54076

UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL

Distr.
LIMITED

E/CN.14/POP/133
8 November 1974

Original: ENGLISH

ECONOMIC COMMISSION FOR AFRICA

Working Group on National and Subnational Population Projections in Africa

Cairo, Egypt, 25-30 November 1974

ESTIMATES AND PROJECTIONS OF AGRICULTURAL/NON-AGRICULTURAL POPULATION AND LABOUR FORCE

Prepared by Statistics Division, FAO

TABLE OF CONTENTS

M74-2297

ESTIMATES AND PROJECTIONS OF AGRICULTURAL/NON-AGRICULTURAL POPULATION AND LABOUR FORCE

Introduction

1. Estimates and projections of the agricultural population and the economically active population (or labour force) in agriculture are important for agricultural planning since, apart from indicating the size of the population depending for their living on, and engaged in, agriculture, they have direct implications on agricultural employment policies. They are also needed for the determination of such important development indicators as per capita agricultural income, labour productivity in agriculture and the proportion of population or labour force in agriculture. FAO's work on estimates and projections covering all countries of the world forms part of a co-ordinated and interrelated programme of the United Nations and the Specialized Agencies in the field of demographic estimates and projections. Under the co-ordinated plan the United Nations prepares the estimates and projections of the total population by sex, age and urban/rural residence; the ILO prepares the estimates and projections of labour force by sex and age; and the UNESCO prepares estimates and projections of school enrolment by sex and age.

Definitions of agricultural population and economically active population and availability of data

2. Agricultural population is defined as all persons depending for their livelihood on agriculture 1/ i.e. the economically active population in agriculture and their non-working dependents. The economically active population in agriculture includes everyone whose main economic activity is agriculture, whether as employer, non-account worker, salaried employee or unpaid family worker and irrespective of whether he or she is employed, unemployed or underemployed at the time of enumeration.

3. Statistics on the size, structure and components of growth of the agricultural population are virtually unavailable. A few countries have collected data on their agricultural population either in the 1950 or 1960 population censuses 2/ but in no country was this done in both censuses. These data have not been published but have been made available to the UN Statistical Office through the periodic questionnaires sent to countries. Data on the economically active population in agriculture are available from nearly all population censuses. These data are however subject to measurement errors arising out of the seasonal nature of agricultural work and the phenomena of multi job holding and part-time employment particularly of unpaid female family workers and children. To obtain the agricultural population, the non-working dependents of the economically

---

1/ Including fishing, forestry and hunting.

2/ Schulte, W., Naiken, L. and Bruni, A.: "Projections of World Agricultural Population" Monthly Bulletin of Agricultural Economics and Statistics, Vol. 21, No.1, Jan. 1972, p.2

active population also have to be identified.3/ The collection of such dependency statistics using the family members' main source of livelihood as the criterion is complex and this may account for the lack of data on the agricultural population and also the omission of appropriate recommendations in the UN programme for the 1970 population censuses. However, in view of the need to assess the size of this important segment of the population, research into the concepts and definitions should be undertaken so that the population could be measured, even approximately if necessary. In the annex a review of the UN recommendations regarding the agricultural population and labour force in connection with the 1950 and 1960 rounds of population censuses is made. Also certain suggestions are made for additional tabulations that may provide data on the agricultural population within the framework of current census programmes.

Basic estimates of agricultural/non-agricultural population and economically active population

4. Estimates of the economically active population and its industrial breakdown are derived from population censuses or labour force surveys. The ILO systematically evaluates these and makes them consistent with internationally accepted standard concepts and definitions as part of its programme of preparing benchmark estimates of the economically active population and its distribution by agriculture, industry and services and projections of the total economically active population. Internationally comparable estimates of the labour force and its industrial distribution for 1950 and 1960 on the basis of the 1950 and 1960 round of population censuses or surveys have been published.4/ The ILO will be undertaking a similar evaluation of the data from the 1970 population censuses, in connection with their forthcoming revision of the projections of the economically active population.

5. In view of the lack of data on agricultural population (and their unreliability and incomparability in the few cases that they exist), estimates are generally obtained indirectly on the basis of the related data on the economically active population in agriculture as evaluated and adjusted by the ILO.

3/ A population concept closely related to the agricultural population is the farm population used in agricultural censuses. Farm population is defined as those living on agricultural holdings or in the households of the agricultural holders. (This will also include members of the households not actually residing there, as well as persons living on the holding who are not members of the household.) This definition, however, does not yield a satisfactory estimate of the agricultural population. It excludes the agricultural workers and their dependents who live outside the agricultural holdings. It also excludes fisherman, hunters and loggers and their family who do not work or live on agricultural holdings. On the other hand it includes people living on and operating small holdings (together with their dependents) although their main economic activity is outside agriculture and, who, for this reason would not be defined as agricultural population.

4/ ILO, Labour Force Projections, parts I-V, Geneva, 1971.

The estimates are derived using the following assumption:

$$EAA/EA = A/T \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where EA is the economically active population
EAA is the economically active population in agriculture
TP is the total population
AP is the agricultural population.
The above expression is equivalent to the assumption that

$$EAA/A = EA/T$$

i.e. the overall activity rate of the agricultural population is equivalent to that of the total population which also implies that the activity rates in the agricultural and non-agricultural sectors are equal. This is an approximation necessitated by the lack of relevant data. The error made is however relatively small in the majority of the developing countries where the proportion of the labour force or population in agriculture is high with the result that the activity rate of the total population overwhelmingly reflects that of the agricultural segment.5/

6. Thus given the estimate of the total population and EAA/EA, the corresponding agricultural population can be easily obtained, using expression (1). Needless to say the non-agricultural population is taken as the difference between the total population and the agricultural population.

Methodology for projections of the agricultural/non-agricultural population and economically active population

7. In view of the lack of data on the components of growth and activity rates of the agricultural and non-agricultural segments of the population, projections of the agricultural population and labour force are obtained after the corresponding projections of the total population and labour force have been prepared. The components of growth and labour force participation rates are either available or can be estimated for the total population so that these projections are usually made by the component method on the basis of assumptions regarding mortality, fertility international migration and labour force participation rates (to obtain the labour force). Given these projections an approximate procedure for projecting the agricultural and non-agricultural population/labour force is simply to estimate the future changes in the proportion of agricultural and non-agricultural population/labour force in the total population/labour force. The relationship given by (1) is assumed for the projection period also so that the proportion of total population in agriculture or non-agriculture is the same as that of the labour force in agriculture or non-agriculture respectively.

5/ Schulte, W., Naiken, L. and Bruni, A.: "Projections of World Agricultural Population" op.cit. p. 5-6.

a) Model for estimating future changes in the proportion of non-agricultural population in the total population

8. Future changes in the proportion of the non-agricultural population in the total population are derived from a model representing the changes in the proportion as a function of the proportion itself. According to the model two assumptions are made about the proportion of non-agricultural population in the total population: (i) starting from a point near zero when nearly all the population depend on agriculture, the proportion in non-agriculture will grow continuously until it nears unity and (ii) the change in the proportion in non-agriculture from time to time (t+1) will accelerate on a defined curve as the proportion in non-agriculture rises from nearly zero to some value around 0.5 and will decelerate along the defined path as the proportion approaches unity.

9. The absolute annual growth in the proportion of non-agricultural population, m(p), is given by

$$m(p) = (N_{t+1}/T_{t+1}) - (N_t/T_t)$$

$$\text{i.e. } N_t\,(1+r_N) \,/\, T_t\,(1+r_T) - N_t/T_t$$

$$\text{or } N_t\,(r_N - r_T) \,/\, T_t\,(1+r_T) \quad \ldots\ldots\ldots\ldots (2)$$

where N_t is the non-agricultural population, T_t is the total population in year t, r_N is the annual growth rate of the non-agricultural population and r_T is the annual growth rate of the total population. The expression may also be regarded as an indicator of the net "migration" rate from the agricultural sector to the non-agricultural sector. 6/

10. It is postulated that m(p) should be low at very low levels of N_t/T_t, increase to a fixed maximum and decline towards zero as N_t/T_t approaches unity. This can be represented by the incomplete beta distribution.

$$m(p) = p^{\alpha} (b-p)^{\beta} \,/\, \int_0^b p^{\alpha} (b-p)^{\beta}\, dp \quad \ldots\ldots (3) \quad 0 \leq p \leq b$$

6/ The difference between r_N and r_T is accounted by net "migration" from the agricultural sector to the non-agricultural sector, net external migration as well as the differential in the agricultural population and non-agricultural population natural growth rates. The latter is due to differences in mortality, fertility and sex-age structure. Data on these components of growth are not available. However, studies on urban and rural natural growth rates have indicated that generally rural fertility and mortaltiy are higher than those of urban areas. Nevertheless, in terms of rates of natural increase (birth rate minus death rate) the resulting higher death rates are compensated to some extent by the higher birth rates so that differentials in urban and rural natural growth rates tend to be relatively small. As most of the agricultural population live in rural areas, and most of the non-agricultural population in urban areas, the above conclusion can be considered to be valid for these two segments of the population also. Thus, as external migration is negligible, $N_t\,(r_N - r_T)$ may be taken to virtually reflect the number of net "migrants" from the agricultural sector to the non-agricultural sector between year t to (t+1). Denoting the latter by $M_{t,\,t+1}$, m(p) can be written as $M_{t,\,t+1}/T_{t+1}$ i.e. the net "migrants" expressed as a proportion of the total population in year (t+1).

where p is the proportion of the total population in the non-agricultural sector, and are the parameters of the distribution, and b is near to 1. The value of b is not likely to be 1 for this would imply that the agricultural population has reached zero.

11. The application of the Beta function to the expected changes in "migration rates" over the whole range of p enables the preparation of very long term perspective of the agriculture/non-agriculture distribution of the population. Such a model that allows for the absolute change in the proportion of non-agricultural population to rise then decline as a function of the proportion itself (which is an important indicator of the level of development) seems to accord with the reality of the situation. At a very early stage of a country's development the "push" from agriculture due to pressure on land and lack of sufficient employment opportunities in agriculture may be present but the non-agricultural sector in its undeveloped stage exert little 'pull'. As development (and often high population growth) gets underway, the 'pull' affect starts to come into the reckoning and amplifies the 'push' from agriculture thus accelerating the change in the sectoral proportions. Once the proportion in the agricultural sector becomes much smaller, the 'push' effect from agriculture should start to diminish even though the 'pull' may be operating to its full extent; in these circumstances the change in the proportion should reach a maximum and start to decline. Clearly when only a very small proportion remains in agriculture one would expect the decline in the proportion to be minimal.

b) Procedure for selecting the parameters of the model

12. Data covering the whole range of p are not available so that the parameters of the model cannot be estimated in the conventional manner. A procedure is adopted in which the co-ordinate representing the levels of p and m(p) as assessed for the base period and that corresponding to the maximum level of m(p) and the value of p at this point, which is either known or need to be assumed, are used to determine the shape of the distribution and the parameters.

13. As the complete beta distribution 7/ represents the area under the curve, which is constant, we can write (3) as

$$m(p) = K \; p^{\alpha} \; (b - p)^{\beta} \quad \ldots\ldots\ldots\ldots\ldots \quad (4)$$

The co-ordinate corresponding to the turning point of the curve is satisfied by the relationship

$$m(p)_{max} = K \; p_{max}^{\alpha} \; (b - p_{max})^{\beta}$$

where K is the appropriate constant and $m(p)_{max}$ and p_{max} are the modal ordinate and mode of the curve respectively. At the point corresponding to the observed values of m(p) and p, $m(p)_{obs}$ and p_{obs}, respectively, the following equation also must be satisfied:

$$m(p)_{obs} = K \; p_{obs}^{\alpha} \; (b - p_{obs})^{\beta}$$

A third equation follows from the properties of the incomplete beta distribution:

$$p_{max} = \quad / \quad (\quad + \quad)$$

Given the above three simultaneous equations, K, and can be evaluated and the curve of the incomplete beta distribution determined. 8/ The projections of p are obtained by using (4) iteratively. Thus if p_t is the level of the proportion in the base year t then

$$p_{t+1} = p_t + K\, p_t \quad (b - p_t)$$

and the process is repeated, with the increased p replacing p_t, as many times as the years covering the projection period.

14. The procedure of fitting the model curve to each country data results in projections of p that are consistent with the trends of the population/labour force and its industrial distribution as reflected by the benchmark estimates.

o) The derivation of the input data for the model

15. As noted earlier $m(p)_{obs}$, p_{obs}, $m(p)_{max}$ and p_{max} have to be either estimated or assumed for the determination of a set of parameters for the model in a given country. As regards $m(p)_{obs}$ and p_{obs} they can be computed from the basic estimates of the total population and its agricultural/non-agricultural breakdown obtained from the last two population censuses. Usually such data are given in intervals of ten years so that the growth rates are ten-year averages. Therefore the values of p and m(p) calculated at the middle of the period, should be taken as p_{obs} and $m(p)_{obs}$.

16. In deriving $m(p)_{max}$, p_{max} and the range of b of the curve two different approaches can be distinguished - one with regard to the developed countries and the other the developing countries.

1) The Developed Countries

17. In nearly all the developed countries there are population census data on the agricultural and non-agricultural labour force covering at least the period since World War I. But the number of censuses are often too few (4 to 5 on the average per country) and spaced at too long intervals to enable an attempt at "fitting" a beta curve to the data. 9/ Moreover the historical trends of the labour force and its industrial distribution

7/ The complete beta distribution is the integral $\int_0^b p^{\alpha}(b-p)^{\beta}\, dp$ given in(3).

8/ Unless specified otherwise b can be taken to be 1. See section c for alternative assumptions in the case of developed countries.

9/ Although the data refers to the agricultural and non-agricultural labour force rather than the agricultural and non-agricultural population it follows from our assumption that EAA/EA = A/T that the data could be used to reflect changes in m(p) as a function of p.

have been "distorted" by considerable external migration, war losses as well as changes in the concepts and definitions of the labour force, so that the m(p) values derived from the data (averages for periods of at least ten years) cannot be expected to follow the pattern postulated by the model. The past data series can however be used to estimate approximate values for $m(p)_{max}$ and p_{max}. These are assumed to have occurred in the past since not only is the proportion of agricultural population in the total population low, but the agricultural population and labour force and m(p) are declining.

18. In these countries the proportion of non-agricultural population is high and a factor of considerable importance in the projection is the point at which p is likely to stabilize i.e. m(p) will reach 0. This stabilizing point which is reflected in (3) by the range b is likely to be close to 1 but its actual value is very uncertain. Alternative values within a narrow range, e.g. .97-1.0 can therefore be assigned to b while keeping fixed the other input values i.e. $m(p)_{obs}$, p_{obs}, $m(p)_{max}$ and p_{max}. Thus the corresponding "migration" curves will reflect alternative assumptions regarding the limiting value of p.

ii) The Developing Countries

19. In most of the developing countries comparable data on the labour force and its distribution and the corresponding estimates of the agricultural and non-agricultural population are available for at most two time points. It is not possible therefore to know whether $m(p)_{max}$ has been reached or not. However as the proportion of population in the non-agricultural sector is still relatively low it may be assumed that there are scope for expansion in the rate of "migration" so that m(p), can be expected to increase further.

20. In order to assign plausible values to $m(p)_{max}$ and p_{max} for each individual country a third basic assumption is added to the model. It is assumed that $m(p)_{max}$ will coincide with the maximum agricultural population. According to the basic assumption of continuous decline in the proportion of non-agricultural population in the total population in the model a point is reached when the net shift from the agricultural sector becomes equivalent to the natural increase of the agricultural population so that the agricultural population stops growing and begins to decline thereafter. This turning point marks the beginning of not only a relief of the pressure on land but also the point when the source of the migrants itself is being increasingly diminished. Clearly this should be a logical point to associate $m(p)_{max}$.

21. According to the above assumption p_{max} is equivalent to the proportion of the non-agricultural population in the total population in the year preceeding that in which zero growth in the agricultural population is reached. The focal point for that proportion is usually taken to be .5, since at this point the agricultural population ceases to be the majority of the population. A p_{max} .5 will require an extremely high rate of out migration to counter the large natural increase from a predominantly agricultural population. This is unlikely in view of the limited absorption

capacity of the non-agricultural sector at this stage of development. On the other hand p_{max} can be greater than .5. Observation of the census data series of the agricultural and total labour force for the developed countries indicate the p_{max} was between .5 and .8. The high values are due to the fact that in these countries the rates of migration have been low. The rates for the developing countries (post-war data) at comparable levels of development (proportion of labour force in agriculture) are higher so that for the purpose of the model for the developing countries it would be more appropriate to set .7 as an upper limit for p_{max}.

22. The maximum absolute increase in the proportion of non-agricultural population, $(p)_{max}$, is expressed as

$$m(p)_{max} = p_{max} (r'_N - r'_T) / (1 + r'_T) \quad \ldots\ldots\ldots (3)$$

where r'_N and r'_T are the growth rates of the non-agricultural and total population respectively in the year when the maximum agricultural population is reached. If (m+1) is the latter year and N_m and T_m are the non-agricultural and total population respectively in year m, the following relationship exist

$$N_m r'_N = T_m r'_T$$

$$\text{i.e. } N_m/T_m = r'_T/r'_N$$

$$\text{so that } p_{max} = r'_T/r'_N \quad \underline{10/} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

23. Thus given p_{max} and r'_T the determination of $m(p)_{max}$ is straightforward. Rough indications of r'_T can be obtained from the separately prepared projections of the total population and taking into account the base level of p, the observed level of m(p) for the base period and the assumed value for p_{max}.11/ Therefore p_{max} emerges as the key factor to be assumed for determining the parameters of the model for a particular country. The limits of the possible values of this variable has already been specified. Certain general rules can be set up for chosing appropriate assumptions according to the levels and trends of the relevant segments of the population as reflected by the data for the base period.

10/ Since p_{max} has been assumed to be equivalent to N_m/T_m.

11/ For example if the base level of p is close to p_{max} and the observed m(p) is high so that the maximum is imminent the projected average growth rate of the total population for the next 5 or 10 years can be used as r'_T. On the other hand if p is low and the probability of the maximum being reached within the period of the projection is small, lower or higher growth rates than that projected in the last year of the period (as consistent with the projected trends in the growth rates) can be taken. With some adjustment in each individual case a plausible figure can be arrived at. Small variations in the rate used is not very important.

24. As p_{max} is equal to the ratio of the growth rate of the total population to that of the non-agricultural population in the year when the maximum agricultural population is reached one may observe the value of the ratio corresponding to the two growth rates in the base period (r_1) as a basis for assumptionsregarding p_{max}. If the base level of p is close to .5 and r_1 is within the specified range of p_{max} a plausible assumption would be to set p_{max} equal to r_1. If p itself is within the limits of p_{max} while r_1 is outside p_{max} can be chosen as a value between that of the base level of p and the upper limit (.70). However, if the base level of p is low, r_1 cannot be relied upon because of its high variability in this region. 12/ In such cases any value between 0.5 and 0.70 can be chosen. However in all cases projections on the basis of alternative assumptions regarding p_{max} can be considered. A higher p_{max} value implies a lower $m(p)_{max}$ and therefore a lower pace of shift from the agricultural sector. The converse is true for a lower value for p_{max}. These could be taken into account in setting up the alternative assumptions. The resulting curves corresponding to alternative "migration paths" can be geared to implicitly reflect particular development planning policies regarding the pace of shift of population from the agricultural sector to the non-agricultural sector.

Illustration of the method of Projection with respect to Iran

25. In the following table, the data on the economically active population in agriculture and non-agriculture and their growth rates as reflected by the 1956 and 1966 population censuses of Iran are shown.

Table 1. Economically Active population in agriculture and non-agriculture 1956 and 1966 13/

	Population('000)		Annual Growth Rates(%)
	1956	1966	1956 - 1966
Economically Active Pop. in Agr. (EAA)	3326	3774	1.4
Economically Active Pop. in Non-Agr. (EA-EAA)	2740	4068	4.0
Economically Active Pop. (EA)	6066	7842	2.6
EAA/EA	.5483	.4812	

26. Thus using the assumption that EAA/EA = A/T, the agricultural and non-agricultural population for the two census years are estimated as in Table II.

12/ In accordance with the assumption of p increasing continuously to a point near 1 there are certain constraints on the variability of r_1. When the non-agricultural population comprises only a small minority of the population r_N can be considerably higher than r_T. However as its size in relation to that total population, i.e. p, increases the weight for r_N in r_T also increases to that the difference between r_N and r_T decreases. Thus r_T/r_N tends to 1 as p also tends to 1.

13/ Source: ILO, Employment and Income Policies for Iran, Geneva, 1973, page 31.

Table II.

Agricultural Population and Non-Agricultural Population 1956, 1966

	Population ('000)		Annual Growth Rates(%)
	1956	1966	1956-1966
Agricultural Population (A)	10626	12533	1.6
Non-Agricultural Population (N)	8755	13514	4.4
Total Population (T) 14/	19381	26047	3.0
A/T	.5483	.4812	

27. The base value of p (in 1966) is .52 and r_1, corresponding to the growth rates of the total population and non-agricultural population during 1956-1966, is 0.676. It is therefore plausible to assume, as Alternative I, that $p_{max} = 0.676$.

28. As a second alternative, a lower value for p_{max} implying a faster pace of change in the sectoral proportions until the maximum point is reached is assumed. Accordingly p_{max} is set at 0.625.

29. For the purpose of obtaining an estimate of r_m^i, the population projection prepared by the Plan and Budget organisation of Iran (Assumption I) is used.15/ These projections are given in the following table:-

Table III.

Population Projections for Iran 1972-1992

Year	Population in thousands	Annual Growth rates
1972	31,045	2.95
1977	36,921	2.89
1982	43,469	2.71
1987	47,366	2.49
1992	53,532	

14/ The 1966 total population is the adjusted census figure. See Population Projection of Iran 1966-1991, Statistical Centre of Iran, Teheran mimeographed, p.12, Table 2, May 1972. The 1956 population is obtained on the assumption that the inter-censal population growth rate is 3 percent per annum (as evaluated by the Statistical Centre and the Plan and Budget Organization).

15/ Plan and Budget Organization, Iran's Population - Past, Present and Future, mimeographed, Teheran, November 1973.

30. In view of the fact that the proportion of agricultural population in the total population in 1966 is not much smaller than p_{max} the maximum agricultural population can be expected during the next 10 to 15 years. Therefore r'_m is taken as .029. Given the latter and p_{max}, r'_N is easily calculated using formula (4) and $m(p)_{max}$ using formula (3).

31. The available estimates of the non-agricultural population and total population correspond to the period 1956-1966. Therefore the interpolated values of p and m(p) for 1961 are taken as p_{obs} and $m(p)_{obs}$ respectively.

32. Thus the input data for the two alternative curves are calculated as follows:

	p_{obs}	$m(p)_{obs}$	p_{max}	$m(p)_{max}$
Alternative I	.4855	.0070	.676	.0094
Alternative II	.4855	.0070	.625	.0109

33. The resulting alternative functions to be used for projecting p are the following:-

Alternative I

$$m(p) = 0.1.582 \quad p^{2.69537} \quad (1-p)^{1.29189}$$

Alternative II

$$m(p) = 18.986 \quad p^{7.0502} \quad (1-p)^{4.2304}$$

34. The proportion of non-agricultural population in the total population estimated as 0.5188 in 1966 is projected up to 1992 in intervals of one year; each subsequent annual increase in the population being obtained iteratively from the two functions determined. The annual projections under the two alternative assumptions are presented in Table IV.

Table IV. Projected Proportion of Non-Agricultural Population in Total Population (p) for Iran, each year, 1966-1992

Year	P	
	Alternative I	Alternative II
1966	.5188	.5188
1967	.5265	.5272
1968	.5343	.5360
1969	.5423	.5451
1970	.5504	.5545
1971	.5586	.5642
1972	.5670	.5742
1973	.5755	.5844
1974	.5842	.5949
1975	.5929	.6056
1976	.6018	.6164
1977	.6107	.6273
1978	.6198	.6382
1979	.6289	.6490
1980	.6382	.6598

Year	P	
	Alternative I	Alternative II
1981	.6674	.6704
1982	.6568	.6807
1983	.6661	.6908
1984	.6755	.7006
1985	.6849	.7100
1986	.6943	.7190
1987	.7037	.7276
1988	.7130	.7359
1989	.7223	.7437
1990	.7315	.7511
1991	.7406	.7581
1992	.7497	.7648

35. Applying the projected values of the proportion to the corresponding projections of total population (Assumption I) the projections of the agricultural and non-agricultural populations are obtained. These are presented together with the implied growth rates for the two alternative assumptions in Table V.

Table V. Projections of agricultural/non-agricultural population and related growth rates 1972-1992

	Population ('000)					Annual Growth Rates (%)			
	1972	1977	1982	1987	1992	1972 - 77	1977 - 82	1982 - 87	1987 - 92
Alternative I									
Agricultural Pop. (A)	13,442	13,984	14,232	14,035	13,399	0.8	0.4	-0.3	-0.9
Non-Agr. Pop. (N)	17,603	21,937	27,239	33,331	40,133	4.5	4.4	4.1	3.8
Total Pop. (T)	31,045	35,921	41,469	47,366	53,532	3.0	2.9	2.7	2.5
A/T	.4330	.3893	.3432	.2963	.2503				
Alternative II									
Agricultural Pop. (A)	13,219	13,388	13,241	12,902	12,591	0.2	-0.2	-0.5	-0.5
Non-Agr. Pop. (N)	17,826	22,533	28,228	34,464	40,941	4.8	4.6	4.1	3.5
Total Pop. (T)	31,045	35,921	41,469	47,366	53,532	3.0	2.9	2.7	2.5
A/T	.4258	.3727	.3193	.2724	.2352				

36. On the basis of assumptions concerning sex-age-specific activity rates the Plan and Budget Organization of Iran hasderived projections of the economically active population corresponding to the total population projections. Thus applying the projected values of the proportion of non-agricultural population in the total population, the agricultural and non-agricultural segments of the economically active population also are obtained. These are presented together with the implied growth rates in Table VI.

Table VI. Projections of population economically active in agriculture and non-agriculture and the corresponding growth rates, 1972-1992

	Population ('000)					Annual Growth Rates(%)			
Alternative I	1972	1977	1982	1987	1992	1972 - 77	1977 - 82	1982 - 87	1987 - 92
Econ.Act.Pop. in Agr.	3,832	3,986	4,119	4,159	4,117	0.8	0.7	0.2	-0.2
Ec.Act.Pop.in Non-Agr.	5,019	6,254	7,883	9,876	12,332	4.5	4.7	4.7	4.5
Ec.Act.Pop.	8,851	10,240	12,002	14,035	16,449	2.9	3.2	3.2	3.2
Alternative II									
Ec.Act.Pop.in Agr.	3,769	3,816	3,832	3,823	3,869	0.2	0.1	-0.0	0.2
Ec.Act.Pop.in Non-Agr.	5,082	6,424	8,170	10,212	12,580	4.8	4.9	4.6	4.3
Ec.Act.Pop.	8,851	10,240	12,002	14,035	16,449	2.9	3.2	3.2	3.2

The UN Recommendations for the 1970 Population Censuses related to the segments of Population engaged in and dependent on Agriculture and the need for supplementing them.

1. Economically Active Population in Agriculture and Related Activities

The economically active population comprise all persons of either sex who furnish the supply of labour for the production of economic goods during the time reference period chosen for the census. It includes both persons in the civilian labour force and those serving in the armed forces. The civilian labour force comprises both persons employed and those unemployed during the time reference period. The UN recommendations for the 1970 population censuses provide for the collection and tabulation of data on the economically active population by branches of economic activity (industry), sex, age, and urban/rural residence.

The recommended tabulation is illustrated below: 1/

Illustration I: Economically Active Population by Industry, Age and Sex

Geographic Division * sex and industry	Age (in years)								
	All ages	Under 15	15–19	20–14	...	...	70–74	75 and over	Not stated
Both sexes Total Econ.Act.Pop.									
Major Division 1									
Division 11									
Division 12									
etc									
Major Division 2									
Division 21									
Division 22									
etc									
Male (as for Both sexes)									
Female (as for Both sexes)									
Total country. Distinguish urban and rural.									

1/ United Nations, Principles and Recommendations for the 1970 Population censuses Statistical Papers, Series M, No.44, New York 1967, p.102

The classification of the economically active population by branch of economic activity according to the latest version of the UN International Standard Industrial classification of All Economic Activities provides for a separate category consisting of agriculture, forestry, fishing and hunting (Major Division 1) with subdivisions for each of the components.2/ But the recommendations do not appear to give sufficient priority to the detailed classification by sub-division so that, as in the past, many countries will not be encouraged to tabulate their data in such detail. As it is important to obtain separate data on the three main activities related to agriculture - agriculture, forestry and fishing - it is essential to put sufficient emphasis on the recommendations to this effect.

2. Population Dependent on Agriculture and Related Activities

The population dependent on agriculture (including fishing, forestry and hunting) or agricultural population is defined as including those economically active in agriculture, together with their dependents.3/ It should include persons of all ages and both sexes. If the members of a household whose head is engaged in agriculture are themselves engaged in other (non-agricultural) activities, they are not included in the population dependent on agriculture.

The UN recommendations for the 1960 population censuses provided for the collection and tabulation of data on the population dependent upon branches of economic activity, agriculture in particular.4/ No metnion of this is made in the recommendations for the 1970 population censuses although provision is made for the collection and tabulation of data which yields information on the number and sex and age composition of the population which is primarily dependent upon others for economic support and those who are not so dependent. The related table which classifies the population by main source of livelihood during a substantial period of time (e.g. six months or longer) by sex, age and urban/rural residence is shown below.5/

2/ United Nations, International Standard Industrial Classification of all Economic Activities, Statistical Papers, Series M. No.4, Rev.2, New York, 1967, p.26

3/ United Nations, Principles and Recommendations for National Population Censuses, Statistical Papers, Series M.No.27, New York, 1968, p.16

4/ United Nations, Principles and Recommendations for National Population Censuses, op.cit., p.19.

5/ United Nations, Principles and Recommendations for the 1970 Population Census, op.cit., pp.136,137.

Geographic Division* sex and age	Total Population	Main source of livelihood					
		Economic Activity	Pensions of all kinds	Benefits and assistance (other than pensions)	Property or other investments	Support by another person or persons	Not stated
Both sexes							
All ages							
Under 15							
15-19							
20-24							
...							
70-74							
75 and over							
Not stated							
Male as for both sexes							
Female as for both sexes							

(a) Total country (b) each major civil division. Distinguish urban and rural for (a) and (b)

In this connection, the determination of the population dependent on a particular type of economic activity necessitates the classification of the data in column 2 of the table by i) branch of economic activity and ii) the dependents corresponding to them. In other words each dependent has to be matched to his or her supporter deriving his living from a particular economic activity. This means that firstly, a question must be asked in the census on the branch of economic activity of those reporting economic activity as their main source of livelihood; secondly, in order to identify the actual supporter of each dependant within the same household, another question must be asked; thirdly, if the supporter lives in a different household from his dependant, additional questions will be required to identify him satisfactorily. The complex nature of collecting such data, in addition to the measurement problems usually encountered in gathering dependency statistics by type of economic activity using the family member's main source of livelihood as the criterion, were probably the reasons that prompted the UN not to make any further recommendations concerning dependency data in the programme for the 1970 censuses.

However, because of the importance of obtaining estimates of the size, structure, trends and urban/rural distribution of the population dependent on agriculture, forestry and fishing separately, efforts should be made in connection with censuses that are still at the planning stage to include additonal questions, as indicated above, in the questionnaires so that some data, even if not fully satisfactory, on the agricultural population can be obtained. The experience gained from these attempts would be extremely valuable in formulating suitable recommendations regarding the 1980 population censuses (as also agricultural censuses).

In addition, even in the case of censuses that are already at the processing stage, some steps could be taken to obtain some tabulations which at least would yield, or could be used to derive, satisfactory estimates of the size and sex-age distribution of the population dependent on agriculture, forestry and fishing. This will ential sorting out at the processing stage, perhaps on a sample basis, all the households, whose head has been reported as economically active in agriculture, forestry and fishing, and to classify all the economically active members of these households 6/ by type of economic activity, sex, age, urban/rural residence etc. Such classifications will provide data on the persons economically active in agriculture, fishery and forestry as well as the non-active (all not necessarily dependent on agriculture) with respect to households whose heads are reported to be engaged in these activities and then these will be a factual basis for estimating the size and structure of these segments of the population.

The suggested form of the tabulations that will be necessary are given below (Illustrations III and IV). The example given in the two tables refers to agriculture only (excluding forestry and fishing) but similar sets of tables will be necessary with respect to households whose heads are economically active in forestry as well as fishing.

6/ Separate tables should be prepared for households whose heads are active in agriculture, forestry and fishing respectively in order to arrive at dependency tables for each of these sectors.

Illustration III: Population in Households whose Heads are reported as economically active in agriculture by status of activity, age and sex.

Geographical Division* sex and age	Total		Economically Active		Not Economically Active	Not stated
	Heads of Households	Others	Employed	Unemployed		
Both sexes						
All ages						
0-4						
5-9						
...						
...						
70-74						
75 and over						
Not stated						
Male (as for Both sexes)						
Female (as for Both sexes)						

* Total country. Distinguish Urban and Rural.

Illustrative IV: Economically Active Population of Households whose Heads are reported as engaged in Agriculture by industry, sex and age

Geographic Region* sex and age	Economically Active Population (including heads of households)	Industry		Not Stated
		Agriculture	Other Activities	
Both sexes				
All ages				
0-4				
5-9				
...				
...				
70-74				
75 and over				
Not stated				
Males (as in Both sexes)				
Females (as in Both sexes)				

* Total country. Distinguish Urban and Rural