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SOME IMPLICATIONS OF POPULATION GROWTH

IN UGANDA

INTRODUCTION.

In Part I of this paper projections of the African population[1] of Uganda are made for future years at various rates of growth. Part II attempts to separate this total population projection into two segments, urban and rural. Part III attempts to separate the total household population of Uganda into two segments, those supported by the modern sector, and those supported in the traditional sector. Part IV presents some possible implications of the arithmetic of this exercise.

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[1] In this paper I deal only with the African population. The non-African population is so small that the results are not altered by its exclusion.

The projections in this paper are not to be taken as predictions. They are simply arithmetic calculations using base figures and growth rates which I hope are made explicit at each step.

Part I The Growth of Population in Uganda.

The 1948 Census showed an African population of 4,917,555. The 1959 Census showed an African population of 6,449,558. The intercensal rate of growth was 2.5 per year. The African population for the years since 1959, as reported in the Statistical Abstract, has been calculated by applying a 2.5% per year growth rate to the 1959 population.

A sample survey of the African population in 1959 provided data which was used to calculate the crude birth rate and crude death rate. These figures (birth rate of 42 per 1.000 per year and death rate rate of 20 per 1,000 per year) give a rate of natural increase of 22 per 1,000 per year. When immigration is taken into account, it is seen that the estimates from the sample survey are consistent with the growth rate derived from the census figures.

In 1948 the estimate of the birth rate was 42 per 1,000 per year and the estimate of the death rate was 25 per 1000 per year. For the years 1948 to 1959 it appears that fertility has remained unchanged and that mortality has declined. This experience is similar to that of many countries having characteristics similar to those of Uganda.

The future growth of the African population of Uganda will be determined by the trends in fertility and mortality, and, to a lesser extent, in immigration. It is not necessary here to go into a detailed discussion of the possible movements of these variables. It will be sufficient to remark that the usual expectation for countries with populations similar to Uganda's is that fertility will remain high for some time to come and that mortality will continue to decline. Table I gives recent UN figures on birth and death rates, and the resulting population growth rates for regions and sub-regions of the world.

Table I:

Rate of Increase, Birth and Death Rates for the World and Regions 1958 - 1963

	birth rate per 1,000	death rate per 1,000	rate of population increase (%)
World Total	34	16	1.8
Africa	46	23	2.3
Western	54	28	2.6
Eastern	43	23	2.0
Northern	44	19	2.5
Middle	40	25	1.5
Southern	41	18	2.3
Northern America	24	9	1.6
Latin America	40	14	2.7
Tropical South	43	15	2.8
Middle Am. Mainland	43	13	3.0
Temperate South	29	10	1.9
Caribbean	38	17	2.1
East Asia	33	19	1.4
Mainland	35	21	1.4
Japan	17	7	1.0
South Asia	42	20	2.2
Middle South Asia	42	21	2.1
South East Asia	42	18	2.4
South West Asia	42	18	2.4
Europe	19	10	0.9
Oceania	27	11	2.1
USSR	24	7	1.6

Source: UN, Demographic Year book 1964, p. 111. This
           publication warns that these "figures are estimates
           of the order of magnitude and are subject to a
           substantial margin of error".

        It will be seen that birth rates are slightly higher
for the African region than for the other underdeveloped
regions of the world (Latin America, East Asia, and South
Asia). Death rates for Africa are slightly higher than for
East Asia and South Asia, and significantly higher than for
Latin America. As the death rates in Africa continue to
fall and approach those experienced in Latin America, the
rate of population growth in Africa can be expected to
approach that of Latin America.

        Barring catastrophies, and assuming no major changes
in the trends in immigration, the population of Uganda will
continue to increase in the near future. A rate of growth
of 2.5% per year can be taken as the minimum value for the
rate of increase; higher rates are more likely. Table II
shows the projected African population at some future dates
under various rates of growth. The mid-year 1959 population
is used as the base.

        A more accurate projection would result if the rate of
decline in mortality were taken into account; that is, a
projection based on, for example, a rate of growth of 2.5% for
1959-1965, 2.6% for 1966-1970, 2.7% for 1971-1975, etc.[1]
But because only a rough order of magnitude is necessary here,
I have given projections based on constant rates of growth
only.

Table II:

Prospective African Population of Uganda under Various Rates of Growth (millions)

			Rates of Growth			
Year	2.5%	2.6%	2.7%	2.8%	2.9%	3.0%	3.5%
1959	6.425	6.425	6.425	6.425	6.425	6.425	6.425
1965	7.451	7.495	7.539	7.583	7.628	7.672	7.865
1970	8.429	8.522	8.612	8.705	8.800	8.894	9.380
1975	9.537	9.689	9.840	9.993	10.153	10.311	11.031
1980	10.789	11.016	11.242	11.473	11.714	11.954	13.232
1985	12.207	12.525	12.844	13.171	13.514	13.858	15.715
1990	13.810	14.240	14.674	15.118	15.628	16.066	18.664
1995	15.624	16.191	16.765	17.359	17.988	18.626	22.167
2000	17.676	18.409	19.153	19.928	20.754	21.593	26.080

Years Needed to Double Population

28	27	26	25.1	24.2	23.4	20.1

[1] The Kampala/Mengo Regional Planning Mission does make a
projection based on gradually falling death rates. Their
"low" estimate of African population in the year 2000 is
18.630 million; the "high" estimate is 20.450 million.
Kampala/Mengo Regional Planning Studies No.1, Population
and Land Requirement, (Kampala, February, 1965), Appendix
A, Table I.

Part II The Urban and Rural Populations of Uganda.

In this part the total population of Uganda is
separated into two segments, urban and rural. The urban
population is found first, and the rural population is
found as the residual. If the usual international standard
of urbanization - the proportion of the population living in
localities of 20,000 or more inhabitants - were applied to
Uganda, the level of urbanisation would be about 1% because
only Kampala and Jinja would qualify as urban. The Kampala/
Mengo Regional Planning Mission considered as urban all the
towns, periurban areas, and the trading centers enumerated
in the Census of 1959. Using the Mission's concept of
urban, and again considering only the African population,
there were in 1959 about 248,000 "urban" Africans out of a
total African population of about 6,450,000, or 3.8%.

Our next problem is to determine how this proportion
can be expected to grow in the future. The Mission mentioned
above presented two estimates for urban population growth.
The "low" estimate was based on the 1948-1959 rate of growth
of Greater Kampala, Jinja and Entebbe. The "higher" estimate
was designed to give an urban population that is 20% of the
total population in 2000/is 2.474 million; the "high" estimate
is 3.887 million.[1] This gives a "low" rate of growth of
urban population of about 5.8% and a "high" rate of about
6.9%. These rates are applied to the 1959 urban population
to give the results in Table III. I am here, as in Part I,
using constant rates of growth, whereas the Mission uses a
more complicated procedure.

Table III:

Prospective Urban Population (Millions)

Year	Urban Population Growth Rate	
	5.8%	6.9%
1959	.248	.248
1965	.348	.370
1970	.461	.517
1975	.611	.721
1980	.811	1.007
1985	1.074	1.406
1990	1.492	1.963
1995	1.888	2.740
2000	2.503	3.825

The results of the projections made earlier will now be
combined to show the size of what will be called the "rural
population". Rural population is the remainder of the sub-
traction of the urban population (Table III) from the total
population (Table II). Table IV gives the rural population
for only four possible combinations of total population
growth and urban population growth.

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[1] Ibid., Appendix A, Tables 6, 7, and 8.

/ The "low" estimate of the African urban population for the year
2000

Table IV:

Rural Population (Millions)

	"Total" growth	2.5%		3.0%	
Year	"Urban" growth	5.8%	6.9%	5.8%	6.9%
1959		6.177	6.177	6.177	6.177
1965		7.103	7.081	7.324	7.302
1970		7.968	7.912	8.433	8.377
1975		8.926	8.816	9.700	9.590
1980		9.978	9.782	11.143	10.947
1985		11.133	10.801	12.784	12.452
1990		12.318	11.847	14.574	14.103
1995		13.736	12.884	16.738	15.886
2000		15.173	13.851	19.090	17.768

It is interesting to determine how long the rural population will continue to expand in absolute numbers under the various assumed rates of growth of total and urban population. For total population growth at 2.5% per year and urban population growth at 5.8% per year, the rural population will expand in absolute numbers for 76 years (from 1959) and will reach approximately 24 million as a peak. For total population growth at 2.5% per year and urban growth at 6.9% per year, the rural population reaches a peak of approximately 15.3 million after 54 years. For total population growth at 3.0% per year and urban growth at 5.8% per year, the rural population reaches a peak of approximately 54 million after 97 years. For total population growth at 3.0% per year and urban growth at 6.9% per year, the rural population reaches a peak of approximately 25 million after 66 years. We see that under various possible rates of growth of total and urban population, rural population will continue to grow for a very long time. An actual cessation of growth of the rural population in Uganda is a very distant possibility.

Part III Modern and Traditional Employment in Uganda.

In this part the total population of Uganda will be divided into two segments: 1) households supported by wage/salary employment in the "modern" sector, and 2) households supported by self-employment in what is termed the "traditional" sector. The following assumptions are made.

      1) There are 4.7 persons per household (figure from Census of 1959).
      2) There is one economically employed person per household. This person is either employed in the modern sector or self-employed in the traditional sector.
      3) The rate of population growth does not affect employment in the modern sector.

It is first necessary to get figures for the number of households (Table V) at various future dates under various rates of population growth. The figures for total population in Table II are simply divided by 4.7 (number of persons per household) to get the figures in the following Table. Not all the entries in Table II are used, and some additional years are added.

Table V:

Number of Households (millions) at Various Rates of Growth

Rates of Population Growth

Year	2.5%	2.6%	3.0%	3.5%
1959	1.367	1.367	1.367	1.367
1962	1.469	1.476	1.493	1.515
1970	1.793	1.813	1.892	1.995
1980	2.295	2.343	2.543	2.815
1981	2.352	2.404	2.619	2.913

Now projections are made of employment in what I have termed the modern sector. This sector provides wage/salary employment, and the amount of employment is reported yearly in the Enumeration of Employees. The reported figure for 1959 was 224,260; for 1962 it was 216,773.

I have used the rates of growth given in P.G. Clark's[1] projection model to calculate figures for employment at various future dates. Clark has estimated the effects of doubling per capita income in Uganda from 1966 to 1981. If this goal is to be reached, urban product must increase at 8.9% per year, construction product at 15.7% per year,[2] and agricultural product at 6.7% per year.[3]

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1. P.G. Clark, Development Planning in East Africa, pp.92,100-101.
2. Mr. C. Vincent has brought to my attention that this rate of growth is too high. If Clark's figures for total construction product are used, the rate of growth is 14.5%. My computations are based on the published figure.
3. Agricultural product includes cotton ginning, coffee curing, sugar manufacture, forestry, fishing, and hunting; urban product is all other elements of monetary GDP except

Foot Note:

    construction product. The employment figures for
these sectors use the same definition. (Clark, op.cit.,
p. 36.)

Clark assumes that productivity will rise in the urban
sector and the construction sector at 5.0% per year. I
assume that productivity increases in the "modern" agricul-
tural sector at 5.0% per year. The result of these
assumptions is that urban employment grows at 3.9% per year
(8.9% – 5.0%); construction employment at 10.7% per year
(15.7% – 5.0%); and agricultural employment at 1.7% per
year (6.7% – 5.0%). I apply these rates to the 1962 employment
figures to obtain the employment level for future years
(Table VI).

Table VI:

Number (Millions) of Wage/Salary Employees

Year	Total	Urban	Agriculture	Construction
1959	.224	.137	.055	.032
1962	.217	.131	.057	.029
1970	.308	.178	.065	.065
1980	.516	.261	.077	.178
1981	.548	.271	.079	.198

    Assumption (2) says that each of the persons counted
in Table VI supports one household. These figures are simply
subtracted from the figures in Table V to give the number of
households supported by self-employment in the traditional
sector as a remainder.[1] These results are given in Table VII.

Table VII:

Number of Households (millions) in the Traditional Sector

Total Population Growth Rate

Year	2.5%	2.6%	3.0%	3.5%
1959	1.143	1.143	1.143	1.143
1962	1.252	1.258	1.276	1.298
1970	1.485	1.505	1.584	1.687
1980	1.779	1.826	2.027	2.302
1981	1.804	1.855	2.071	2.365

[1] Because the Enumeration of Employees does not cover those
persons employed in "peasant agriculture or those employed
as "domestics", the category "self employed in the traditional
sector" will include those households supported by such
employment.

I have here included a column for population growth at 2.6%. This is the population growth that Clark used in his projection model. I make the assumption (3) that a lower or higher population does not affect the employment prediction in Table VI. Clark used a population based on a 2.6% growth rate to enable him to calculate the total product needed in 1981 to support a doubled per capita income. Unchanged employment projection but a lower (higher) population projection will bring about more than (less than) a doubling of per capita income.

It is interesting to see the proportion of the population supported by traditional agriculture and how it changes under various population growth rates with the given employment increases of Table VI. In 1959, under the definitions used, the traditional sector contained 84% of the households of the country. By 1981, this figure falls to 77% if population grows at 2.5%, to 79% if population grows at 3.0%, and to only 81% if population grows at 3.5%. It is obvious from these figures that even with the low estimate of population growth and with very optimistic rates of modern sector growth that the vast majority of the people in Uganda will for some time in the future be supported by the traditional sector.

Can the figures for "modern sector" employment be reconciled with "urban population"? Is there reason to use the terms synonymously? The problem is caused by the fact that if we expand the 1959 employment figure by 4.7 times (in accordance with our assumption 1), we get a figure of 1.052 million for the number of people supported by modern sector employment - yet in 1959 the urban population was only .248 million.

A number of points can be made:

1) Not all the activities covered by the "modern sector" take place in urban areas, so we should not expect a coincidence.

2) It is obvious from the statistics that in many cases employees in the modern sector do, without doubt, live in the rural areas. Example: Masaka town population (1959) = 2,457; employment (1959) = 2,939.

3) A factor which works the opposite way is the fact that people employed in domestic households and living in urban areas are not counted in modern sector employment.

For these reasons one must be careful when attempting to equate "urban" with "modern" and, conversely, "rural" with "traditional".

Part IV Some Implications of Population Growth in Uganda.

In Part II we saw that the rural population of Uganda will continue to grow for a very long time. In Part III a similar idea was expressed by showing that even at very rapid rates of modern sector growth, the traditional sector would remain the dominant sector for a very long time. Now some implications of this are discussed very briefly under three headings:

1) Lewis-type models and concept of development,

2) agricultural investment policy,

3) population growth and population density.

1)   Lewis-type models and concept of development.

The model of economic development presented by W.A. Lewis [1] has been applied to African countries. In this model the economy is viewed as being composed of two sectors, a modern ("capitalist") sector and a traditional ("subsistence") sector. Capital is accumulated in the modern sector and combined with labor drawn from the traditional sector. The process of economic growth in this model consists in the expansion of the modern sector in both absolute and relative terms. [2] More recently, Ranis and Fei have presented what is basically an elaboration of the Lewis model. They make the relative expansion of the modern sector the key element in their definition of development. "In such a dualistic (two-sector) setting the heart of the development problem may be said to lie in the gradual shifting of the center of gravity of the economy from the agricultural to the industrial sector." [3]

If development consists in the expansion of the modern sector relative to the traditional sector, then population growth becomes very important. The rate of population growth affects the speed with which the "center of gravity of the economy" can be shifted.

We saw in Part III that with population growth of 2.5%, and with Clark's projection of modern sector growth, the modern sector expands from supporting 15% of the population in 1962 to supporting 23% in 1981. With population growth at 3.0%, the expansion was from 15% to 21%. It is evident that when the modern sector is such a small proportion of the economy, even rapid rates of growth in the modern sector produce only slow changes in the proportion of the economy supported by it when the total population is growing rapidly.

Let us make the highly unrealistic assumption that there is no population growth from 1962 to 1981 and attempt to measure the effect. This would require that the birth rate fall to the level of the death rate. (Even if this took place, the birth rate would still be approximately as high as the birth rate of Europe. See Table I). There is no reason to suppose that total product as projected by Clark would be any smaller than if population grows at his assumed rate of 2.6%.

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[1] W.A. Lewis, "Economic Development with Unlimited Supplies of Labor", Manchester School, May, 1954, and "Unlimited Supplies of Labour: Further Notes", Manchester School, January, 1958.

[2] Lewis, 1958, p. 10.

[3] G. Ranis and J. Fei, Development of the Labor Surplus Economy, 1964, p. 7. See also Ch. 4.

The size of the labor force during 1962-1981 will be practically unaffected by the lower fertility. And, as Coale and Hoover state: "with fewer dependents, the population with reduced fertility could invest more and hence gradually produce more."[1] With the same labor force, and the same or greater capital formation, the total product could be as large as projected by Clark. And with the same population as 1962, per capita income in 1981 would be 3.25 times higher.

I suggest that we have here a measure of the "cost" of population growth. With population growth at 2.6% per year, per capita income doubles from 1962 to 1981, and the modern sector expands from supporting 15% to 23% of the population. With no population growth, per capita income increases 3.25 times, and the modern sector expands from supporting 15% to 37% of the population.

If total employment in the modern sector expands, as shown in Table VI, from 217,000 in 1962 to 548,000 in 1981, the rate of growth of employment is approximately 5.0% per year. This is a very high rate. A comparison with the rates planned in Kenya and Tanzania shows that it is probably much too high. The Kenya planned increase in employment is at 2.8% per year. Tanzania plans to increase modern sector employment ("largely" wage and salary employment) 100% over 1964-1980, a rate of growth of 4.4% per year.[3]

In 1962 the ratio of traditional employment to modern employment in Uganda was 85:15. Table VIII shows how many years are required for a transformation of an economy from a traditional: modern employment ratio of 85:15 to a developed level of 20:80, at various rates of total population growth and modern sector employment growth. This Table makes it clear that in a situation in which population is growing at a high rate it takes very high rates of growth of modern sector employment to bring about transformation.

Table VIII:

Years Required for a Transformation from 85:15
(Traditional: Modern) to a Developed Level of 20:80

Modern Sector Employment Growth Per Year

		6%	5%	4%	3%
Total	0%	28	34	43	57
Population	1.0%	34	43	57	84
Growth	1.5%	38	49	68	112
Per	2.0%	43	57	84	168
Year	2.5%	49	68	112	335
	3.0%	57	84	168	∞

Ranis and Fei in their elaboration of the Lewis model make the rapidity of the rate of reallocation of labor from the traditional to the modern sector the criterion of a good or successful development effort.[4]

1 A. Coale and E. Hoover, Population Growth and Economic Growth in Low-Income Countries, p.333.

2 Kenya Development Plan 1964-1970, p. 135

3 Tanganyika Five-Year Plan, p. 73

4 Ranis and Fei, op. cit., p. 136.

They discuss three possible cases: the "stagnation" case in which the population and the modern sector labor force grow at the same rate; the "failure" case in which population grows faster than the modern sector labor force; and the "success" case in which the modern sector labor force grows faster than population.[1] The point I am making is that even the success case - and all but one of the cases presented in Table VIII are "sucesses" - may make development a very long term process if population is growing rapidly.

2)   Agricultural Investment Policy

Once it is made clear that Uganda is at present overwhelmingly a rural-agricultural society and will probably remain so for a very long time, it is apparent that a proper allocation of investment resources both to agriculture as a sector and within the agricultural sector is very important.

Even though in the Lewis-type model attention is focused on the modern sector, there are strong reasons for investment in agriculture. The first concerns the problem of demand. Is not an expansion of the productivity and incomes of the agricultural population in Uganda a necessary condition for expansion of the modern sector? Another reason hinges on the definition of development. If development is defined to be an increase over time in the per capita income of the population, and if most of the population is in agriculture, then it can be argued that efforts must be made to improve the productivity and incomes of the agricultural population.[2]

I have made the obvious point that attention must be given to the share of investment funds going to agriculture as opposed to non-agriculture. Here I want to mention just one aspect of the distribution of investment within the agricultural sector in Uganda in the light of the population figures given earlier.

It is thought that mechanization through "group farming" will bring about a transformation of agriculture. But is it realized that even with a rapid growth in the number of group farms only a very small proportion of the agricultural population can be accomodated? If in the next five years 100 additional farms are set up (20 per year), and each consists of 150 families, the total number of group farm families is 15,000. That is less than one-half of one year's increase in agricultural population. In spite of rapid expansion, less than 2% of the agricultural households in Uganda can by 1970 be on group farms.

Each of the group farms needs a trained agriculturalist as a farm manager. Can Uganda afford to invest 100 trained agriculturalists in such a small fraction of her farm population? Could these agriculturalists have more effect as extension workers, or perhaps in primary education, since most of the primary school gradudates will find themselves in agriculture?

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[1] Ibid., pp. 112-113. It is interesting to note that under the Ranis-Fei criterion, Kenya's planned effort is not leading to development: with population growth at 3.0%, and planned modern sector employment growth of 2.8%, Kenya falls into the "failure" category.

[2] See Ranis and Fei, op.cit., for a very complete analysis of the relationship of the agricultural and modern sectors.

3)   Population growth and population density.

        It is sometimes said that Uganda has no population
problem. If this is taken to mean that population "density"
is not a serious problem, except in a few areas, it is
probably correct. But I think that from the point of view of
economic development Uganda can be said to have a problem of
population "growth". Most of this paper has been concerned
with the problem of "growth".

        With continued rapid population growth, however, the
problem of population density inevitably arises. In this
respect Uganda does have a breathing space before densities
approaching those found in some of the countries in Asia are
reached.   It should be realized that at rates of growth of
2.5-3.0% open spaces are soon filled. A rate of growth of
3.0% can quadruple a population in 47 years.