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The Poverty Demography Trap in Third World Countries

Empirical Evidence from Tanzania

Asmerom Kidane





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Abstract

This study suggests that reducing fertility should be a primary policy variable used in concert with macroeconomic policies and poverty reduction strategies. It empirically verifies the existence of a poverty demography trap by analyzing survey data from two regions in northern Tanzania. It first summarizes the macro and microeconomic issues of the relationship between GDP and population growth, highlighting poverty and demographic variables in Africa and in Tanzania. The number of children ever born (CEB) and household size in the study area indicate a high rate of population growth. Non-nuclear household members are about 23 percent, indicating heavy population pressure on household resources.

The demographic variables were classified with selected poverty indicators (undernutrition and malnutrition; monetary expenditure; and access to land, clean water, sanitary facilities, and energy sources). The results showed moderate undernutrition and acute malnutrition associated with CEB and household size. Large households tend to spend much less on food, compared to smaller households. The mean weekly expenditure among households with six members is a meager US$5. As much as 50 percent of farming households do not own land and depend on wood for energy needs. Access to clean water, modern toilet facilities, and electricity is very poor, especially among large households. Getting out of the poverty trap implies reducing fertility and vice versa.

Key Words: poverty, demography, household size

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The Poverty Demography Trap in Third World Countries: Empirical Evidence from Tanzania

Asmerom Kidane*

Introduction

Many third world countries, including those in sub-Saharan Africa, are afflicted with rampant poverty. The reasons are many and varied. Some reasons widely held by donors, recipients, and international financial institutions include the inability of countries to open up their economies with painful structural adjustment programs, poor physical and social infrastructure, and absence of appropriate incentives to attract potential investors. Another reason that has contributed to the magnitude and depth of poverty is the high rate of population growth. Even though the relation between population growth and economic development has been the subject of theoretical and empirical investigations, population growth has been and continues to be treated as an exogenous effect and not a policy instrument. In other words, with appropriate macroeconomic policies, the per capita gross domestic product (GDP) of developing countries could increase, poverty could be reduced, and many countries could reach a higher level of development, resulting in a lower rate of population growth.

Those who argue in favor of treating population growth as an endogenous variable believe that, unless the current high rate of population growth in third world countries is reduced, the high rate of poverty—in both magnitude and depth—will continue to exist. They highlight the fact that in almost all developing countries the poor appear to have large families, commonly referred to as a "demography poverty trap." This term refers to the fact that many developing countries exhibit a higher rate of population growth and a lower growth of per capita GDP. A fast-growing population results in many dependents, which in turn reduces aggregate savings and investment. Unless the population grows at a lower rate, developing countries cannot attain sustainable economic development. In other words they are in a "demography poverty trap." In this paper, we attempt to show the relation between poverty indicators and demographic variables, using a 2008 household survey on poverty profiles in northern Tanzania (the Lake Victoria area).

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This paper has six parts. Part 1 summarizes the relationship between population growth and economic development. Part 2 discusses the demographic and economic crisis in Africa. Part 3 briefly considers the demographic and economic scenario in Tanzania. Part 4 identifies the demography and poverty indicators used in this study. Part 5 presents the empirical findings and part 6 concludes.

1. The Relationship between Population Growth and Economic Development: Macroeconomic and Microeconomic Aspects

The relationship between growth and economic well being has been a subject of discussion for centuries. Most of the work on this subject is undertaken both at macro and micro levels. Among those arguing at the macro level, Malthus was the first to hypothesize that uncontrolled fertility or a high rate of population growth would lead to lower per capita income and a corresponding consumption below subsistence level. In addition, high population growth would lead to deforestation, land degradation, low agricultural productivity, and worse effects from drought and recurring famine (Kidane 1989; 2000). This is the major theory and current proponents are labeled "population pessimists" (Coale and Hoover 1958; Leff 1969; Schultz 1990; Demeney 2003). They cite the empirical fact that developed countries in the northern hemisphere have lower population growth. The opposite is true in the southern hemisphere, where African, South Asian, and Latin American countries have low per capita income and high rates of population growth.

On the other hand, a group of "population optimists" believes that a high population growth rate could accelerate innovation to manage and keep up with growing consumption. Greater population could also lead to economies of scale and efficiency (Simon 1981). One study (Bloom and Williamson 1998) considered the effect of demographic transition, where population growth during the past decade is related to economic development over time. This macro-level analysis related the accelerated per capita GDP growth in East Asian countries to a more productive population (15–59 years old). The implication is that a higher percentage of productive population in a country is a direct result of reduced population growth. (A fast-growing population is expected to yield more youthful or dependent population.)

The negative relationship between population growth and economic development may not be unidirectional. Increased income may affect demographic variables if it means, or is accompanied by, increased access to education and health services. Better access to health services may lower infant and child mortality, as well as increase expectations of live births. Reduced infant and child mortality means fewer births and families may not need so many

pregnancies to have the desired number of children. Access to education could increase participation in the modern-day labor force by both men and women. In this situation, fewer healthy, educated children would be preferred over larger numbers of children.

The preceding macro arguments do not appear to directly link demographic variables with poverty. In order to link these two issues, one also needs empirical information at the micro, or household, level. In other words, one has to compare income and demographic differentials in communities and among various socioeconomic groups. Lack of access to education and basic health services are the main variables that characterize the poor. In addition, empirical evidence strongly suggests that larger families are poor. When basic health services are not easily available, infant and child mortality is likely to remain high.

This idea of relating lower income to demographic variables is commonly referred to as the demography poverty trap. Also, the fact that the poor have few or no assets to use as collateral implies that they are unlikely to have access to financial markets or to establish security against old-age uncertainties. Instead, poor households depend on their children as a source of security and income upon retirement. More children are preferred over "quality" because poor households may not be able to afford to send all their children to school. In the process of deciding which child (or children) will go to school, households may be gender selective, preferring males over females. Their rationale is that investing in sons is more likely to yield a higher return than daughters.

We have already noted that high infant and child mortality among the poor can lead to higher fertility through the "replacement hypothesis." Higher fertility can also lead to a higher ratio of dependents, which in turn lowers per capita consumption. Finally, the fact that most of the poor in low-income countries reside in rural areas, where access to basic education, health, and other social facilities is meager, may lead to an "energy poverty trap." This is a derivative of the demography poverty trap.

2. Demography and the Economic Crisis in Africa

The demography poverty trap figures prominently in almost all African countries, where the development crisis appears to be more pronounced and unique. Most African countries gained their independence in the early 1960s. During this decade, they registered a relatively higher per capita GDP, even though fertility was also on the rise. The per capita GDP was not significantly lower than those of East Asian countries. On the other hand, between 1980 and 2000, many sub-Saharan African countries registered a negative growth rate. During these same

two decades, there was a higher rate of population growth, accelerating ecological distress along with increased debt and debt servicing. All these factors increased the magnitude and depth of poverty in Africa. A crisis in governance, common in low-income societies, affected many African countries profoundly, which in turn retarded development. High population led to a low savings rate and to less investment; this low rate of domestic investment could not be offset by a large inflow of private foreign capital. This is due to poor infrastructure and weak human capital, compounded by the poor governance and rampant corruption. Some analysts have even declared that some African countries in the demography poverty trap are "too poor to grow" (Humberto et al. 2009; World Bank 2009).

Several solutions have been put forward. The major ones include increasing agricultural productivity, enhancing the rural infrastructure, providing easy access to basic health facilities, improving nutrition, as well as expanding family planning services. These solutions are expected to have direct and indirect impact on demographic variables. Higher investment in rural infrastructure, along with access to family planning services, is associated with reduced mortality and fertility. Because this reduction in fertility rate is an outcome of poverty alleviation, the above interventions could help make the poor prime beneficiaries of positive demographic dividend. The effect of this demographic dividend on reducing the large poverty gap is obvious.

It may also be argued that rural households' income and consumption may be directly associated with a larger household size. This argument contends that children are contributors to household income. However, empirical evidence over time and across countries clearly shows that rampant poverty is associated with increased household size (higher fertility). However, in rural African settings, where agriculture is the major activity and major employer, the size of arable land per farmer is very small, and technology is primitive, the marginal productivity of agricultural output relative to labor input is minimal and possibly negative. Thus the argument that children contribute to household income is not always true.

3. The Demographic and Economic Scenarios in Tanzania

The first attempt to estimate the population of Tanzania was in 1913, when the country was called Tanganyika and under German rule. However, the estimate was not scientific. The first proper census was conducted in 1948, followed by five periodic censuses in 1957, 1967, 1978, 1988, and more recently in 2003. Between 1950 and 1957, the annual population growth rate was only 2.7 percent (increasing from 7.94 to 9.45 million people). Between 1957 and 1978, the population grew by 4.0 percent (to 17.65 million), and from 1978 to 2005, the growth was 4.2 percent, or 37.80 million people (US Census Bureau 2009). By 2010, the population is

expected to reach 43 million—one of the highest population growth rates in the world. Tanzania's population policy is primarily oriented toward expanding family planning programs and rural development assistance, along with efficient economic redistributions.

Between the time of independence in 1961 and 1967, GDP growth was 5 percent. Agricultural production grew at about 7 percent per year, more than three times the population growth rate in the same period. Beginning in 1970, the situation began to reverse and Tanzania began importing food to meet an ever-increasing food shortage. A nationwide system of collective agriculture and state regulation, known as Ujjamma, was introduced. With the 1967 Arusha Declaration, Tanzania was declared a socialist state. There was an unprecedented price control.

There was a major policy departure in the mid-1980s, when International Monetary Fund/World Bank-backed reforms were first introduced through the Structural Adjustment Program (SAP), along with a significant amount of foreign assistance (loans and grants). The aim was to reintroduce market forces via privatization and open the country to private investors. As could be expected, the immediate impact of this large-scale liberalization program was increased unemployment and inflation. From the mid-1990s to 2009, the impact of SAP appeared to be positive. The current belief held by policy makers is that agriculture is an engine for growth and a means of reducing poverty. The Tanzanian government is committed to reducing poverty by 50 percent by the year 2015. In order to achieve this objective, per capita GDP needs to grow 6–7 percent per year.

4. Measures of Demography and Poverty

Compared to poverty, demographic indicators have fewer measures. Demographic indicators are expected to measure the growth and age structure of the population. At any given time, as one of a number of demographic indicators, fertility measures (especially the total fertility rate, gross and net reproduction rates, children ever born [CEB],[1] and household size) should give reliable estimates of the future rate of population growth. These indicators are interrelated and naturally highly correlated. In this empirical exercise, we used both children ever born and household size as demographic measures. The choice was dictated by the availability of data.

[1] Children ever born (CEB) are all the live children a woman gives birth to, in and out of wedlock and from all marriages. It excludes stillbirths, stepchildren, and adopted children.

The study also highlights selected direct and indirect measures of poverty. The direct measures are nutrition and malnutrition; the former measures the *quantity* of food intake, while the latter measures the *quality* of the same. Indirect indicators include expenditure on food, other consumption goods, and assets. Access to land by agricultural households is also included as a poverty indicator, as is access to clean water, sanitation facilities, and energy.

5. Empirical Findings

The following empirical findings are based on a 2008 survey conducted in two Tanzanian regions, Mwanza and Mara. These two areas are adjacent to Lake Victoria where the impact of SAP appears to be significant. Mwanza has a large urban population and Mara is predominantly rural and agricultural. A sample of 520 households was selected on the basis of stratified random sample. The aim of the study was to evaluate the magnitude and depth of poverty of the households in these two regions. (Measures of depth of poverty are provided in section 5.2.) In the process, respondents were asked demographic questions, such as age, sex, and number of children and relatives in a household. The study area is predominantly agricultural and fisheries provide one option for employment. Regarding literacy and provision of basic services in Tanzania, residents of the study area appear relatively better off.

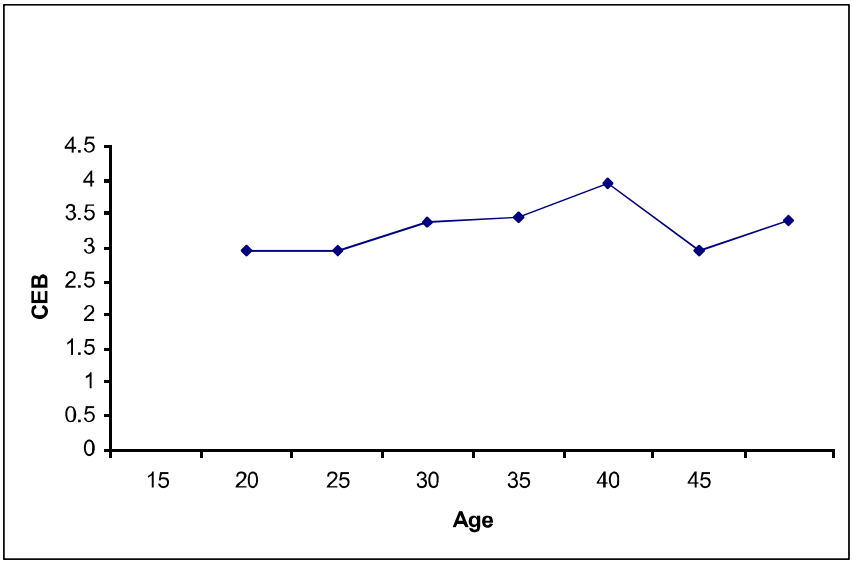
5.1 Demographic Indicators

As already noted, the number of children ever born and household size are the two measures of fertility used in this study. Table 1 and figure 1 show the number of children ever born, classified in the conventional five-year intervals of the age of the mother. CEB is expected to be a non-decreasing function of mother's age, but the results do not reflect this. CEB follows the expected pattern up to age 40 and then begins to decline. This is characteristic of African demographic data. Mothers in their later reproductive ages forget to include children who have grown up and left the family.

Table 1. Mothers and Children Ever Born (CEB): Tanzania 2008 Survey

Mother's age (years)	No. of mothers	No. of CEB
15–19	67	2.96
20–24	79	2.95
25–29	108	3.38
30–34	74	3.46
35–39	68	3.95
40–44	40	2.96
45–	73	3.39
Total	***509***	

Figure 1. Children Ever Born (CEB): Tanzania 2008 Survey



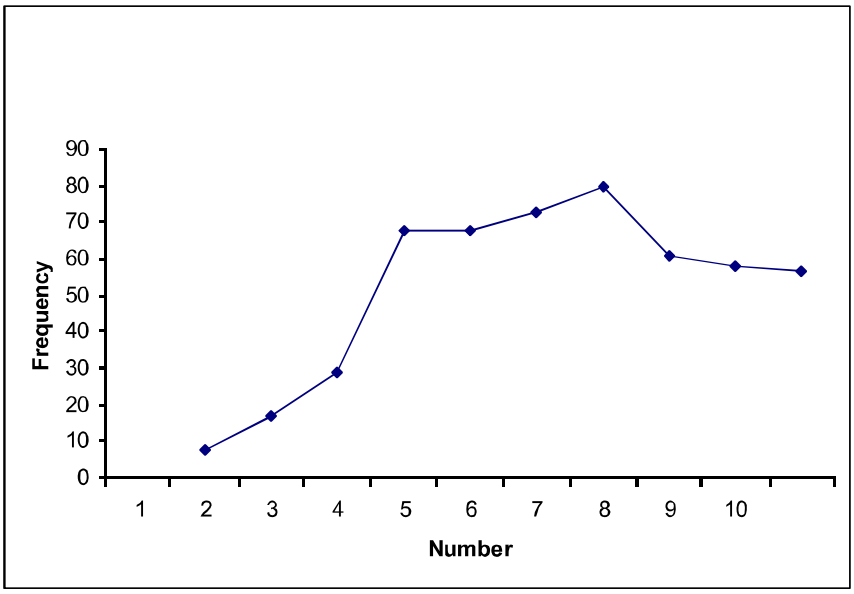
Because of the underestimated CEB, we supplemented it with household size as an indirect measure of fertility. The result is shown in table 2 and figure 2. Naturally, household size includes husband, wife, children, and relatives, and is larger than CEB. If household size is significantly greater than CEB by more than 2, it implies the presence of relatives and dependents. A higher number of non-nuclear family members within a household is an indicator of large population in distress; which accelerates the demography poverty trap. We estimated and

compared the mean value of nuclear family (father, mother, and children) with the mean of the household size as 5.2 and 6.4, respectively. In other words, 23 percent of household members are relatives.

Table 2. Distribution of Household Size

Household size	No. of households	%
1	8	1.5
2	17	3.3
3	29	5.6
4	68	13.1
5	68	13.1
6	73	14.1
7	80	15.4
8	61	11.8
9	58	11.3
10	57	11.0
Total	***519***	***100.0***

Figure 2. Distribution of Household Size



We also noted that the CEB estimate in our sample was under-reported for women 40 years old or more. The 2005 Demographic and Health Survey for Tanzania counted CEB as 5.14. In other words, both CEB and household size indicated a higher rate of population growth in Tanzania. Table 2 shows that more than 70 percent of the surveyed households had a household size greater than six. This is very high.

Both the CEB and household size in the study area varied by region, by migrant status, and by type of employment (see table 3). Mwanza, where a large percent of the residents reside in urban areas, and Mara, a predominantly rural region, are both located around Lake Victoria. As expected, Mara has a higher fertility rate, especially with regard to household size. Compared to migrants, the local population in the two study regions tends to have higher fertility. Families where either husband or wife is less educated exhibit a high fertility rate. People engaged in agricultural also have higher fertility rates compared to the others.

Table 3. Variation in CEB (Fertility) and Household Size by Socioeconomic Variables

Socioeconomic variables		Mean CEB†	Mean household size
Region	Mara	3.3 (2.2)	6.8(2.9)
	Mwanza	3.2(2.2)	6.1(1.8)
Residence status	Local	3.5(2.2)	6.3(2.3)
	Migrant	2.9(2.1)	6.5(2.4)
Activity	Farmers	3.7(2.3)	6.4(2.4)
	Non-farmers	2.7(1.9)	6.4(2.2)
Husband's education	No or little education*	3.4 (2.2)	6.3(2.4)
	More education**	2.8(2.1)	8.8(2.1)
Wife's education	No or little education*	3.4(2.2)	6.4(2.3)
	More education**	2.4(2.1)	6.4(2.4)

Note: Values in parenthesis are standard deviations.

† CEB = Children ever born

* 0-6 years of education; ** 7 or more years of education.

Based on the results in table 3, we attempted to identify proximate determinants of fertility. A multiple linear regression of CEB on the husband's and wife's education, type of employment, and migration status was estimated. The result is provided in table 4 below.

Table 4. Determinants of Fertility (Children Ever Born)

Explanatory variables	Coefficient	Standard error
Husband's education	0.028	0.19
Wife's education	0.47*	0.21
Employment**	-1.01*	0.21
Migration status***	-0.14*	0.21
Constant	4.21*	0.44
$\bar{R}^2$	0.08	
n	453	
F(4,48)	9.59	
Prob>0	0.00	

* Significant at 5%
** 0 = farmer, 1 = non farmer.
*** 0 = non migrant, 1 = migrant.

Except for husband's education, all the explanatory variables appear to be significant. In other words, households engaged in non-agricultural activities, as well as migrant households, appear to have low fertility. The reported positive relation between wife's education and fertility appears to be counter intuitive; wife's education is expected to have a depressing effect on fertility if the level of education is sufficiently high. Among the surveyed wives, the level of education is not very high.

5.2 Poverty Indicators

There are different ways of measuring poverty. The ones used in this study include nutritional status, monetary expenditure, land ownership, and access to clean water, toilets, and electricity or other energy sources. Below, we consider each component of poverty and relate it to the already cited demographic growth indicators, that is, CEB and household size.

5.2.1 Nutritional Status

Some ways of measuring nutritional status are direct, while others are indirect. Based on the information from the 2008 survey, we used indirect measures of nutrition. Nutrition status is measured in terms of undernutrition, which is related to the quantity of food intake, and malnutrition, which is related to the quality of food. In the 2008 survey, respondents were asked

how many meals they consumed per day. A value of less than 3 implies existence of undernutrition, while 3 implies absence of the same. In order to measure malnutrition respondents were asked whether they had meat (e.g., beef, mutton, chicken, pork, goat, etc.) or fish in their meals and to count the number of meals with meat or fish per week. The results are summarized in the following five tables.

Table 5 shows the extent of undernutrition by percent. It appears that about 72 percent of respondents had a mild form of undernutrition (two meals) per day, while 3 percent suffered from extreme undernutrition (one meal per day). The table also shows that farmers and non-migrants in rural Mara suffered more from undernutrition compared to the others. We noted earlier that these groups belong to the high fertility class, implying a demography poverty trap.

Table 5. Indicators of Undernutrition: Number of Meals per Day

Socioeconomic group		No. of meals	% of respondents
Region	Mara	1	2
		2	74
		3	24
	Mwanza	1	6
		2	68
		3	27
Residence status	Locals	1	3
		2	74
		3	23
	Migrants	1	4
		2	69
		3	27
Activity	Farmers	1	5
		2	74
		3	21
	Non-farmers	1	2
		2	68
		3	30

The mean meal per day is cross-classified with fertility measures (tables 6a and 6b). Compared to table 5, the variation of undernutrition by CEB and household size is not obvious, yet the result appears to show a moderate form of undernutrition.

Table 6A. Indicators of Undernutrition: Average (Mean) Number of Meals per Day by Children Ever Born (CEB)

CEB	Mean
0	2.1 (0.49)
1	2.2 (0.49)
2	2.2 (0.50)
3	2.3 (0.50)
4	2.3 (0.51)
5	2.2 (0.45)
6	2.1 (0.47)
7	2.2 (0.39)
8	2.3 (0.45)
Overall	***2.2 (0.49)***

Note: Values in parentheses are standard deviations.

Table 6B. Indicators of Undernutrition: Average (Mean) Number Meals per Day by Household Size

Household size	Mean
1	2.3 (0.49)
2	2.0 (0.50)
3	2.2 (0.47)
4	2.2 (0.48)
5	2.3 (0.49)
6	2.3 (0.49)
7	2.2 (0.41)
8	2.2 (0.51)
9	2.2 (0.49)
10	2.2 (0.56)
Overall	***2.3 (0.56)***

Note: Values in parenthesis are standard deviations.

Tables 7a and 7b measure the extent of malnutrition. The study area, which is close to Lake Victoria, is known for its fisheries. One would expect more people to consume fish compared to meat**.** Still, the percent of respondents not consuming fish is about 32 percent—a relatively high number**.** The reason is that most of the fish caught is exported, export prices are high, and local people cannot afford to consume their own catch. The results indicate that families with high CEB and large household size suffer more from malnutrition. As much as 68 percent of the respondents had no meals with meat in a week. (One is expected to have 21 meals per week.)

Table 7A. Indicators of Malnutrition: Meals without Meat or Fish in a Week by CEB

CEB	% of meals without meat	% of meals without fish
0	67	37
1	30	36
2	40	25
3	47	22
4	59	31
5	55	27
6	66	50
7	68	42
8	67	25
Overall	***55***	***32***

Table 7B. Indicators of Malnutrition: Meals without Meat or Fish in a Week by Household Size

Household size	% of meals without meat	% of meals without fish
1	50	13
2	47	29
3	58	31
4	34	35
5	39	27
6	42	34
7	55	29
8	61	33
9	46	29
10	58	38
Overall	***55***	***31***

5.2.2 Monetary Expenditure

Respondents were asked about their weekly, monthly, and yearly expenditures. Weekly expenditure refers to food; monthly expenditure is for monthly bills, such as house rent, water, and electricity bills; and yearly expenditure is for household assets, such as radio, stoves, etc. The results are presented in tables 8a and 8b. All expenditure categories, especially the weekly expenditure on food, show that larger households spend less than small-sized households. The mean weekly expenditure on food is only about US$ 5 per household—a clear indicator of a demography poverty trap.

Table 8A. Monetary Expenditure (Mean Value in TZS 000)

CEB	Weekly expenditure	Monthly expenditure	Yearly expenditure
0	9.5	27.0	185.0
1	6.7	9.0	157.8
2	6.3	10.2	139.9
3	5.9	11.7	207.4
4	6.7	12.6	250.7
5	6.0	10.5	312.2
6	10.4	6.9	126.8
7	8.2	4.8	112.0
8	5.7	8.3	90.0
Overall	***7.1***	***12.2***	***173.4***

Note: TZS = Tanzanian shillings; US$ 1 = TZS 1,250

Table 8B. Monetary Expenditure (Mean Value in TZS 000)

Household size	Weekly expenditure	Monthly expenditure	Yearly expenditure
1	12.1	10.2	650.7
2	13.3	8.9	460.9
3	9.3	5.7	209.3
4	9.2	11.5	185.4
5	6.9	14.9	238.9
6	7.6	15.7	145.9
7	5.0	9.3	148.3
8	9.5	12.4	92.5
9	3.4	17.5	92.5
10	4.3	8.1	167.5
Overall	***7.1***	***12.2***	***173.4***

Note: TZS = Tanzanian shillings; US$ 1 = TZS 1,250

5.2.3 Land Ownership

Results for land ownership (see tables 9a and 9b) refer to respondents who are engaged in agriculture. The results show that as much as 50 percent of those engaged in agriculture do not own land. This is true for small and large households and implies that large-family farming households are heavily distressed, compared with small-family households—another indicator of a demography poverty trap.

Table 9A.

Farmers without Land by CEB

CEB	%
0	48
1	29
2	59
3	51
4	56
5	55
6	52
7	34
8	57
Overall	***50***

CEB = children ever born

Table 9B.

Farmers without Land by Household Size

Household size	%
1	67
2	50
3	36
4	51
5	55
6	46
7	60
8	44
9	38
10	53
Overall	***50***

5.2.4 Access to Clean Water, Sanitation Facilities, and Energy

Lack of basic necessities is not only essential for a family or a household but may impact the whole community. Lack of proper sanitation facilities can have a devastating impact on community health and the local environment. Shortage of modern sources of energy can deplete forest resources. Table 10a shows that as much as 60 percent of households do not have access to clean water, as much as 80 percent have poor toilet facilities and no electricity, and more than 50 percent use firewood for cooking. Similar results are reported in table 10b. These poverty indicators appear to be positively related to the size of households.

Table 10A. Access to Clean Water, Sanitation Facilities, and Energy

CEB	% with poor quality source of water*	% with poor quality toilet type**	% with poor quality source of electricity)***	% with poor quality source of energy for cooking****
0	49	70	79	38
1	66	78	79	55
2	59	71	74	49
3	65	82	79	58
4	52	75	75	43
5	61	76	75	52
6	53	67	75	53
7	66	76	76	63
8	50	75	75	42
Overall	***59***	***75***	***75***	***51***

* Water from open wells, rivers, and lakes.
** Toilets without flush or cover.
*** Electricity not connected, does not come from a generator or solar power.
**** Wood as a source of energy.

Table 10B. Access to Clean Water, Sanitation Facilities, and Energy

Household size	% with poor quality source of water*	% with poor quality toilet type**	% with poor quality source of electricity)***	% with poor quality source of energy for cooking****
1	63	88	50	63
2	59	53	65	47
3	52	69	86	45
4	60	75	75	52
5	56	68	75	49
6	59	81	75	52
7	60	79	73	51
8	64	74	68	51
9	55	81	83	54
10	58	72	83	48
Overall	***59***	***75***	***75***	***51***

* Water from open wells, rivers, and lakes.
** Toilets without flush or cover.
*** Electricity not connected, does not come from a generator or solar power.
**** Wood as a source of energy.

5.2.5 Relation between Poverty Indicators and Fertility

Table 11 presents a simple linear regression of selected poverty indicators on CEB. Due to the nature of survey data and the limited range of values of the dependent variable, some of the coefficients appear not to be significant. In spite of this, we have reported the results because the sign of the coefficients are in the expected direction, suggesting the depressing effect of demographic variables on basic needs. This further helps to explain the demography poverty trap.

Table 11. Demography and Poverty Indicators

Dependent variable	Intercept	Slope	$\bar{R}^2$
No. of meals per day	2.23* (0.04)	-0.03 (0.01)	0.001
Number of meals with meat per week	0.89* (0.08)	-0.012 (0.02)	0.001
Number of meals with fish per week	1.65* (0.10)	-0.03* (0.01)	0.01
Weekly expenditure**	7287.9 (669.1)	--58.71 ((249.65)	0.002
Monthly expenditure***	18133.84* (1732.44)	-1834.12 (446.01)	0.001
Yearly expenditure****	189885.3* (30819.9)	-5105.6 (7939.8)	0.001
Source of water (0 = bad, 1 = good)	0.427* ((0.039)	--0.004 (0.010)	0.001
Type of toilet (0 = bad, 1 = good)	0.260* (0.030)	-0.002 (0.008)	0.001
Source of energy (0 = bad, 1 = good)	0.540)* (0.039)	-0.130**** (0.010)	0.003

Notes: Values in parenthesis are standard errors. CEB (children ever born) = explanatory variable.

* Significant at 5%.

** Weekly expenditure, mostly for food and related items. Expenditures are in TZS.

*** Monthly expenditure, mostly on utility bills.

**** Yearly expenditure, mostly on household assets.

6. Conclusion

The preceding empirical results show that demographic variables and poverty indicators are interrelated. The selected poverty indicators, including low nutritional status, meager expenditure on food and related items, and limited access to land and basic services, show that the surveyed population in Tanzania exists in rampant poverty—in both magnitude and depth. Even though there were some regional variations, as well as variation by residence and employment, the overall picture is one of extreme poverty. The surveyed population exhibits high fertility and large family size. As much as 23 percent of household members are relatives (i.e., non-nuclear family). This too is an indicator of population pressure on resources. The two indicators—poverty and demography—appear to be closely linked. Getting out of the poverty trap implies reducing fertility and vice versa, leading one to conclude that the population under study is in a demography poverty trap.

The way out of this "trap" may be to treat population as an endogenous or policy variable. Beside the standard macroeconomic policy prescriptions, an all-out effort needs to be targeted at reducing fertility. It should be noted that poverty reduction policies should not only aim at introducing short-run solutions, such as food subsidies, but also aim at providing basic necessities, such education, health, clean water, sanitation, and related provisions. These too will help reduce fertility. Investment in human capital is paramount, but it must include aggressive reproductive and family services.

Getting out of poverty is a two-way street. Implementing appropriate macroeconomic policies along with poverty reduction strategies, and at the same time making family planning services available, will go a long way toward moving African countries out of the demography poverty trap they are in.

References

Bloom, D.E., and J. G. Williamson. 1998. Demographic Transitions and Economic Miracles in Emerging Asia. *World Bank Economic Review* 12(3): 419–55.

Coale, A.J., and E.M. Hoover. 1958. *Population Growth and Economic Development in Low Income Countries*. Princeton, NJ, USA: Princeton University Press.

Demeney, P. 2003. Population Policy: A Concise Summary. Policy Research Division, Working Paper, no. 73. New York: Population Council.

Humberto, L., and L. Serven. 2009. "Too Poor to Grow." Policy Research Working Paper, no. WPS5012. Washington, DC: World Bank.

Kidane, A. 1989. Demographic Consequences of the 1984–85 Ethiopian Famine. *Demography* 26(3): 515–22.

———. 1990. Mortality Estimates of the 1984–85 Ethiopian Famine. *Scandinavian Journal of Social Medicine* 8: 281–86.

Leff, N, 1969. Dependency Rates and Saving Rates. *American Economic Review* 59(6): 886–96.

National Bureau of Statistics-Tanzania. 2005. Tanzania Demographic and Health Survey 2004–2005. Dar-es-Salaam: NBS.

Schultz, T.P., 1990. *Ester Boserup: Introduction to Economic and Demographic Relationships in Development.* Baltimore, MD, USA: Johns Hopkins University Press.

Simon, J.L. 1994. *The Ultimate Resource*. 2nd ed. Princeton, NJ, USA: Princeton University Press.

Tanzania Ministry of Planning, Economy, and Empowerment. 2006. Macroeconomic Policy Framework for the Plan/Budget 2006/07–2008/09. Dar-es-Salaam: United Republic of Tanzania.

U.S. Census Bureau. 2009. International database. Washington, DC: US Census Bureau.

World Bank. 2009. Change the Climate for Development. *World Bank Research Digest* 4(1): 1, 8.