) VT (56) PS+ST(18)	VT (39) PS+ST(44) PE+ST(17)	PS + ST PE+ST
Unskilled Labor	PE	PE	PE	PE	PE

* It was suggested that the second and third alternatives be employed with the second alternative of table B.1

** (AI) refers to above intermediate education, i.e, a number of years of education after secondary education and below university level.

(SL) Skilled laborers up-graded to technicians

(I) Intermediate education, such as all types of secondary education
(BI) Below intermediate education, i.e, below the secondary education

* & * * Figures between parenteses refer to the percentage of each level