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THE EFFECTS OF INDUSTRIALIZATION
ON POPULATION ^{1/}

-(WG/INT/75/015) -

by

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^{1/} The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This document has been translated from an unedited original.

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INTRODUCTION

The purpose of this study is to show, to the extent possible, the connexions between industrialization and demographic phenomena such as mortality rates, fertility and migration. More precisely, an attempt will be made to analyse the influence of industrialization as a dynamic force on the laws governing the structure and spatial distribution of populations.

This set of problems reflects two major difficulties which are intimately linked and which constitute a dominant concern for all those endeavouring to combat under-development:

The absolute necessity of promoting "reasonable" industrialization in third world countries, which will lead to the creation of adequately diversified and independent economies to guarantee national sovereignty. On the other hand, the heavy burden of population growth often nullifies efforts made in this direction in many countries without strategic raw material resources.

The limited effect of family planning programmes, the results of which have often proved disappointing, as a result of a rigid socio-economic environment which places a brake on the dissemination of new ideas not in harmony with actual ways of life. But the indispensable changes in social and educational structures are bound up with the forces of progress, particularly industrialization.

At the World Population Conference held in Bucharest in August 1974, attended by 137 countries and many specialized agencies, a great deal of attention was paid to the measures to be implemented within the framework of a World Population Plan of Action. All the participants rapidly reached agreement that it was unrealistic to analyse population phenomena in the abstract, i.e. without specific reference to social and economic conditions. In their view, the effective solution to demographic problems lay in the social and economic transformation of established structures, a decrease in fertility going hand in hand with development. Thus, it was felt that demographic policy would be ineffective if it did not form an integral part of a general process of modernization. The objectives in the field of development and population could not be achieved unless the third world countries rapidly improved the living conditions of all their inhabitants. The international community should therefore decide

to co-operate in improving the quality of life in the various regions of the world, within the framework of the relationships arising out of a new economic world order.

It is clear that under these circumstances it will be useful, for the planning of future action, to determine the foreseeable impact of industrial development on various demographic variables. The task is not easy, however, and there are difficulties of two kinds:

Firstly, the complexity of relationships within the human sciences, which may make it impossible to determine the main causal factor in a complicated network of multiple correlations. The influence of urbanization may be analysed, for example, in terms of the combined effects of education, health, income, employment and, in a word, the way of life, which is an ill-defined and unquantifiable general concept.

Secondly, the uncertainties specific to third world countries, where sometimes only the basic over-all statistics are available. It is doubtful whether there is a reasonable chance of obtaining acceptably reliable information on small minority groups, in any case not easy to identify, who are subject to the rules of modern life in their employment but who are no less strongly influenced by traditional structures in their way of life.

The method of approach adopted in this study is therefore conditioned by the limitations described above. An attempt will be made to present certain global data for the various points analysed; in addition, wherever possible, reference will be made to more detailed works which exist on certain specific subjects in relation to certain countries. Under these circumstances, questions will often be touched upon which it will be difficult to answer with the requisite scientific rigour; they will constitute priority subjects for future research.

The following points will be taken up:

- Chapter I - Analysis of interrelationships between industrialization and population.
- Chapter II - Analysis of effects of industrialization on demographic variables.
- Chapter III - Analysis of effects of industrialization on the spatial distribution of populations.

CHAPTER I

ANALYSIS OF THE INTERRELATIONSHIPS BETWEEN
POPULATION AND INDUSTRIALIZATION

In view of the complexity of the problem posed by the influence of industrialization on demographic trends, it is necessary to analyse the possible interconnexions and interactions between what appears to be the essential element in the forces of modernization within third world economies, namely industrialization, and the changes observed in demographic variables. The evolution of the latter is slow with regard to such data as birth and death rates but exceedingly rapid as regards spatial distribution of population.

There can be no question in such an analysis of ignoring the lessons of history, and there are convincing examples at the present day of the reciprocal effects between population and development and even, more precisely, between population and industrialization. Nevertheless, great caution is needed in estimating the fundamental role of the mechanisms of social change under the influence of changes in methods of production; identical patterns will rarely recur in time or space, in view of the manifold contributory factors such as level of development, relationship between population and developed or potential resources, religion, type of culture and political options.

SECTION I - THE CONCEPT OF A LINK BETWEEN INDUSTRIALIZATION AND DEMOGRAPHY

Traditionally, the usual idea has been to link demographic evolution and economic evolution. It is apparently easier, at first sight, to consider the phenomenon of development as a global concept than to isolate an aspect which is doubtless essential but the real effects of which are difficult to observe and even more difficult to measure.

Industrialization still affects very limited numbers of people in the less developed regions; that is a serious handicap to acquiring information.

It should be recognized that, while development appears to be the objective and industrialization one of the means, the quantitative assessment of each of the two phenomena is quite different.

Measuring development implies taking into consideration a heterogeneous group of qualitative changes the indicators of which are not above criticism. Use of per capita gross national product (GNP) is a good example: the vast differences of income within a single country, the difficulty of allowing for habits of barter and for subsistence production, show clearly that this indicator gives a very imperfect idea of life styles when a modern sector and an agricultural sector using antiquated methods are included in a single figure. The link with the various demographic phenomena can be made only at a general level of analysis at which the introduction of other indicators (level of education and health, type of dwelling ...) seems unsatisfactory. The difficulty of identifying the major causal factor in a series of significant correlations very substantially limits the value of these studies concerned with over-heterogeneous social groups. In order to meet this criticism, an attempt is usually made to distinguish between the urban and rural population, but that is not a completely satisfactory method. The populations of towns in the third world are particularly variegated: educated young people without jobs, small craftsmen and traders, civil servants, industrial employees ... Furthermore, the excessively rapid growth rate of such towns implies a very high number of new arrivals, who are not integrated into the urban system and whose life style remains that of the rural groups from which they came.

The use of the criteria of industrialization in certain studies on the connexion between population and socio-economic structures has the advantage of being more easily quantifiable by the usual statistical techniques, because one is concerned here with activities in the modern sector and well-established methods of observation can be employed.

Moreover, the industrial sector is relatively easy to delimit, provided that certain conventions are accepted, and for that reason the area dealt with is more homogeneous than in the preceding framework. Lastly, since industrialization is regarded as the main engine of development, reference to this particular process of social transformation seems likely to be fruitful from the point of view of measuring current demographic and sociological changes.

There is a drawback: industrialization is a recent phenomenon which is not yet widely diffused in the productive structures of the less developed regions, touches only a limited number of workers in each country and therefore requires careful studies of which few have so far been carried out. But this criticism is in itself perhaps the best argument for an analysis of the relationships between industrial and demographic evolution, the concentration of the forces of modernization within the industrial process giving a foretaste of the changes which may reasonably be expected when the transformation of methods of production has spread more widely.

SECTION II - INDUSTRY, ENVIRONMENT, POPULATION

An attempt to establish the nature of the links between demographic laws and industrial development may cause surprise at a time when environmental issues are of increasing concern to economists (industrial pollution) and even to demographers (world overpopulation).

Not many years ago, very few people would have raised any objection to development based on that observed in the industrialized countries, nor would they have censured the basic motive force of such development, namely, industrial growth. Today, there is increasing concern about the quality of the environment and it is impossible to undertake any study of the relationship between industrial development and population growth without touching upon this problem. Indeed, the very concept of growth is being questioned; over and above the condemnation of certain effects of industrial

production, several authors have included in their analyses the foreseeable adverse effects of what they consider to be overpopulation. As a result, the emission of products noxious to river fauna in a developed country and the no doubt excessive use of an insecticide in an under-developed agricultural region are sometimes attacked at one and the same time. Both actions are highly blameworthy; in one case, however, the safeguard of a certain environment is involved, whereas in the other the survival - at any cost - of some thousands of individuals is at stake. This position was defended by UNIDO in a recent study, which stated that the problem of poverty is present where development is inadequate, and that this is the most important factor for the developing countries. These countries have to concern themselves not merely with the quality of life but with life itself, which is jeopardized by natural disasters, malnutrition, shortage of water, insufficient hygiene, poor housing and, in general, an inadequate standard of living. Developing countries cannot avoid the undesirable effects of industrialization by refusing to industrialize, since that would be tantamount to perpetuating poverty.

We shall therefore accept the assumption that the process of industrialization is essential; perhaps the intensity of the need for industrialization may vary according to the objectives set by each State, but the need is present in every case, irrespective of the type of economic and social development chosen. Furthermore, in objective terms industrialization appears to be the only major force capable of generating the essential structural changes without which it would be pointless to set targets relating to health (chemical and pharmaceutical industries) and education (creation of jobs).

For several reasons, the type of industrialization favoured in the third world countries is not related to that whose effects can now be seen in the rich countries:

The basic industries, which are among the most pollutant industries, will probably continue to be concentrated in over-industrialized regions, where they benefit from the proximity of huge markets and large economies of scale that are favoured by very dense infra-structural networks. Furthermore, they are highly capital-intensive and their labour requirements are often limited to the manpower necessary to supervise automatized operations.

The industries needed in the third world are first and foremost those which are labour-intensive, in view of the many labour market problems encountered in these regions. Therefore the predominant need is for units engaged in the final stages of production, processing semi-manufactures and oriented towards assembly or packaging. Over and above the number of jobs they create, such industries enable substantial foreign exchange savings to be made on imported non-durable consumer goods, whose cost is heavily affected by the wages paid in developed regions.

In contrast to the experience of industrialized countries, it would no doubt be advisable to allow some degree of decentralization of industrial activity, in order to limit the effects of pollution and favour a high coefficient of absorption by nature. Such a policy would also guarantee better distribution of the forces of modernization among the population as a whole and reduce the rural exodus which is currently focused on a few cities suffering from abnormal growth.

The effects of industrialization have been discussed at length by many authors, and we shall therefore mention only those which directly entail changes in social, educational and family structures. The first phenomenon to be noted, is a self-sustaining but attenuated process of rising employment, the rate of which depends on the initial effort. Therefore it is necessary not only to make a direct analysis of the number of jobs created in industry, but also to take into account those created indirectly in other sectors of activity. In recent monographs prepared by the United Nations, the ratio between derived and primary jobs is estimated at an average of approximately three to one. The results differ widely from industry to industry and from country to country; for 100 industrial jobs, the number of additional jobs created in other branches varies between 50 and 700. Industrial planning is therefore a valuable tool in establishing an employment policy.

Another positive aspect of industrialization is the substantial increase it brings about in the income of workers employed in industrial activities. Studies carried out by P. Bairoch highlight the very wide gaps between income in the modern and rural sectors. These differences are greatest in Africa,

ranging from 220 per cent to 1,460 per cent, with an average variation of the ratio 1:6. In 23 of 40 countries considered, income in the modern sector is at least 200 per cent higher than in the rural sector; in 9 countries the difference is equal to, or more than, 400 per cent. If industrial branches alone were taken into account for the purpose of the calculation, the figures would be very much the same. Under these conditions, it is easy to understand the role played by income in changing standards of living in a world where individuals are unaccustomed to monetary transactions. It may of course be pointed out that the income growth mentioned above (320 per cent on the average) has to be considered in relation with the low initial income level. But the basic effect appears to lie not so much in the size of the sum available as in the need for a wage in order to procure a large share of the non-durable consumer goods previously supplied by the traditional structure. In other words, the main development in the life-style balance consists in the transition from an economy dominated by consumption of own production to a partially monetary economy; when this happens, over-all behaviour patterns will soon change, and here industrialization plays the role of catalyst for social change.

SECTION III - THE LESSONS OF HISTORY AND THE ACCELERATION OF PROCESSES

The advantages of discussing industrialization rather than development in a study of this type have already been touched upon. Mention should be made of another element which constitutes one of the most convincing arguments, even though its possible application to less developed regions is somewhat controversial. That is the only development actually observed that tends to substantiate the theory that there is a link between the structure of production and the level of demographic variables.

From the birth of mankind up to the middle of the eighteenth century, the human race progressed slowly and the demographic pattern was characterized by a long-term relative balance between the birth and death rates. Annual growth was very small, sometimes even negative, but the balance between high levels of deaths and births (about 40 vital events per thousand inhabitants) concealed many sharp fluctuations occurring in the wake of economic, political or medical developments.

Mortality was subject to the greatest variations from the average, being closely dependent on the trilogy of famine, war and epidemics. When ruin and desolation follow prosperity, the slow and frail growth of population is quickly wiped out.

Difficult communications made it necessary for each province to live in a state approaching that of self-sufficiency; the low level of agricultural output, which was subject to sharp fluctuations, had a direct impact on mortality, and a precise correlation is observed between increases in the number of deaths and scarcity of means of subsistence.

Fertility was also subject to rapid, albeit smaller, variations and was affected in particular by the mortality level. In all troubled times, furthermore, the intention to marry is postponed pending the advent of a more favourable period and the number of births is subject to the same variations.

The combination of these situations explains the considerable fluctuations in population observed in the old demographic pattern. Long periods of depression characterized by high mortality and decreasing fertility were followed by phases during which few deaths occurred, owing to the disappearance of the weakest individuals and the rejuvenation of the age structure brought about by high natality. The above outline highlights the preponderant effect of economic factors - in this case, means of subsistence - on the development of the world population up to the middle of the eighteenth century. This situation is generally referred to as the old demographic pattern and is characteristic of all populations with traditional structures.

From 1750 onwards, in some European countries - primarily Britain and France - there were profound changes in the set of laws governing the socio-economic environment. The processes observed in these two nations were subsequently to affect most other European and non-European States in which the structure of production underwent the same changes. It would, however, be an over-simplification to claim to describe a universal process; many specific developments can be identified but, in their essentials, they are related to the phenomena observed from the end of the eighteenth century onwards in the first countries to be affected by industrial development.

Alteration of the balance between the various demographic variables, known as demographic revolution of transition, occurs in three distinct phases.

FIRST PHASE - Mortality decreases, slowly at first and then more rapidly under the combined effect of a change in social structures and in the mode of production. This decrease stems basically from an increase in the means of subsistence available per head of the population, which reduces the danger of famine and epidemics. The increase in means of subsistence has a twofold origin: greater agricultural productivity and greater product mobility as a result of the opening up of frontiers. According to P. Bairoch, the means of subsistence available per head of the population increased by 10 to 15 per cent during the period which preceded the birth of industrialization in western Europe, which to his mind goes to prove that economic changes precede demographic changes.

The other nations that experienced the demographic revolution during the course of the nineteenth century underwent a slightly different process, owing to the export of new medical techniques by the more advanced States (as is now the case in the under-developed countries). Although industrialization was preceded by a drop in mortality, the interval of time separating these two phenomena was in all cases very short. In view of the relative stability of the birth rate around its previous level, the population increases rapidly, but it should be emphasized that nowhere in Europe did the annual growth rate exceed 1 per cent during this phase of economic take-off.

SECOND PHASE - A new development occurs: the birth rate falls rapidly. The main causes for this change are complex and it is difficult to single out any one factor. It is possible to identify three sets of considerations which explain the substantial decrease in the number of births:

Demographic: In order to perpetuate itself, the family no longer needs as many children, since mortality in general, and infant mortality in particular, have decreased.

Sociological: The transition from the patriarchal to the biological family, the status of women and their role in the new society, and the relationships created by a greater density of human settlement make the integration of a further child more difficult.

Economic: The child loses his role as short-term provider of security for his parents' future and becomes first and foremost a consumer, who must be given an education and provided with a heritage.

All these changes together contribute to conferring upon the child a status in the industrial world which he did not enjoy in the traditional world. This factor is basic to the understanding of contemporary demographic development and to the study of the reasons for the confirmed failure of family planning in some populations where none of the changes listed above have really taken place yet - that is to say that they have not yet been experienced over a long period of time by each family. A collective work on the history of population ascribes the decrease in fertility in nineteenth-century France to living conditions which favoured only small families. The individual was successfully set in opposition against the claim for equal distribution of financial burdens among families. As a result, social measures were not taken in favour of the family, which became not only more insecure but also smaller. The development of capitalism favoured both the expansion of the middle classes and the desire to rise in social status.

THIRD PHASE - There is a tendency towards a new equilibrium in the form of low demographic indicators (from 10 to 15 per thousand) with little deviation. The fall in the death rate slows down, to reach a minimum in the light of medical technology and age structure. Fertility also becomes stabilized, but many special situations can be noted: in some nations, there are still appreciably more births than deaths, resulting in a limited but sustained population increase; in others, fertility decreases to a point at which it falls below the vital generation reproduction threshold. It is difficult to give precise explanations for these differences in behaviour, apart from the constant tendency of certain populations towards a pronounced Malthusian attitude.

In the light of this process it may be affirmed that the changes in intensity to which the demographic variables are subject are the consequence of the evolution of available means of subsistence, in the case of mortality, and of the disruption of social and economic structures caused by industrial production methods, in the case of fertility.

Can the pattern observed in the nations which are at present industrialized apply to the rest of the world? Before replying to this question by analysing the interrelation between industrial and demographic development, the present evolution of the demographic variables must be noted and they must be placed in their socio-economic context.

The present situation in the third world bears only a distant relationship to that in western Europe at the beginning of the nineteenth century: the population is increasing at a rate of 2 to 3 per cent per year, a completely new situation which some writers call the "population explosion". At the same time, the social and economic structures remain static in most cases, although superficially there seems to be some progress in certain respects.

Undoubtedly, as in certain countries in the nineteenth century, there is a general decrease in the death rate in most of the so-called less developed nations, but the reasons are fundamentally different and it is by no means possible to make a comparison with the transformations resulting from the European demographic transition.

The fall in the death rate is a phenomenon exclusively imported from the richer countries, which, moreover, are often former colonial powers. The humanitarian action to combat the cause of death undertaken for nearly half a century has not affected all regions simultaneously; for example, the first tangible effects appeared in Asia around the 1930s but, in Africa, not until 1950.

The methods used are exclusively medical and based essentially on a very rapid development of the chemical and pharmaceutical industries of the developed nations. There are many reasons for this, including the low cost of the products used, due to mass production, and the extent of the market thus available to rich countries. In some cases, this form of aid in fact constitutes a subsidy by the rich nations to their own chemical industries.

The consequences quickly become evident: the decrease in the death rate continues, whereas the stability of fertility leads to an excess of births over deaths, which increases in extent owing to the extreme youth

of the populations concerned. At the same time, the available means of subsistence grow, but often not rapidly enough, and in some regions a decrease in food availability per head of the population may be noted. Agriculture is sometimes unable to cater for the needs of the mass of new arrivals because the green revolution does not fully come up to expectations.

In fact, the process now taking place in the less developed regions bears no relation to that described for western Europe. It is merely a change, within the former demographic equilibrium, which is now completely disrupted, in the complete set of social and economic realities. It may be noted that more food has not become available, and that industrial development is still restricted to a few enclaves, with no effect on the traditional economy as a whole. This situation is characteristic of the idea of dualism familiar to economists who specialize in problems of underdevelopment.

We are therefore faced with development that is purely exported, without any genuine influence on local realities; hence the serious imbalances which affect certain nations.

Under these conditions, demographic growth becomes more rapid and although in the nineteenth century it was considered a positive factor in the industrial development process, in the second half of the twentieth century it soon appears as a major obstacle to the attainment of the legitimate objectives of peoples which are still undeveloped.

Changes in certain structures may of course seem to be linked to the industrial production mode; this is especially true of urbanization. In fact, they are merely the expression of the major imbalance, resulting from the wide gap between the possibilities of an agricultural economy and a continually increasing population.

It can be noted that, logically enough, there is no decrease in fertility, because each family has not enough experience of the decrease in the death rate which would prevent it from losing its children; similarly,

the status of women and the importance accorded to children remain unchanged. Consequently, new action will be taken, instituted by certain developed States, leading to a new foreign intervention with regard to the demographic variables, in order to set in motion the second phase of the demographic revolution. Once more, recourse will be had to industrially mass-produced remedies. Rich nations will propose, either directly or through charitable institutions, measures designed in principle to slow down population growth by acting upon fertility. It is in fact a question of repeating, apart from some details, the operations carried out to decrease mortality during the last half century. However, while an appeal to the instinct of self-preservation and to a very limited extent to individual willpower is quite enough to combat an increase in mortality, the success of a birth control plan cannot be ensured without convincing the people concerned, in other words going against tradition, and obtaining sustained support, characterized by constant effort and strict discipline over long periods.

There must be a development in attitudes from, say, the involuntary consumption of chlorinated water distributed by the town water system, which is an effective method of combating typhoid fever, to the daily habit of taking a contraceptive pill, but this has not yet been achieved in many countries which have agreed to introduce a birth control policy. A twin difficulty is therefore encountered: the refusal of certain underdeveloped nations to plan the fertility of their citizens and the almost universal lack of efficiency of the measures adopted.

According to certain experts, national family planning programmes will probably not succeed in reducing a country's population growth rate. It is in fact perfectly possible that the personal preferences of couples with regard to the number of children they want are not compatible with the Government's objectives concerning the reduction of the fertility rate. Even where a certain slowing down in the birth rate is noted, the experts still do not understand the reason for that development. It is generally recognized that a slowing down in the birth rate noted after the introduction of a national family planning programme does not necessarily mean that one is a consequence of the other. These opinions are not universally

held, some considering that it is a first voluntary act on the road to development and that these effects, however limited they may be, should become more widespread as soon as the conditions for change are fulfilled. They seem in fact to express a hope rather than a rational analysis of the true situation.

It may be concluded from the first studies of the effectiveness of a birth control policy that, although it has been possible to export the first phase of the demographic transition without taking account of the immobility of socio-economic structures, export of the second phase is proving particularly difficult, in the absence of changes in the socio-economic context. This therefore condemns purely demographic policies which ignore the need for economic development and the evolution of social structures, and emphasizes the need to pursue a set of complementary activities at all levels, especially with regard to industry, which is the only means of preserving national sovereignty for all peoples.

It should be noted from the preceding analyses that the aid provided by the developed countries has served to combat the effects rather than the causes. In his analysis, which distinguishes between three types of practices - anti-mortality, anti-natal and economic - Alfred Sauvy notes that the least expensive activities have been deliberately favoured; although it costs less than \$1 to prevent a man in the third world from dying, \$5-\$20 are needed to prevent an additional birth and over \$20,000 to create a job in industry.

CHAPTER II

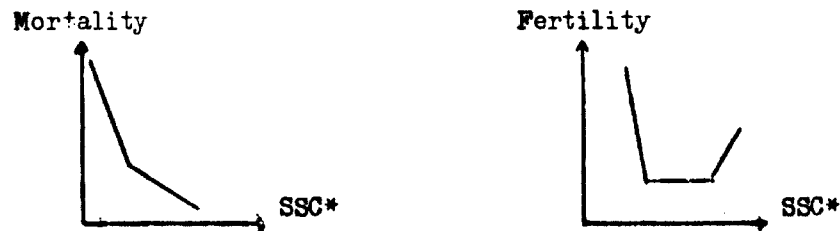
AN ANALYSIS OF THE EFFECTS OF INDUSTRIALIZATION
ON DEMOGRAPHIC VARIABLES

Demographic variables are obviously linked in some way to the family lifestyle, which in turn is closely dependent on the structures of production and particularly on the extent of industrialization.

All specialists recognize the sensitivity of these variables to the income level, the job held, the type of accommodation and the education received, even though they may disagree about the mechanisms at work.

In a number of rich countries, studies to work out correlations between population and employment, have turned out to be very positive. The composite notion of social status categories (SSC) which associates the workers' economic activity and his socio-educative environment in order to classify behaviour linked to both life style and work style, has proved to be a very useful criterion for analysis in this context.

It has thus been possible to show a negative correlation between social status category and mortality - with a few exceptions, in which training proves to be a preponderant factor - and first a negative, then positive, link with fertility, confirming, if that were still necessary, the effect of the type of activity on the level of the demographic variables.



* SSC: Social status categories in hierarchical order.

In spite of the interest there may be in studying these results relating to the industrialized areas, there is little point in carrying the analysis further, bearing in mind the serious risk of error incurred by trying to transpose certain conclusions obtained into the context of a different type of structure of production.

An effort must therefore be made to extract the information from the scant data available for the less developed areas, generally prepared for other purposes. In this connexion the statistical difficulties which the demographer will be bound to encounter should be noted:

The small proportion of the economically active population engaged in an industrial production structure limits the intensity of the transformations to be studied; and the groups that fully experience the effects of the forces of modernization are marginal compared with the size of the traditional populations. A few figures might be useful to indicate the relatively low proportion of the economically active population working in industry.

Employment in industry as a percentage of the
economically active population

(average calculated for large area)

Developed countries	35 per cent
Less developed countries	15 per cent
Western Asia	24 per cent
Southern Asia	14 per cent
Africa	10 per cent
Latin America	22 per cent

The poor quality of the data in many less developed regions. Some countries have only very recently carried out their first post-colonial censuses; these show that the size of the population had at times been considerably under-estimated. Likewise the main indicators on mortality and natality remain very uncertain, for want of a civil registration system with adequate coverage. In the absence of reliable statistical series, any study of the development of the intensity of the principal demographic laws might well be injudicious.

These few comments will doubtless make it easier to understand the chronic absence of data calling for a certain level of sophistication in the concepts and methods of inquiry.

SECTION I - MORTALITY AND INDUSTRIALIZATION

The analysis of this demographic variable is particularly representative of the complexity of the problems to be solved and the manifold inter-actions to be considered.

Among persons engaged in industries established in the less developed regions, there are at least two main influences to be observed, operating in opposite ways on the mortality trends.

A drop in the general rate of mortality due to better medical services and a more satisfactory health environment.

Transformation of the activity-linked mortality risk, resulting from the high intensity of accidents at work in the mechanized sectors.

The drop in the general mortality rate of workers in the modern sector is widely acknowledged; the reasons for this are manifold, the principal ones being as follows:

(a) The sum total of the joint health measures as a by-product of the urbanization phenomenon (water treatment, collection of domestic refuse, etc.).

(b) Better medical and hospital services, generally concentrated in the towns to the detriment of the country areas. It is not unusual to find one doctor for 100,000 people in rural areas, while this figure is between three to eight times lower in urban districts. Towns therefore show a considerable drop in mortality risk through pregnancy.

(c) In-service health inspection of workers with a view to limiting repeated absenteeism, and the risk of infection, which impairs labour productivity.

(d) The role of social security institutions, generally speaking open only to workers in the modern sector, enabling them more easily to take advantage of essential services (proximity of the places of treatment, financial cover).

Bearing in mind the foregoing facts, and having regard to the amount of urban unemployment, there is some justification for wondering whether at this level there is not some indirect selection process of individuals enjoying better health, which would naturally have a considerable influence on the demographic indices relating to mortality. The state of health of the majority of the population leaves a great deal to be desired; amongst recruitment criteria in the modern sector, health questions may, for executive staff, assume

particular importance, since there is little question of qualification. The traditional sector would continue to be responsible, as in the past, on account of its family aid system, for the protection of the weakest as far as health is concerned. This process, which is well defined in the context of the international migration of labour, should pass unnoticed as long as the group engaged in the modern sector is relatively small. If an analysis such as this proves to be accurate, as we are led to believe by the practices observed in advanced sectors of the economies of the third world, it would bring about a general bias in any comparisons which might be made between three populations at different stages of the modernization process (rural, urban, industrial), quite apart from any consideration as to the well-known effects of the specific age structures.

The lower level of the natural mortality rate of people belonging to the modern sector therefore appears to be associated with the appearance of another work-linked life-style, but doubtless also with the very characteristics of the group studied. This influence may be greater in the regions recently affected by industrialization, in which the age of the workers does not exceed 45 (Territories of the South Pacific).

After describing the links between natural mortality and manufacturing activities, a negative element needs to be added to the above account. Work accidents are clearly numerous in the modern sector of the less developed regions, but once again comparisons prove to be difficult, both with the agricultural sector in which reporting is practically non-existent, and with the industrialized countries, in which records are kept far more strictly. From the very few and often incomplete data available it may be estimated that the rate of accidents at work is from two to ten times higher than that observed in the most advanced industrial nations (based on the rates per 1,000 persons employed). Certain reasons may be advanced to explain this situation:

(a) The less skilled workers (those most at risk in all industries) have undergone an abrupt change from an agricultural world where manual labour predominates, to a world of machinery, in which the dangers are not

immediately apparent to them. The time given to their training is too short to enable them to acquire new reflexes, and to assimilate the signalling methods. (This is also true of workers emigrating to the large industrial centres).

(b) At the biotechnological level, job descriptions are issued in the manner usual in the industrial countries which produce the machinery. Maladjustments relating to the size of the individual, his habits and positions during work (the sitting position replaces a crouching or upright position), may present a certain risk for workers with different physical characteristics.

(c) Elementary safety precepts are respected little at various levels: among workers, the attitude towards death is different, it remains impregnated with the feeling of fatalism and powerlessness of the traditional communities, which are still largely in the majority. The trades unions have so far only partially included safety in their claims. The hierarchical structure and the origin of firms, which are often foreign, do not favour an awareness of the problem among managers.

Finally, labour legislation is inadequate, particularly as regards the promotion of accident prevention.

All these considerations on deaths through work accidents therefore counteract the positive effects observed on the natural death rate. In this connexion it is to be regretted that the risk involved can clearly not be quantified; however, it can be ascertained that the activities considered to be dangerous are partly rejected by young people coming on to the labour market, as is the case particularly in the building sector in certain African countries.

SECTION II - NUPTIALITY, THE FAMILY AND INDUSTRIALIZATION

Let us recall the general relationship between family size and production structures. The subject is a particularly important one. The view has often been put forward that industrialization affects the size and role of the family.

That is an indubitable fact, which, however, cannot be quantified with any precision because of the multiplicity of the situations observed and the absence of any analytical studies.

It must be admitted that, to draw up the distribution of family structure strictly in terms of modes of production would be an oversimplification. The extended family may be defined as two or three consecutive generations coexisting within a single production unit chiefly characterized, in principle, by consumption of own production and the provision of assistance to all its members at all levels (from child care to support in old age). Conversely, the nuclear, or biological, family consists of a couple and its children; it is usually typical of modern society, in which certain of the responsibilities assumed by the extended family are taken over by the State (education, social welfare, etc.).

In fact, if one considers the extended family only in under-developed regions, one must admit that the nuclear family normally flourishes in essentially rural areas. Here it would be a mistake to regard the married-couple family as an absolute criterion for modernization; it is a necessary but not a sufficient condition. In certain towns, for example in Tropical Africa, a pattern can be seen which is, on the face of it, anomalous: migration of persons seeking employment tending to add to the size and role of the extended families which take in new arrivals who are homeless and unemployed. This is yet another illustration of the ambivalent nature of the urbanization process that can be seen in the third world, where there is evidence of a breakdown in the traditional analysis of the factors of attraction and repulsion between life-styles and conditions in the urban labour market.

With that reservation, specialists nevertheless agree that "the nature of the family and its role in the lives of its members and in society had varied in time and place. Economic and social development, the modernization of society and demographic changes had caused fundamental alterations in family structure and roles. Because the family was the basic intermediate variable in reproductive behaviour, its nature as an institution and the modifications in it over time had influenced demographic processes". (World Population Conference, Bucharest, 1974).

Family structures have been considerably altered by industrialization and modernization. The phenomena of exodus to the towns have greatly contributed towards weakening traditional practices and various taboos. Thus, an increase in fertility is occasionally observed, particularly in Africa, in persons newly arrived in cities: being freed from certain taboos and weaning their children sooner than is demanded by custom, many women find that family size grows rapidly. This pattern tends to develop as the implications of modernization are experienced and become part of the individual's daily way of life.

The spatial redistribution of the population promotes instances of postponement of marriage and may even lead to the actual dissolution of existing marriages. Thus, even where a family already exists, the result of migration may be fewer offspring. Moreover, since these relocations mainly involve young men, imbalances in age and sex distribution may greatly restrict the possibility of forming a family. The concomitant result, in the zone of origin of the migrants, may be a resurgence of polygamy under the pressure of parents unwilling to accept the prospect that their daughters will never marry.

Another consideration to be added to the conditions mentioned above is the question of work outside the home by women in the modern sector. Along with the assumption by the modern State of some of the responsibilities of the extended family, this factor is of the greatest importance in the influence of industrialization on family structure and reproduction:

In a population which makes little use of contraceptive techniques, age at the time of marriage is a central factor in determining completed family size. Some calculations indicate that if the age of marriage were raised to what was the customary age in western Europe at the beginning of the present century (approximately 25), it would be justifiable to expect a 33 per cent decline in the highest birth rates, this considerable drop being the result of less exposure to risk of fertility during the period when fertility is at its height. In a number of Asian countries there is clear evidence today of a marked increase in the age of marriage (6.2 years for men and 6.5 years for women over a forty-year period in Korea; in urban zones the difference is even more marked - an additional 1.6 years for men and 2.0 years for women). In the light of this experience, a number of third world countries (e.g. Tunisia) have decided to intervene legislatively in this area by changing the legal age of marriage.

In addition, the abandonment by women of the traditional family production unit in order to seek work outside the home certainly represents one of the ways in which modernization can most easily affect family structures. Frequently, such a practice runs into difficulties arising out of urban unemployment, in which male job-seekers tend to be favoured, although there are a number of industries which traditionally employ female workers (e.g. electronic component production in Asia).

Taken together, these observations confirm the role of modernization in the emergence of a new family structure, whether in the form of development from the traditional to the biological family or a transition from the family which consumes what it produces to one which supplies manpower and uses services available in a market.

SECTION III - FERTILITY AND INDUSTRIALIZATION

This is clearly the aspect which is of the greatest interest to all experts studying the relationship between population and development, in view of the importance of fertility in a large part of the world. Unlike mortality, which can be reduced solely through the combined effect of environmental measures and the impact of progress (water treatment programmes, systematic vaccination campaigns, clinics and prevention), fertility continues to be essentially a matter of choice on the part of a couple who rationally or irrationally decide how many children they wish. The relationships which have been revealed are merely the reflection then of family behaviour as it relates to the desire for children - a desire which is often subconscious and largely influenced by the socio-economic environment.

The determination of the maximum number of children that a woman can biologically expect to bear is complicated by a number of limiting factors, some involuntary (standard of living, hygiene, health), and others voluntary (taboos, social values, and the knowledge, suitability and practice of contraceptive methods). Any changes in the socio-economic context and the habits which are linked with it have a direct effect on these factors.

If we were to make a more comprehensive analysis, we should express this line of reasoning on the basis of the role of children in society and the means made available to mothers to achieve the desired level of fertility.

It would be a mistake to believe that the development of external factors automatically results in fewer births. Particularly in Africa, present evidence points to higher fertility in towns than in the country (an opposite phenomenon to what is occurring in the affluent countries), representing the desire by women, expressed in a number of surveys, to have more children than they have at the time.

"Limiting" factors of the involuntary type tend to be less pronounced in urban areas (better hygiene - clinics), there are fewer causes of sterility, and fertility increases. This is an isolated case, but it fully corroborates the description of the fertility mechanisms that have been proposed.

On the question of evaluating fertility according to a population's achieved economic level, comparison based on experience suggests that, in the present state of knowledge, an analysis can only be made on the basis of specific cases. Certain nations, for example, have experienced a significant decline in fertility without any considerable change in per capita income. According to a background paper prepared for the World Population Conference, the Republic of Korea offers "the strongest proof that a low income, rural, 'traditional' society can make amazingly rapid progress towards the solution of its population problem." Nevertheless in the same document, the author acknowledges that it appears to be easier to win over civilizations which are Chinese in origin or have been assimilated to the cause of fertility limitation. Another study carried out for the Economic Commission for Asia and the Far East states that the above pattern of fertility trends and programme impact may suggest that fertility decline is associated with, if not caused by, the process of socio-economic development. These contradictions are only apparent, and the only problem lies in the inadequacy of our knowledge. The weakness of the theory of demographic transition derives from the fact that it confines itself to the assertion that a high degree of modernization is enough to cause a reduction of fertility, without identifying the degree of modernization necessary to cause such a reduction. Moreover, it seems increasingly probable that the threshold thus defined, is not universal, but is far more likely to be specific to each population in the light of its system of production and socio-political structures.

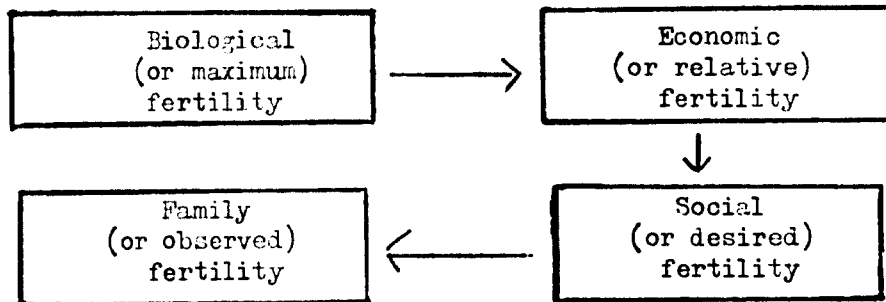
An analysis of the factors affecting fertility is difficult. Because of the multiplicity of the variables, the complexity of the modes of action and the simultaneity of the effects, it is necessary to define rigorously the terms of the analysis in a way that can be expressed in the form of a general model of fertility following the sequence: possibility - desire - means.

On the basis of the level of "natural" fertility, which depends almost exclusively on exogenous factors of biological origin, it is possible to define the "relative" fertility of a population, i.e. fertility dependent on economic factors which, in the case in question, operate essentially as constraints (e.g. malnutrition, inadequate hygiene, endemic diseases). This relative fertility is subjected to social realities, in the commonest sense of the term (income, education, housing, etc.); and leads to "desired" fertility, which is the social expression of fertility.

Relative fertility is therefore seen as the highest level of fertility compatible with economic factors and represents the demographic mechanism operating in pre-industrial Europe and now operating in a fair number of third world countries.

Desired fertility expresses the wishes of families regarding family size and is closely related to social structures - the role of children, the position of women in society, education, housing, etc. - and the prevailing mode of production - employment held, sector of activity, income, etc. Usually, desired fertility is an unconscious expression of the will, the fruit of the accumulated knowledge of several generations who know through experience that a high number of births is necessary to guarantee that a male child may survive beyond the child-bearing period of the mother.

A fourth type of fertility, that which is recorded in each family, is a measure of the knowledge, suitability and use of contraceptive techniques. Depending on the degree of acceptance of these methods, the number of children desired, whose birth is possible, can be determined in the following way:



With regard to this variable also, the leading studies tend to place a major emphasis on housing, and to seek a distinction between the behaviour of urban and rural populations. Once again, the data are partially biased:

There is still too much discussion of birth rates, a concept which is strongly influenced by specific age structure and the imbalance between the sexes observed in urban areas.

Industrialization, universally recognized as being a major factor in the processes of change, is taken into account far too little, and appears as only a marginal consideration in analyses based on housing, education or income.

Let us very briefly review the findings of this kind of research in an effort to describe, on the basis of several surveys thematically closer to the subjects of interest in this study, the probable links between industrialization and fertility.

URBANIZATION The nature and process of the development of towns in the third world has already been specifically indicated, taking into account their dual aspect; two types of behaviour are observable depending on the antiquity of the populations affected by the urbanization phenomenon. Initially, one often observes an increase in completed fertility, which is readily explained by an increase in economic fertility, while the rules of social fertility remain identical. Subsequently, certain trends essentially affecting the cultural and social sphere become evident. The economic role of the child changes in urban surroundings, and he becomes more a consumer than a producer; in due course, fertility tends to diminish, or, at least, there is a development in the desires of families regarding family size.

The data for Africa are not confirmed by the information on Asia or Latin America, where fertility is consistently lower in urban than in rural areas.

This behaviour difference may be attributed to the fact that the urbanization process is new in Africa, whereas it has affected other regions for a long time. This implies larger net migratio. flows, and confirms the view that has been expressed regarding the two successive roles of the town with respect to fertility. One may also draw attention to the fact that the industrialization process is older in Asia and Latin America.

EDUCATION It is difficult to dissociate the role of this phenomenon from that of urbanization, since, generally speaking, educational facilities are mainly located in the towns. One can, however, show that there is an inverse relationship between education levels and fertility levels, in both rural and urban areas.

Once again, the reasons given are many and complex; some authorities lay the emphasis on the postponement of marriage, caused by later school-leaving, and attempt to show that, as education is not evenly distributed throughout the various social strata, and especially affects better-to-do families, a new relationship including income must be considered. The acquisition of an education generally implies a changed status for women in relation to the traditional status, a fortiori if the woman in question engages in activities outside the home, depending on the modern sector. The fall in fertility doubtless reflects the wish for a smaller family, but also, and above all, the ability to use contraceptive techniques and products in a continuous manner.

In the richer countries, behaviour is somewhat different. A fall in fertility is observed as the level of education of the woman rises until a turning-point is reached, marked by a new increase in fertility, which then develops in the same direction as the level of education. This reversal of the trend is not inconsistent with what is observed in the countries of the third world, but the phenomenon only occurs below a level of completed fertility roughly equal to 2.5 children per established family (which means identical replacement of generations).

INCOME This term is highly equivocal in the context of international comparisons, and we shall therefore confine ourselves to stating that as a general rule, a negative correlation between income level and fertility is observed in the rich countries.

In the less developed regions, reliable statistics on family income related to fertility are scarce, and at the most there are some relatively trustworthy data expressing relationships between the area of arable land belonging to a family and its completed fertility: the number of children increases along with theoretical available resources, until a certain level of wealth is reached, when the relationship is reversed. The threshold point varies greatly depending on the region and ethnic group.

In spite of the weakness of the connexion and notwithstanding geographical variations, many specialists agree in affirming that there is a causal relationship between the income level and the completed fertility of a family. This theory, however, is essentially based on analyses of demographic trends during the nineteenth century in the western European countries affected by the industrial revolution. This transposition of a phenomenon observed at a different period in a different region raises many methodological problems, to which must be added considerations concerning time lags and the period required for the process to take place.

It would be possible to multiply the analysis of relationships by singling out other variables which each express a particular aspect of development. For example, fertility depends on marriage practices, monogamy proving the most fertile system whatever the population concerned. Religions also play a major role in the determination by couples of final family size, depending on the way in which the link between the sexual act and the desire for children is approached.

Lastly and above all, the occupation of the husband, and of the wife if she is in paid employment, and their consequent membership of a social status category, have a very direct influence on the number of children per family. It may be true that very few specific studies on industrial employment and fertility have been made, but it seems useful to note the tendencies of couples as far as quantified fertility is concerned, by ascertaining the number of children desired. This type of information comes to light notably through

KAP surveys (surveys concerning knowledge, attitude and practice in regard to family planning); it has the advantage that it goes further than the information on observed completed fertility - which is affected by past habits - and concentrates attention on desired family size. The use of contraceptive techniques, if these are employed, subsequently permits the number of children to be brought in line with the expectations of parents.

Two sets of studies seem capable of providing information of great value for a fuller understanding of this subject:

A series of studies on Africa and the Middle East involving an attempt to identify - distinguishing rural populations from urban populations - the declared advantages and disadvantages of large families.

A study on Iran which provides data by social status category, allowing a differential analysis.

The role of the child in Africa and the Near East

Within the framework of the expansion of family planning programmes in various less developed regions, fairly detailed surveys have been made of attitudes towards either one additional child or a large family. It has thus been possible to estimate the proportion of married couples who are potentially ready to accept contraceptive techniques. In order to give an idea of changing attitudes among families towards family size, reference will be made to results obtained in fairly diverse countries: Ethiopia, Ghana, Nigeria, Kenya and Iraq.

The economic position of these countries varies greatly; there are numerous differentiating features:

Size of population (Nigeria, 60 million inhabitants; Ghana, 10 million inhabitants);

Level of development;

Availability of strategic resources (Iraq, Nigeria).

Generally speaking, the role of industry is still fairly limited, the contribution of the manufacturing sector to the gross national product ranges between 6 and 11 per cent and, if in all cases a high rate of increase of industrial production can be expected (over 10 per cent per annum), that is due to the exploitation of new-found natural wealth or to the exceedingly low level at which these countries started. Industry employs relatively few

workers, between 6 and 10 per cent of the economically active population or around 15 per cent if extraction industries and construction are included. The scanty information available on trends in the labour market suggests the likelihood of a very slow growth in industrial employment which will probably be less than the growth of the population as a whole.

The questions asked in the surveys reflected the approach adopted in general fertility models: the advantages and disadvantages that the couple associates with the arrival of an additional child are investigated. It is thus a matter of ascertaining the place of the child in the society under study.

The results are rather difficult to analyse in view of the number of possible answers suggested and the possibility in certain cases of giving several answers. Nevertheless certain general tendencies can be noted:

Among the recognized advantages of having a large family, economic factors and prestige for the family were the most often mentioned. The child was seen as a short-term producer in rural areas, whereas he was rather regarded as a long-term form of security in urban areas. The child was also often regarded as a source of prestige, but in that respect there are marked differences depending on region and religion (Iraq). It should be noted that there were no significant differences of view as between the sexes. Lastly, only a very few groups regarded high fertility as a means of compensating for deaths in infancy. Here is an apparent contradiction with the widely held opinion among demographers linking these phenomena.

Analysis of the disadvantages of having a large family is simpler; economic factors clearly predominated and constituted between 75 and 90 per cent of the replies. Logically enough, the expense that a child entailed was expressed in different terms in the country and in the towns; in the former case reference was made to the general financial burden that the child constituted whereas, in the latter case, more specific answers were given mentioning education, child-care and the standard of living.

Family problems were also mentioned, but it is not possible to determine whether they were a subject of more concern to women than to men.

The various answers obtained in these surveys unquestionably give first place to questions relating to the economic effects of a large family.

This is a striking feature of the views expressed by the parents, who were concerned only with the economic aspects and disregarded the psychological and social advantages which they might hope to obtain. Increased mortality risks for the mother inherent in a large number of pregnancies and compensation for the death of children were also ignored in the views expressed on fertility by those concerned. The bias was probably due to the way in which the questionnaire was drawn up (a question on this subject received second place in the survey carried out in Iraq).

These studies do not perhaps shed direct light on the part played by industrialization, but the results are interesting in the general context of the effects of the forces of modernization on family structures and completed family size. It is possible to discern the general trend even if it cannot yet be quantified.

Fertility and social status categories in Iran

Iranian industry is playing an ever greater role within the national economy, although its share in the production of manufactures in the third world is steady at 2.5 per cent. This sector has had a sustained rate of growth at 11 per cent per annum for more than 10 years, which has allowed it to occupy a major place in the creation of wealth, accounting for 20 per cent of the GNP, not including petroleum. To supplement this rapid survey, one must consider the weight of industry in the labour market, since 8 million Iranians are declared as economically active out of a total population of 26 million; that represents a rather low gross labour force participation rate of 30 per cent, which can be explained by the extreme youth of the age structure and the low participation by women in the productive sectors. Industrial employment accounts for 23.6 per cent of the economically active population and has grown by approximately 50 per cent in ten years.

With that industrial framework, it is possible to define better the scope of a demographic survey on rather the same lines as those described previously, but with the advantage of making a first distinction by major social status categories. However, it may be a cause for regret that certain categories are too large and thus have too little homogeneity.

The survey was made in the province of Ispahan, where the population is very young (55 per cent less than 20 years of age) and highly urbanized, but on the other hand has not a very high literacy rate, particularly among women (less than 30 per cent). The live birth rate is estimated at 48 per thousand (20 per cent of the population consist of married women of child-bearing age!) and the crude death rate is approximately 13 per thousand.

The economy of the province is growing fast, and, alongside a craft sector with a high reputation, a diversified industrial complex is developing around a large steel works. In the second part of the Second Development Decade, Ispahan will probably be the most highly industrialized zone in Iran.

The activity rates of women in the urban and rural zones are the highest in the country. The development and modernization of industry, associated with the growth in employment opportunities for women and educational facilities for children, have raised the relative cost of rearing children while lowering the purely economic advantages of large families, in the short-term and long-term view.

Under these conditions a growing number of couples seem to want to limit the size of their families. That becomes very clear when one considers the replies given in the various social status categories on the ideal number of children:

Manual workers	3.8
Civil servants	3.3
Teachers	3.6
Technicians/supervisory staff	3.0
Farm workers	4.3
Military personnel	2.7
Businessmen	3.6
TOTAL	3.7

It should be noted that at the time of the survey 35 per cent of the manual workers were using a contraceptive method, as against only 12 per cent of farm workers and 75 per cent of technicians and supervisory staff. On the other hand, it can be noted that, in families with a low rate of infant or child mortality, the ideal number of progeny indicated is lower than in families which have lost many children.

The result expressed here corroborates most ideas on the development of the family. It can thus be considered that the very advanced level of the industrialization process in the region described and the emergence of social categories linked with modern employment are the principal causes for the changes observed.

CHAPTER III

THE SPATIAL DISTRIBUTION OF THE POPULATION

Population movements linked to employment affect practically all countries; it is only the orientation and intensity of the phenomenon that vary greatly from case to case.

Traditionally, and in order to facilitate analysis, a distinction is made between several types of movement:

Internal migration, often related to urbanization trends, and of a fairly marked definitive character; and

External or international migration, either to major industrial centres in foreign countries or to neighbouring countries that have advanced further in the development process. In such cases of expatriation, the family is usually left at home and absence from the home country is usually only temporary.

As a rule, specialists in this subject distinguish between repellent forces, which move the individual to leave his home and original activity, and attractive forces, which make the desired destination seem to be a target whose real advantages are very closely linked up with irrational hopes.

A joint study of these two migratory phenomena cannot be carried out with all the necessary clarity. Obviously, it is the repellent factors that play a determining role in the rural exodus, but the "mirage" of the city, with its alleged facilities, is not to be neglected. As far as international migration is concerned, the problem is more complex, the primary attractive force being incontestably that of the high comparative level of wages, though one should not neglect the influence of under-employment or of phenomena related to a change of social class in the decision to leave.

Finally, another important difference is the part played by industrialization in setting off the movements observed: this is not a very determining factor in the present urban phenomenon in the third world but is an essential factor in almost all international movements, including movements in the framework of agro-industrial activities.

SECTION I - INTERNAL MIGRATION AND INDUSTRIALIZATION

Before presenting some concrete cases, an attempt must be made to place internal migration in the less developed regions in its socio-economic context. The analysis proposed is not a new one, many specialists being agreed on the causes of the phenomenon.

Urbanization was regarded up to the end of the Second World War as a process that favoured economic development. Some rural areas became depopulated because manpower, which had become available owing to the rapid increase in productivity, left for the towns or, more accurately, the major industrial centres (as housing proved to be very much dependent on employment).

There is one fundamental difference between this situation, which was observed in the industrial countries, and the present situation: a rather low rate of variation of spatial distribution, in keeping with the capacity of absorption of the industrial sector, and even sometimes below it.

Once again it is noted, as in the case of demographic transition, that the model can no longer be applied on these terms to the least developed regions owing to a very marked acceleration in processes, incommensurate with the levels recorded beforehand. The rural exodus brings to the towns a mass of persons without work and without skills; industrial employment is too limited in extent to cope with these new demands. The importance of the dilemma can be best seen if one recalls that towns and industrial employment are growing at more or less the same rate in the third world but that unfortunately the two populations are very different in size. Therefore the gap widens rapidly and it seems that the growing disequilibrium can be limited only through energetic action in favour of modern employment.

Thus urban growth in the least developed regions seems to be the result of three variables: rural employment, gaps in earning levels and training of youth.

At the moment agriculture cannot satisfy the demand for employment of a largely rural population (70-85 per cent) whose natural rate of growth varies from 1.8 to 3.6 per cent per annum. Therefore pressure is exerted in favour of a migratory flow towards the towns, which moreover have a variety of attractions for under-employed rural youth.

There is a large gap between rural and urban wages; on the whole the ratio is about 1:3, depending on the country and continent, so that the hope of obtaining higher wages is the fundamental motive force in movements to the towns. In the view of M.P. Todaro, taking into account the high rate of unemployment in the towns, one must go beyond the simple notion of hoping for higher earnings and arrive at a more elaborate concept in which the gain expected is counterbalanced by the often subjective probability of finding work in a sometimes distant future. Thus a young man would be ready to draw earnings lower than those in agriculture simply because he expects to achieve a higher wage in due course. This acceptance of lower earnings in the present because of the expectation of future gains would explain the continued very intense flow towards zones in which unemployment and underemployment are chronically rife.

The youth of the migrants is also a dominant characteristic of urban immigration; a large proportion of persons who have had some rudiments of education refuse to return to rural activities which have not a very high status and in addition are badly paid. Young people therefore prefer to go to the towns, where they expect to find employment that will suit them, thus swelling the mass of unemployed. In their defence it should be mentioned that the rural world, with its rigid social and economic structures, offers them no future at all.

This hyper-urbanization of the third world is quite unrelated to forces of modernization and industrialization, and there is clearly no connexion between the rate of urbanization and the percentage of the economically active population employed in manufacturing industry. As P. Baroch shows in a historical account of the development of these two indicators in the less developed countries between 1920 and 1970, the gap between the two rates has constantly widened; while the industrialization rate was ahead at the beginning of the period analysed, after fifty years there was a 110 per cent gap to the detriment of industrialization.

1920: Urbanization 6.7 per cent; percentage of active population in industry 8.5 per cent;

1970: Urbanization 21.0 per cent; percentage of active population in industry 10.0 per cent.

The link between industrialization and urbanization is far from evident; there is doubtless a series of induced effects favouring a higher income among urbanized populations, but it would be possible to reason more or less in the same way in connexion with commerce or government service. In this field the multiplier effects of industrial employment on marginal and "informal" activities should be precisely quantified in order to identify more clearly the role

of industry in the processes observed. Above all, industry seems to be the only sector capable of partially solving the problem raised by the increase in urban unemployment, with the help of an analysis of the most appropriate technologies.

SECTION II - INTERNATIONAL MIGRATIONS AND INDUSTRIALIZATION

The phenomenon of international migration is very ancient and has affected all countries to varying degrees at different periods. The causes have been many, but it is certain that, since the beginning of the twentieth century, structural changes and industrialization concentrated in some countries have been a major factor in setting in motion and maintaining this process.

Once the industrial revolution had exhausted the manpower resources within each country - in other words, when technological progress in agriculture was no longer capable of fully meeting the growing needs of industry - most of the advanced regions felt the need to supply themselves with labour from other markets. So ample use was made of the steadily expanding transportation facilities, and regional markets (neighbouring countries, special zones of influence) or even world markets for labour developed rapidly.

Thus, the wealthy European countries, after having turned to the populations in the northern Mediterranean area characterized by semi-poverty, enlarged their spheres of action to their former colonies (Africa in the case of France, Asia in the case of England, etc.). During the same period, the United States of America, a country of immigration par excellence, limited entry to their territory to people from certain areas of the world, although skilled people indispensable to the American economy were recruited throughout the world - in the third world countries just as in highly developed countries.

It would none the less be very misleading to present migratory movements as relating exclusively to North-South exchanges and relations between rich and poor countries. Immediately following the various processes of decolonization, the countries in the third world were confronted with internal regional movements, the causes of which were twofold:

There are traditional shifts which originate in differing living conditions connected with the climate and relative natural wealth of countries. In Africa, for example, the richer countries with forests have always attracted people from the savannah, and this has also continued to be the case since independence.

Some countries which are more favoured than others by their potential wealth or by the effects of the policies of the great Powers and of multinational corporations have experienced a growth in their labour requirements owing to rapid changes in production structures and to the role played by their national populations in the development process. In many of these countries (e.g. oil-rich Middle Eastern countries, West African countries), internationalization of the labour market has proved to be the only possible solution.

In this phenomenon of the multiplication of regional movements within the third world, the level of relative development is increasingly proving to be the driving force behind migration. Although still in its infancy, the phenomenon of direct industrialization (manufacture of products) or indirect industrialization (industrialized agriculture, extraction of raw materials) in some countries acts as a focus of attraction by comparison with the chronic under-development of the remainder of the region.

International migrations of workers are, with very few exceptions, linked to the current industrial phenomenon, whether they are oriented towards the industrialized countries or towards certain large cities in the third world.

Unskilled people going to Europe are mainly used in the manufacturing industries and related activities, and account for:

- 63 per cent of the miners in Belgium,
- 39 per cent of employees in metallurgy in the Netherlands,
- 32 per cent of employees in construction in France,
- 25 per cent of employees in metallurgy in Switzerland.

Qualified people and scientific personnel employed in services (notably health) or in research teams (particularly in universities) cannot really be dissociated from a highly dynamic industrial environment, which is indispensable to the smooth functioning of user activities. One has often heard denunciations of the pillaging of the third world's specialists accompanied by the admission that, regrettably, the facilities needed for their work are usually unavailable in the third world.

In the less well endowed countries, the problems are exactly the same, although the role of industrialization is not very obvious at first glance. Thus, apart from the foreigners working directly in industrial centres, there are many migrant workers in the agricultural export sector. However, it would seem rather artificial to make a sharp distinction between one specific field of modern agriculture and the food industry (vegetable oils, cocoa, sugar), the textile industry (cotton, jute) or the manufacturing industry (rubber).

On the basis of these few remarks, we can, then, attempt to draw up a quick balance-sheet of the main characteristics of international migrations. Since there are so many studies which have been published and so much work which is now under way on the subject, it will not be necessary to place undue emphasis on a problem for which many answers have already been put forward.

The main aim of the modern migrant worker is, above all, to work in a community and, usually, to become a part of it. This situation has many consequences:

The migrant worker is usually a young man.

He is generally unmarried, or in any case leaves his family behind.

His skill or lack thereof is the decisive factor.

He usually intends to return to the socio-economic context from which he came, and therefore saves a substantial share of his income to reinvest in his country of origin.

The migratory flow also reflects a number of factors which determine fairly precisely its origin, its destination and the level of skill concerned.

In regions with subsistence economies or dualism and dislocation of production structures, most movements toward the rest of the world involve unskilled workers. The permanent situation of unemployment and zero marginal productivity brings constant pressure to bear in favour of immigration.

In areas where a certain level of comfort has been reached, migrations are of a more mixed nature. Some trained workers leave their countries in order to escape a high level of structural unemployment deriving from the fact that the secondary sector is as yet unable to absorb all the types of labour available. In other cases, we see very marked drainages of skills motivated purely by income differences between the two types of economy. For example, among the Turkish workers employed in the Federal Republic of Germany, there are school-teachers who have found it worth their while to leave their profession and their country. Recent studies by the Organization for Economic Co-operation and Development (OECD) bring out the attraction exerted by the wages offered by industry in the wealthy countries, especially for workers who have already received training.

The migratory flows therefore appear to depend very much on relative levels of development. They are subject to two supplementary processes which are closely related to the production techniques used and determine the extent to which a given country must turn to an international or regional labour market:

Rejection of the most primitive or unhealthful jobs has been noted, not only in the rich countries (e.g. Switzerland and France) but also in the developing countries (e.g. the Ivory Coast). At different educational levels, we find an almost universal reluctance to engage in certain types of manual work among both young people in industrialized countries and the literate rural population in the third world. This shift in the aspirations of national workers, associated with the age structure of the population, can encourage an imbalance in the job market. Regardless of whether there is endemic unemployment, it may be necessary to bring in workers from other countries. There would also be another possible solution, namely to invest in technologies capable of replacing unskilled workers, but this rarely happens because it is very costly.

The disparity between supply and demand in regard to highly skilled workers is closely linked with the capacity of the training system and its response time. In certain circumstances, some countries may find it more advantageous to turn to the international market. The advantage of doing so is threefold:

The response time is fairly short, since it is just a question of enticing skilled workers from other countries.

The cost is relatively low, since the country receiving the workers does not bear the expense of training for the skill desired. In any event, the cost of education is lower in third world countries than in the rich countries.

The flexibility of the method used makes it possible to adjust supply and demand in a given job market on a short-term basis, without making any change in domestic structures, by manipulating the number and level of skill of immigrants.

It is incontestable that international migratory phenomena are decisively influenced by development and industrialization. This is probably the aspect of the relationship between industrialization and population where the links are most evident and have so far been most closely studied.

SECTION III - SOME MIGRATORY FLOWS

Quite a large number of studies have been carried out in this field, making it possible partially to define the links between industrial development and movements of workers. The two examples presented are typical: one is representative of a region (the Ivory Coast), and the other is an example of a strong emigration movement claiming a place in the planner's concerns (Algeria).

Migration to the Ivory Coast

The Ivory Coast is equally divided between the savannah area and the forest area, from which it derives part of its wealth. The population is estimated at 6.5 million inhabitants (in 1975), with the city of Abidjan alone accounting for nearly one million persons. The economy of the Ivory Coast has been growing at a steady rate of 8 per cent a year for ten years, thanks to an agricultural production which has been steadily diversified, and to a rapidly developing infant industry.

The integration of the various activities is based on industrialized agriculture, dominated by development companies (allowing active State participation), and the establishment of processing industries in various fields, such as foods (oil, sugar, coffee), textiles (cotton, jute) and other manufactured products (rubber, wood).

In contrast with most of the African countries, which were confronted by very difficult unemployment problems immediately following independence, the Ivory Coast had to turn to labour markets in neighbouring savannah-area countries, owing to its rapid economic development, small population and certain attitudes towards labour. This geographical complementarity may be observed in other parts of West Africa, in particular in Ghana.

The migratory phenomenon in the Ivory Coast is very composite in nature, since the domestic and foreign migrations are closely interrelated. In this connexion, it is useful to distinguish between flows of workers by origin:

Urban migration of young literate Ivory Coast citizens who leave agriculture to go to the city of Abidjan.

Foreign African migration (mainly from the Upper Volta, but also from Mali, for example), of farm workers who are recruited into the family undertakings of Ivory Coast planters, or into the large agro-industrial complexes for which they are the only source of labour.

Foreign African migration from the same countries as above, towards the urban industrial sector and "informal" sector.

African and European migration of qualified personnel to supervise workers and manage enterprises.

The numbers of Ivory Coast citizens employed in the primary, secondary and tertiary sectors amount to 18 per cent, 51 per cent and 56 per cent of the total figures, respectively. In the modern sector, foreigners account for more than 52 per cent of the total number of employees.

As has been pointed out by L. Roussel, these migratory movements lead to a double paradox, with simultaneous rapid economic development and aggravation of unemployment (especially affecting Ivory Coast citizens), and the coexistence of this unemployment with the presence of a very large number of foreign workers. The imbalances are explained by continued inadequacy in the training of Ivory Coast cadres and the rejection by the local population of unskilled work, especially in agriculture. Furthermore, while industrial development is advancing rapidly, the number of jobs created none the less remains limited by comparison with the total size of the working population of the Ivory Coast. The modern sector, including marginal enterprises, employs around half a million people out of an estimated three million economically active people.

It is uncertain what conclusions should be drawn from this brief discussion. The movements of foreign workers are without the slightest doubt linked to the growth of industry and of agro-industrial complexes. On the other hand, the urban migrations involving mainly Ivory Coast citizens reflect more complex motivations, among which industrial employment would appear at first sight to play a secondary part.

Algerian migration

The country has a wide variety of national resources which are so far being exploited only in part, due to inadequate financing capacity (the savings level is very low) and, above all, a lack of skilled manpower in key sectors of industry.

According to the last census carried out in Algeria, in 1966, the resident population totalled 11.7 million persons. The age structure is at present extremely young, 56.6 per cent of the population being under 20. This results in a high dependency ratio.

Urbanization is particularly rapid, and 38 per cent of the population lives in urban areas - an additional causal factor in unemployment in a developing country.

The official working population (economically active population) consists of 2,277,000 men and 245,000 women. The number of working women is substantially understated, reflecting the usual aversion in Moslem countries to admit that women work.

The employment market is characterized by very high unemployment in both the secondary and primary sectors:

Totally unemployed according to census: 610,300

Temporary workers (agriculture): 350,000

One paid employee in seven in urban areas works less than 30 hours a week.

Two-thirds of agricultural workers are underemployed (250 days in the case of men - 100 days in the case of women).

The Algerian planning authorities estimate that only 900,000 jobs are permanent. This represents barely 50 per cent of the working population actually in employment and 33 per cent of total available manpower.

As might be deduced from the quantitative Algerian manpower situation, the skill level of Algerian workers is inadequate in all sectors.

A chronic shortage of members of scientific professions and professional-level staff in general (Algeria has to use 65,000 foreigners, who are employed in all sectors).

An excessive number of tradesmen and craftsmen.

A total lack of training for agricultural workers.

It should be borne in mind that, in 1960, 90 per cent of all men and 96 per cent of all women were illiterate and less than one per cent had higher educational qualifications.

In the light of these facts, the Algerian economic development plan has made provision for movements of workers, assigning four major objectives to international migration:

To reduce unemployment and underemployment through migration to Europe, at the same time reducing the number of non-productive consumers. This advantage is particularly marked if the worker is young and inexperienced and has an urban background (unskilled or semi-skilled worker).

To increase regular transfers of foreign currency, thereby enabling on the one hand the family remaining in Algeria to have a better standard of living and, on the other, the country to purchase essential capital goods not produced locally.

To initiate inexperienced young workers into industrial life. This initiation, assumed to be effective, must be reserved first and foremost for the urban workers who are the major sufferers from chronic underemployment. The result of encouraging a rural worker to leave would be to reduce the agricultural labour force, bearing in mind that the population in certain areas of Algeria is on the decrease, thereby jeopardizing the rural renovation plan. In addition, the urban labour market situation would remain unchanged and would even be aggravated in the medium term when the migrant worker returned, through the indirect encouragement of rural-urban migration.

To help reduce the major skill shortages in the medium-term. Algeria has, at the present time specific needs which could certainly be met by some of the skilled manpower of Europe. While it is impossible to estimate at present the proportion of skilled workers who will be able to find employment in their own countries, it is certain that Algeria could recruit in Europe an appreciable number of professional staff specializing in areas in which it suffers from a shortage.

This plan for the reorganization of the qualitative structures of the labour force, however, faces a number of problems deriving from disparities between the job patterns of Algerian workers abroad and the future needs of Algeria. These problems will include:

The impossibility of reintegrating those emigrant workers whose only working experience is in the construction sector. In Europe, 44.3 per cent of Algerian workers are employed in this sector, whereas Algerian requirements in the same sector for the period 1971-1973 accounted for only 17.9 per cent of new recruits.

The difficulties of finding skilled staff for other activities; some sectors have an absorption capacity equal to, or even exceeding, the total number of specialized emigrant workers.

Lastly, one of the major obstacles to expansion is still the scarcity of supervisory personnel in all sectors. The investment plans require more than 15,000 persons, only 38 per cent of whom will be able to be trained or upgraded by the Algerian educational system. It appears that there are only 5,000 workers of this skill level in Europe. This is a bottle-neck which is slowing down Algeria's development considerably. The use of foreign skilled manpower is the only solution in the medium-term.

The link between industrial employment and migration is in this specific case very clear; it is even institutionalized in official documents. The Algerian authorities encourage the departure of workers into European manufacturing industry; in return, they expect this process to have a positive effect on national development by increasing trained personnel.

CONCLUSION

The ideas expressed in this document constitute an attempt to define the specific place of industrialization in the general development process and its particular influence on demographic variables.

Since it is axiomatic that a certain level of development cannot be achieved without a minimum amount of industry, it is possible to show the major role of the new production structures on the socio-educational environment of the family and thereby on completed fertility.

The purpose set for this paper was therefore not to measure the effect of industrialization, but to ascertain, or confirm whether there was an undeniable link between industry and the level of certain demographic variables. In view of the present state of our knowledge this seemed to be the most realistic approach.

The advantage of such an approach was clear, in view of the ambiguity of some development criteria currently used for measurement, which have proved to be quite inaccurate, particularly as far as links between urbanization and mortality or urbanization and fertility are concerned.

Industry is the most homogeneous sector in which it is possible to determine social groups brought face to face with a new reality which is the direct result of modern modes of production. One can also define fairly diversified social status categories, characterized by a particular life style, from unskilled workers to the managerial grades.

Experience shows that the most difficult problem encountered in studying the effect of industrialization on the various relevant demographic variables lies in defining its influence on vital statistics (mortality, nuptiality, and fertility). The factors involved interact in many ways, and though it is now generally agreed that the role of the forces of modernization should be recognized, it is not possible to define the threshold at which these forces begin to affect the behaviour of families. Because of the large number of levels and types of development, historical and political circumstances that have favoured the economic take-off of particular countries, the amount of information obtained from such observations which might be extended to other countries is seriously restricted.

Mortality and industrialization: Two major influences are observed: the first relates to the fall in general mortality due to better medical arrangements and a more satisfactory health environment. The second, directly linked to new modes of production, is expressed by a high rate of work accidents in the mechanized sectors.

Family, nuptiality and industrialization: While the married couple - family is not an absolute criterion of modernization, it is generally agreed that family structures are considerably affected by industrialization. The place of a modern State and its growing responsibilities vis-à-vis the citizen are factors which are liable to limit the size of the family when the decrease in infant mortality is recognized as an undoubted fact by parents.

Fertility and industrialization: There are many factors that influence the level of fertility and they operate in extremely complex ways. Nevertheless it is possible, by means of spot checks to show more or less general trend to limit the number of children per couple except in recently urbanized African population groups. This development is linked to a change in the economic role of children from short-term producers to absolute consumers and in the status of women in the family and in society (economically active women in the industrial sector in Asia). In this context it has always proved difficult to isolate the industrialization phenomenon from the whole process of modernization when it is often one of the only objective and quantifiable forms of modernization.

The data on the spatial distribution of the population are different in nature, depending more directly on employment phenomena and hence on the role of industry on the labour market. It often seems to be rather difficult to associate the two forms of internal and external movement in one analysis. Indeed, the link between industrialization and international migration is fairly clear and is the dominant factor in all the explanations provided. On the other hand, internal migration and urbanization develop within a far more complex framework. It is necessary to consider the impact of repellent forces (escape from the agricultural world) and attractive forces (hope of a higher income) in the context of the problem of underemployment and urban unemployment.

Internal migration and industrialization: The rapid growth of urbanization alongside the slow increase in the creation of jobs in the manufacturing sectors makes clear the present discrepancy between industrialization and urban growth in the third world countries. In this case, the reasons for leaving a rural environment, which is unable to provide an attractive job for literate young men and women, are reinforced by the possibilities of earning more money in the town.

It is a matter of weighing up present loss of earnings due to urban unemployment against the often illusory hope of earning more money in the not too distant future.

External migration and industrialization: With very few exceptions, the international migration of workers is associated with industrial phenomena, whether migration takes place to third world countries or the more affluent regions. The qualifications of the migrant are closely linked to the relative levels of development of the two countries concerned; in all cases movement is motivated either by the offer of industrial jobs which are no longer being taken up by nationals or by growth in sectors closely linked to manufacturing activities (fundamental research, agro-industrial complexes). A number of countries of origin of migrant labour and recipient countries have decided to take account of such movements in the planning of human resources.

Two conclusions may be drawn from such a study: on the one hand, the role of industrialization appears to be fairly positive in most cases and on the other hand the modernization process has been shown to be a criterion for obtaining more reliable information.

Efforts must be increased with regard to research into the relationship between industry and population in the light of the current problems mentioned at the World Population Conference held at Bucharest. It would seem to be useful to conduct a series of inquiries in the manufacturing sector in a limited number of countries, regarded as representative and belonging to different regions of the third world. Two subjects should be given priority:

The first is mortality among workers in industrial enterprises in the third world; specifically, the improvement on the normal death rate and the additional risk of death by accident would be measured, by reference to a control group.

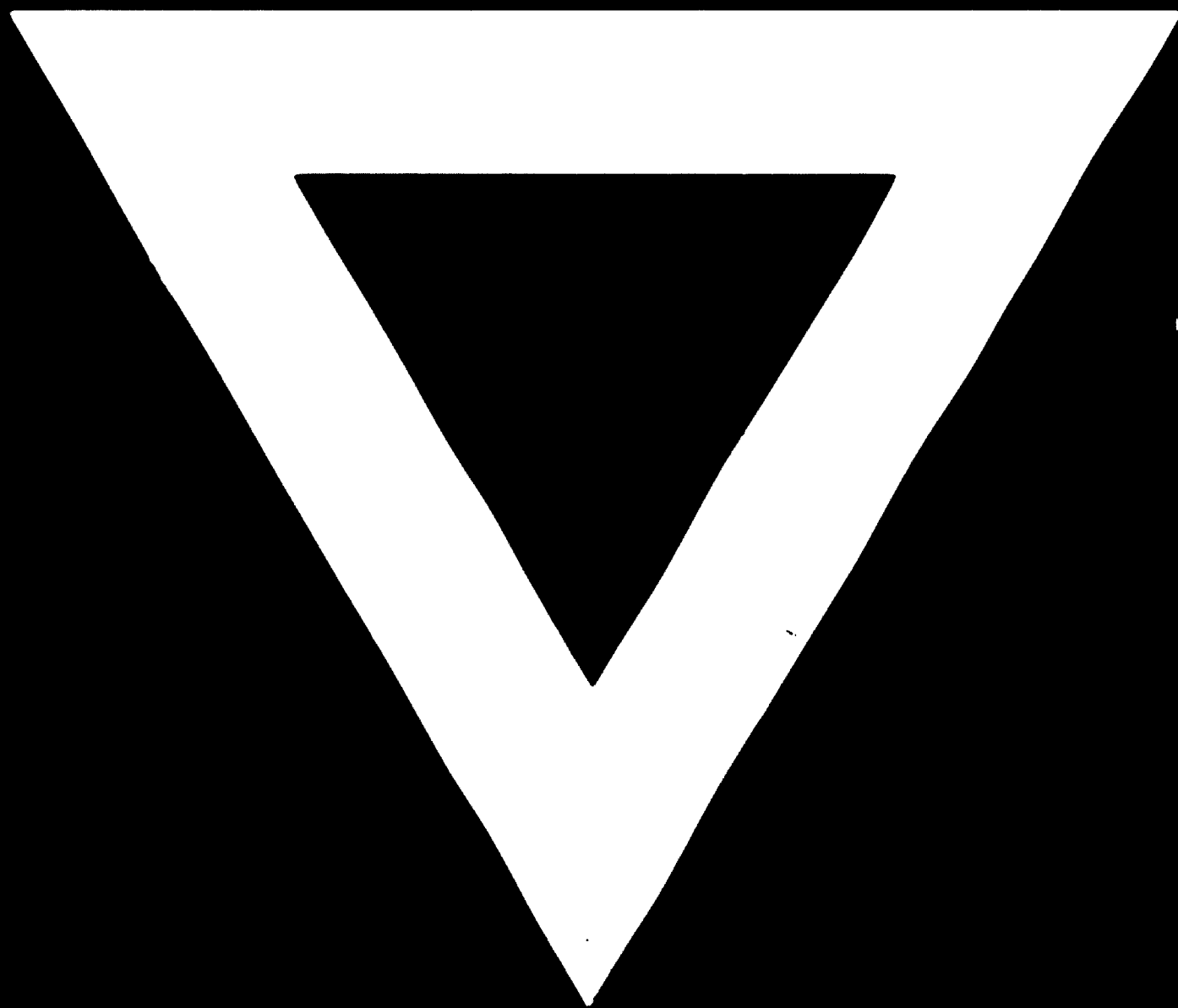
The second subject, which is greater in scope, would be an attempt to measure the differential fertility of workers in the secondary sector, by obtaining accurate data about family structure and completed fertility. It would be necessary to use a control group from the traditional sector.

Many studies are being conducted in the field of migration. It is therefore difficult to suggest topics for research. Nevertheless, a series of regional analyses might be considered, which attempted to take account of migration trends associated with employment. In many contiguous countries, there is evidence that certain sectors of the labour market and urbanization are becoming internationalized. However, national development plans very rarely mention such complementarity between neighbouring countries. The persistent unawareness of objectives and measures to be implemented by each side is likely to lead to serious imbalances; past complementarity is transformed into present or future opposition. Global studies on the subject would facilitate co-ordination and prevent the programming of operations whose implementation would be hampered by the lack of human resources.

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