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Less poverty with higher household size in the eastern and southern Africa region: analysis and implications for the population debate and population policy.

Main author: Chrysanth Lwechungura KAMUZORA

Mailing Adress: University of Dar es Salaam
Statistics Department
P.O. Box 35047
DAR ES SALAAM
Country: TANZANIA

Tel: off: 255-22-2410500 Ext 2450 | Fax: 255-22-2410395
res: 255-22-2843470 Mobile: 255-0744275247
Email: Kamuzora@udsm.ac.tz
Kamuzora@yahoo.com

LESS POVERTY WITH HIGHER HOUSEHOLD SIZE IN THE EASTERN AND SOUTHERN AFRICA REGION: analysis and implications for the population debate and population policy

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C. Lwechungura Kamuzora

University of Dar es Salaam
Statistics Department
P.O. Box 35047
DAR ES SALAAM Tanzania

E-mail: Kamuzora@udsm.ac.tz

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ABSTRACT

The subject arises out of coincidental findings of a 1996 survey of rural poverty in Bukoba District, north-west Tanzania, confirmed by a follow up study showing less poverty with higher household size, with contextual non-neomalthusian response explanations given. This paper, utilising vast data from country Demographic and Health Surveys (DHS) of the 1990's, investigates the extent to which this pattern is pervasive in the eastern and southern Africa region, and any deviations for their relation to development level.

Poverty is measured by a possessions index, and quality of housing and sanitation, argued for, against income or expenditure. Analysis is done by bivariate and, for control of intervening factors, logistic regression. Pervasion of less poverty with higher household size, but changing to the converse with modernisation, is observed.

Interpretation is made as it being related to life cycle buildup of both household wealth and, in a largely non-contracepting society, size; but also in the context of the region's labour intensive socio-economy. Finally implications for the classical population debate, consequently policy, particularly family planning approach, are drawn.

Introduction

The study was prompted by coincidental findings of a 1996 investigation of sources of rural poverty in Bukoba District Tanzania (Kamuzora and Gwalema, 1998): observed was higher proportion of households less poor with higher household size. A follow-up study of a homogeneous sample of 320 'normal' households, with both husband and wife present, confirmed the earlier observation. Investigation of factors making for this phenomenon pointed first and foremost to labour supply, understandable in a labour intensive African socio-economy. Important also were Kingsley Davis multiple and multi-phasic reponses to population pressure: from out-migration and diversification of activities that keep families afloat without necessarily resorting to fertility limitation outright, though by no means negating the latter malthusian response at later stages (Kamuzora and Mkanta, 2000).

Preliminary investigation of the Tanzania Demographic and Health Survey (TDHS) 1996 data shows pervasion of the pattern in almost all regions. However, in developed Kilimanjaro Region, although labour availability is still a significant factor, the less poverty/higher household size seems to hold no longer. The region has had over time a

diversification of economic activities from peasant agriculture, and it is in the middle of a demographic, notably fertility transition from 7 in the 1960's to about 5.7 live-births in the 1990's, a little below the national average (Tanzania, 1997: 30; Ringers, nd).

A basic question is to what extent the less poverty with higher household size pattern is pervasive of the African scene, and whether, **a'la** Kilimanjaro, the relation is changing with development or modernisation. The countries of the eastern and southern Africa region, certainly varying in development levels, are investigated, taking advantage of availability of vast data from the DHSs of the 1990's.

The significance of this study is, in the first instance, bringing out the extent of poverty that is talked about of Africa, and associated factors. Secondly implications of findings will be drawn, on, first, a possible 'theory'of pattern of population trends with development, thus enhancing the population debate on the effect of population growth on development. For all intents and purposes the debate has been protracted: it is to date still in a stalemate of controversy.

Notable sides to the debate are seen in their following conclusions: evidence points to unclear relationship (Kuznets, 1965 in Ahlburgh, 1998: 324-25, footnote 1; Easterlin, 1967, 1985; Lee, 1985; McNicoll, 1995; Ahlburgh, 1998); positive: population pressure mother of invention (Boserup, 1965, 1981), as high prices due to shortages in the short-run attract development of alternative cheaper substitutes in the long-run (Simon, 1981, 1996); population important resource (African Academy of Sciences, 1994); a youth-full population, ultimate resource for Africa (Kamuzora, 1999). Thus, and second, looking at still low contraceptive practice, in spite of family planning programmes since the late 1970's, over twenty-five years, a question is whether the findings do not have serious implications for the need for dynamic interpretation of fertility behaviour that will help focus both policy and programmes effectively.

The plan of the paper is, first data and methods used are described, wherein definitions, particularly arguing for measurement of poverty level with the (wealth) possession items

available in the data sets, are given. Second the resulting country poverty levels and patterns by household size in the region are presented. Subsequently analysis of the relation of poverty level with household size, looking out for varying patterns thereof, but taking into account of (i.e. controlling for) correlates of poverty is made. Finally interpretation of the findings in view of low contraceptive level in the region is made with implications drawn for effective population policies, importantly approach of programmes; this is extended to enhancement of the protracted population debate.

1.0 Data and methods

1.1 Definitions

Poverty is a condition of living below a defined poverty line or standard of living (Bagachwa, 1994; Mtatifikolo, 1994; Semboja, 1994); thus the line is subject to variation by socio-politico-economic-cultural set up. Its measurement in this study is by a possessions index, a composite of household possessions, mainly that of the head, and quality of housing and sanitation. The justification and construction of the index is detailed inSection 1.3, and can be had in Kamuzora and Gwalema (1998) and Kamuzora and Mkanta (2000). In brief, possessions are generally found to correlate with income, relevantly level of living (Sender and Smith, 1990). In any case, being in themselves items that provide welfare, possessions and housing and sanitation quality are clear indicators of poverty level.

Household size consists of the number of persons usually residing in the household (**de jure**) and share household expenses ('common' kitchen). Ideally, as the welfare of a household is also drawn from a larger network of relationships (outlay too to others), the extended family. The data limits us to this. Nevertheless the given variable is of members that are practically involved in the day to day welfare of the household, therefore not significantly far from the ideal.

1.2 Data

The study utilises country-wide Demographic and Health Surveys (DHS) of the 1990's : 10 countries in all from eastern and southern Africa.

1.3 Measurement of poverty

Poverty level, as stated above, was measured by a possessions index and quality of housing and sanitation. Construction of the index is detailed in Appendix 1. Justification of these items as indicators of poverty level can be made. As argued convincingly and used successfully in a study in Lushoto District, Tanzania by Sender and Smith (1990, pp. 28-29), and in Bukoba District by Kamuzora and Gwalema (**op. cit.**), and Kamuzora and Mkanta (**op. cit.**), this index of material well-being, is: (i) not only simple but importantly, its inputs, though stocks, have generally been observed to be closely correlated with current well-being (from flows of income) and shows overall economic status of respondents as measured by other indicators e.g. landholding, cropping patterns, use of productive inputs, and access to education and health services (the Tanzania Demographic and Health Survey collected also degree of a household's food security (flows): its correlation with the possession index (stocks) will be shown after description of the latter); (ii) it is not distorted by memory lapse, nor subject to ability of respondents to distort or mislead, and exaggerate or underestimate as e.g. income; (iii) questions require definite **versus** arbitrary or estimated answers; (iv) information is both easily collected by research assistants with little training, and its elements are physically seen e.g. housing.

In this study, because logistic regression will be used with poverty level as a dependent variable, a household is identified in either of two categories, poor and less poor as follows:

Poor=1: poor housing (earth walls/floor or thatch roof, or improved housing but with only minimal possessions of up to a bicycle or radio, crowding above 4 person per room, unsafe water source, or poor or no toilet facility).

Less poor=0: improved housing (cement walls/floor and corrugated iron sheets or tile roof) and housing and possessions beyond that of the poor (i.e. any or all of, electricity, refrigerator, television, motorcycle/car/lorry).

1.4 Analysis

Statistical methods are used. First, simple bivariate patterns of percent less poor by household size. Here also country poverty levels across the region can be observed. Second, analysis of these patterns is done by logistic regression whereby, controlling for intervening factors of poverty, the (net) association of poverty level with household size can be discerned; further for variation by level of development will be looked at. Thus with above binary coding of poverty category, an odds ratio of less than one would mean a higher value of the independent variable is associated with less poverty, and if greater than one more poverty.

2.0 Levels and patterns of poverty by household size

Poverty levels and patterns by household size in the eastern and southern Africa region, as per above definitions can be observed in Table 1. Shown are percent of households that are less poor by household size (the complement, the difference from 100 percent is the percent poor). The totals row shows a country's poverty level.

Table 1 Percent of households in less poor category by household size in the countries of the eastern and southern Africa region, 1990's.

(a) East and Southern Africa

House-hold size	UGANDA %	(n)	RWANDA %	(n)	ZAMBIA %	(n)	TANZANIA %	(n)	MOZAMBIQUE %	(n)	KENYA %	(n)	NAMIBIA %	(n)	ZIMBABWE %	(n)
1	26.4	(855)	21.1	(351)	20.1	(437)	27.8	(698)	14.5	(795)	42.6	(1197	46.0	(298)	65.9	(675)
2	26.0	(962)	16.7	(633)	22.7	(724)	26.7	(924)	13.5	(1174)	35.9	(999)	54.0	(404)	56.3	(646)
3	22.8	(1077)	11.5	(875)	22.4	(967)	26.8	(1084)	14.7	(1388)	32.4	(1084)	45.3	(397)	54.6	(722)
4	21.9	(1068)	12.0	(955)	24.0	(1013)	21.0	(1104)	16.8	(1478)	30.9	(1209)	46.5	(473)	47.9	(785)
5	18.2	(935)	11.8	(888)	27.2	(1023)	19.4	(1121)	20.9	(1233)	24.2	(1113)	38.5	(436)	40.3	(775)
6	20.2	(805)	12.2	(863)	28.9	(831)	18.3	(956)	23.9	(1080)	25.2	(936)	34.2	(406)	39.6	(667)
7	20.9	(608)	14.2	(655)	35.8	(746)	19.8	(737)	29.3	(703)	22.4	(691)	34.8	(339)	34.1	(539)
8+	22.7	(1098)	21.0	(911)	40.1	(1428)	22.0	(1211)	35.6	(1332)	23.5	(1002)	29.3	(1212)	31.5	(951)
Total	22.5	(7408)	14.5	(6131)	28.9	(7169)	22.6	(7835)	20.9	(9183)	30.2	(8231)	38.7	(3965)	45.8	(5760)

(Eastern and Southern Africa ctd)

The Islands

	COMOROS		MADAGASCAR	
1	32.7	(52)	15.0	(500)
2	29.3	(147)	16.5	(818)
3	27.8	(216)	16.7	(1059)
4	28.8	(257)	21.9	(1212)
5	26.9	(294)	19.2	(1008)
6	22.8	(281)	16.2	(868)
7	28.0	(261)	15.8	(601)
8+	26.6	(728)	14.0	(1019)
Total	27.0	(2236)	17.3	(7085)

Wide variation of poverty levels can be observed in the region. The proportion of households that are less poor ranges from a low of 14.5 percent in Rwanda to almost 46.0 in Zimbabwe, averaging at 26.9 percent. The complement, proportions living in poverty, are thus between 53 percent in Zimbabwe and 85 in Rwanda; this is on average, 73.1 percent. It is a deep pervasion of poverty. Looking at it from the actual indicators used in this study, it is low standards of living of poor housing, unsanitary conditions, and having no or just a few household items.

Observations on the pattern of poverty by household size, the focus of this study, have to be withheld for the moment due to the need to control for intervening correlates of poverty. Yet three basic groupings emerge outright from these data, even without control for the intervening factors, meriting therefore a moment to be looked at.

The first group is of countries showing what prompted this study, i.e. rising proportions less poor with higher household size: Zambia and Mozambique. In contrast are those with a converse pattern of less poverty with smaller household size: Zimbabwe, Namibia, Kenya and Comoros. This can be called a third group, because the second falls in between. The latter, for most of the remaining countries, have mostly declining proportions less poor but rising near the highest household size. Rwanda however has a U-shape pattern: fluctuating at the bottom over a distinct wide range of household size, 3 to 6. There is then Madagascar rising a bit then falling, thus being a bit different from the others.

All in all, an additional variable, pattern, therefore is created as per these groupings, a difference to be controlled for as for the others, in the search for the relation of poverty level with household size. (Coding for the variable, pattern, is for a higher value for the country nearer the pattern of focus: higher proportions of households less poor with higher size).

In Table 2 therefore are results of logistic regressions, showing odds of a household of a certain size being in the poor category in contrast to the largest of size 8 persons and over, while controlling for correlates (intervening variables) of poverty. A value above 1.0 indicates higher odds (in effect number of times) of being poor compared to the reference

size. All odds are statistically significant at $p < .01$ or $< .05$ except where indicated by a minus sign. For the control variables, with poverty category coded 0 for less poverty and 1 for being poor, also an odds value of less than one means a higher value of a variable is associated with less poverty.

Table 2.0 Odds ratios of a household of a certain size being poor compared to the largest by poverty/household size pattern grouping in Eastern and Southern Africa.

(a) Eastern and Southern Africa

VARIABLE	TOTAL	ZAMBIA MOZAMBIQUE	UGANDA TANZANIA	RWANDA	KENYA	NAMIBIA ZIMBABWE	The Islands COMOROS	The Islands MADAGASCAR
Household size / Odds Ratios**								
1 (1)	2.782	4.149	2.102	7.528	2.145	1.238-	1.600-	2.480
2 (2)	2.345	3.150	1.565	6.161	1.883	1.327+	1.525-	1.778+
3 (3)	1.721	2.254	1.257+	4.445	1.312+	.941-	1.219-	1.189-
4 (4)	1.536	2.019	1.265	3.111	1.149-	1.040-	1.051-	.826-
5 (5)	1.545	1.521	1.515	2.733	1.489	1.143-	1.123-	.902-
6 (6)	1.348	1.454	1.176-	2.077	1.061-	1.099-	1.358-	1.062-
7 (7)	1.160	1.143-	1.063-	1.595	1.158-	1.119	.882-	.857-
8+(8) (Ref.)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Sex of head	.852	.892-	.673	1.358	.923-	1.082-	.717	.962-
Age of Head	.989	.989	.989	1.004	.990	.990	1.000+	.976
Location	10.139	9.327	11.034	7.783	5.871	27.289	4.362	29.093
Education of head	.806	.829	.789	.801	.817	.816	.876	.728
Prop.in Labor force	.206	.250	.323	.099	.151	.285	.477	1.112
Husb./Wife Pres.	1.341	1.341	1.157	1.590	1.674	1.281	.854+	.040-
Pattern	1.213	-	-	-	-	1.534	-	
Sample	62,849	15,692	14,858	5,955	8,130	9,363	2,189	6,662
Per caput GNP, 1998 (US $)	-	330 210	310 220	230	350	1,940 620	400	250

\+ Significant at p < .05; - not significant.

It can be seen, first from the region as a whole (see the totals, i.e. first column), that, now with control for other correlates, the pattern of less poverty with higher household size comes out clearly, and it is overwhelming. This is shown by high statistical significance, mostly at less than .01 level (of error). For example the odds of being poor decrease monotonically with higher household size: a one-member household is nearly three times poorer than the largest of eight members, 2.3 times for the two-member, 1.7 for the three member, and so on. Thus almost all countries, except four (out of the ten) generally show this pattern. Even the exceptions, namely Namibia, Zimbabwe and Comoros, if not for non-significance statistically, they show a tendency of the larger households to be less poor. Thus there appears to be two groupings to replace the earlier three, when no control for intervening factors was done. The first is of less poverty with higher household size that is pervasive of the region; second is where this pattern is only a tendency, i.e. not significant.

Important observations can also be made on the correlates of poverty, i.e. the variables other than household size. All but two have the expected odds values, and importantly they are statistically significant (mostly with $p < .01$) in all countries, confirming their importance as intervening factors of poverty. Thus less poverty is associated with older age (a life cycle trend), , and education obviously. Abject poverty conditions in rural areas can be observed clearly: over 10 times poorer than urban areas. Notable is higher proportion of household members in labour force ages of 15 years and over: it is everywhere related to less poverty; together with higher household size, they are the two important explanatory variable of less poverty the phenomenon of focus. Strangely female headed households show to be less poor, except for Rwanda, Namibia and Zimbabwe, and in the same vein, households with both husband and wife present are poorer.

It is worth noting here that these findings do not by any means say every individual big household is less poor than small ones or the converse. Indeed, as can be seen in the bivariate case in Table 1, even in e.g. the clear cases with proportions less poor rising with higher household size, one still observes high proportions in the poor category at all levels of household size in all countries. It is a phenomenon that needs further study, but beyond the data available. What the data and further analysis shows is, in spite of these exceptions,

the major finding is not in doubt, that proportions less poor significantly increase with higher household size in most countries, as confirmed by multiple logistic regression when control is made for intervening factors.

Supporting evidence (not shown here) can be drawn from a wide range of data sources: western African countries, the Egyptian and Turkish DHSs. Contrasts of poverty by household size in the Egyptian case rivals those of many other African countries.

The finding of less poverty with higher household size raises so much skepticism that it is imperative to cast the methodology net wider for more information. Stepwise regression is employed to see which factors are drawn into the equation, i.e. that are more associated with poverty level. Here we increase the number of factors: those identified above, and interaction among them (two-way interactions). This will be done watching out for hypothesized factors: not only merely household size but its coming into the equation as per two groupings of poverty/household patterns identified earlier.

In Table 3 are shown results of this stepwise logistic regression for the region and country groupings observed above.

Table 3 Coefficients of stepwise multiple logistic regression of poverty category with household size, correlates and their interactions in the east and southern Africa: total and rural urban location.

Variables in the Equation	Coefficients **		
EAST AND SOUTHERN AFRICA			
	TOTAL	URBAN	RURAL
HOUSEHOLD SIZE, PROP. LABOUR, PATTERN:			
Pattern (Poverty/H'size)	.1884	.2468	.1565
Household Size	.0609	-	-
H'sehld Size, PropLabor	-.2239	-.2524	-.1284
Household Size, Husb./Wife Pres.	-.0617	-	-.0691
Household Size, Education of head	-	.0053	-
PropLabor, Education	-.0965	-	-.1351
PropLabor, Sex of head of h'sehld		-.3149	-
PropLabor, Age of head of h'sehld	-	-	-.0063
OTHER CORRELATES:			
Age (of head of household)	-.0106	-.0084	-
Education (of head of household)	-.1033	-.2358	-.0628
Location of h'sehld	2.1401	-	-
Sex, Education of head h'sehld	-.0330	-	-.0328
Age, Husband/Wife Present	-	-	-.0101
Education, Husb./Wife Pres.	-	-	-.0231+
Location, Husb./Wife Pres.	.3373	-	-
Husband and Wife Present	-	.1570	1.2580

NOTES:

1. ** All variables are significant at p < .01 level, except where stated.
2. + Significant at p < .05.
3. Coding:
   Dependent var: poverty category: Less poor=0, Poor=1;
   Sex (of Head): Male =1, Female =2;
   Education: years attended;
   Loc(ation of household): Urban =1, Rural =2;
   PropLabor: proportion of household members 15 years and above.
4. Negative coefficient: The higher the value of a variable, or interaction, the less poor a household is.

Table 3 Coefficients (B) of stepwise multiple logistic regression of poverty category with household size, correlates and their interactions in the countries of east and southern Africa region.

	ZAMBIA MOZAMBIQUE	TANZANIA UGANDA	RWANDA	KENYA	NAMIBIA ZIMBABWE	THE ISLANDS COMOROS MADAGASCAR
Variables in the Equation / Coefficients **						
HOUSEHOLD SIZE, PROP. LABOUR LABOUR:						
Pattern (Poverty/H'size)	-	-	-	-	.4073	
H'sehld Size, PropLabor	-.2279	-.2041	-.2836	-.1205	-	- .688
Household Size, Husb./Wife Pres.	-.0624	-	-.1948			
Household Size, Age	-	-	.0051	-	-.0007	- .010
Household Size, Education		.0104	-	-	.0061	- .021
Household Size, Location	-	-.1108	-.1108	-	-	- -.130
PropLabor, Education	-	-	-.2479	-.9114	-.1143	- .175
PropLabor, Sex of Head	-.2596	-.1815	-	-	-	-.329 -
PropLabor, Age	-	-	-	.0265	-.0110	
PropLabor, Location	-	-	-	-1.1121		

(ctd next page)

(Table 3 ctd)

OTHER CORRELATES:							
Age (of head of household)	-.0129	.0175	-	-.0317			
Age, Education of head	.0013+	-	-	-	-	-.792	-.003
Location	1.9214	3.7938	2.7545	2.5906	3.3290	1.439	-
Education	-.3253	-.2043	-	-	-.1544		
Sex, education	-	-	-	-.0601	-		
Sex, Husband/Wife Present	.4911	-	-	-	.1573		
Location, Husband/Wife Present	-	-	.7151	.2636			
Sex, Location	-	-.2549	-	.1416+			
Age, Location	-	-.0184	-.0106				
Education, Location	.0578	-.0547	-.0401	-.0456			

A first important observation is that higher household size per se is in all countries not selected into the equation. That should calm the surprise and skepticism on the matter. However, and secondly important, this observation does not dismiss the argument of focus, of less poverty with higher household size. Household size appears very much into the equations, though now importantly when interacting with other variables. As can be seen in the first panel (with variables of household size or proportion in the labour force) almost all coefficients have a negative sign. It is borne out therefore that higher household size, not per se, but by interaction with another variable is associated with less poverty. The more relevant, indeed important one is higher household size interacting with higher proportion of household members being in the labour force ages of 15 years and above: they are found to be less poor. Evidence from the western African, Egyptian and Turkish DHSs (not shown) show similar results.

The labour force result raises desire to see contrast of poverty level of households' proportion of members in the labour force, call it household (age) structure.

2.1 Poverty by household structure

In Table 4 is shown odds ratios of poverty compared to a household with the highest proportion, i.e. .67 and higher of its members in the labour force ages of 15 years and over, controlling for intervening factors of poverty (though not shown). Median age of the head of the household at each level is shown in the right panel.

Table 4 Odds of being poor, and age of head of household by household's proportion of members in the labour force ages of 15 and over.

Proport'n in labor force	Odds of being poor			Median age of Head		
	Total	Rural	Urban	Total	Rural	Urban
0 - .335	1.63	1.53	1.69	37.0	38.0	36.0
.335 - .509	1.27	1.20	1.31	39.0	40.0	37.0
.509 - .673	.99	.90	1.06	43.0	45.0	38.0
.671 - 1.000	1.00	1.00	1.00	48.0	52.0	39.0

Less poverty with higher proportions in the labour force can clearly be seen, as expected from earlier results of logistic regression. Though not shown, this is true at disaggregated level, whether by rural-urban location or grouping by pattern of poverty by household size. Over the life cycle, a household would be expected to have more of its members older, therefore in the labour force. It can be seen that the head's age rises monotonocally with proportion of members in the household. Together with earlier observed less poverty with higher size one can say with confidence that a life cycle buildup of both wealth and size is shown to exist, importantly with a fair indication of causality (for wealth buildup) from labour availability for both household production and in-coming income transfers.

The poverty/household size issue is pursued further by a question whether the correlates of poverty vary by the two poverty/development level groupings above.

2.2 Correlates of poverty by development level

African countries were seen above to be in two groupings: the pervasive or dominant one of less poverty with higher household size, and where this pattern is not significant. These seems to be related to level of development. As shown in Table 2 bottom, countries with the dominant pattern are less developed, with GNP per caput of US $ 210-350, while where

there is no significant pattern, i.e. in Namibia, Zimbabwe and the Comoros it is US $1,940, 620 and 400 respectively (Population Reference Bureau, 2000: 2-3).In support of this, and at a glance these higher income countries, except Comoros, are the southern Africa countries which provide so called greener pastures where migration within the region, even from western Africa, is directed to. They are also more modernised (westernised). Informal inquiries (end of 1999) about South Africa, the economic giant in sub-Saharan Africa, indicates a converse pattern namely, less poverty with smaller household.

Change of the pattern from labour intensive agrarian peasant to a more diversified economy. This is already observed even within Tanzania: in most developed Kilimanjaro Region the pattern overall is not significant (Kamuzora and Mkanta, 2001), and tends to be the smaller the less poor in rural areas. In western Africa Ghana and Togo, though not in the highest income group, but known to pursue modern or western life styles, show this changing pattern.

3.0 Discussion

In order to arrive at a fair conclusion it is important to realise that there is need to separate two issues however related, though in another sense: the fact on the one hand, and on the other explanation or interpretation of the fact. The fact, observed in 10 independent national surveys, in spite of the appeal to the contrary, is the pattern of less poverty with higher household size, pervasive of the Africa region. This holds even when correlates of poverty, generally observed and shown in this study as powerful determinants of poverty level, are controlled for. The study finding is an incontrovertible fact therefore. The few cases, where the converse is true, that is less poverty with smaller household size, rather than being exceptions, have been found to be related with higher level of economic growth. They are useful pointers to possible changes with socio-economic transformation. But for now the dominant pattern can also be explained.

The fact of the pattern is as observed. It is perhaps interpretation and/or explanation, further, implications, particularly on population policy and development inter-relationships of that

fact that maybe debatable. But here plausible insight that reflects realities on the ground is given. Understanding of the less poverty/higher household size pattern can be had at two levels: the life cycle of a household, and economic context. Thus it can be seen as reflecting more of older household heads having accumulated both more children and wealth. It is a life cycle build-up: Rome was not built in one day!

A more insightful explanation is the basis of living of the population, the economic context. Of this study's relevance is the basis of higher household size, from which both a higher proportion and number of workers is drawn. Indeed this is reflected in the analysis shown, indicating less poverty among households with higher proportions of members in the labour force ages of 15 years and above. All this can be understood in terms of the basis of the African economy: it is by and large labour intensive technology. It is not surprising therefore, that micro level farm studies have shown labour in Africa as the most binding constraint to production (Ruthenberg (ed.), 1968; Cleave, 1974; Kamuzora, 1980; Kamuzora and Gwalema, 1998). We may not have direct data for a production function, but it suggests causality. With this reality the observation of less poverty with higher household size would be expected. Further understanding can be had by looking at it in terms of non neo-malthusian responses to population pressure, i.e. coping with population pressure in ways other than, and perhaps precursor to fertility limitation.

The celebrated Boserup (1965) thesis of evolution of higher yield agricultural systems have been widely observed: in Tanzania, Ukara Island (Ludwig, 1968), and mountain slopes of the Kilimanjaro (Maro, 1975): in Kenya, "More People Less Erosion" found in Machakos, by Tiffen **et al.** (1994). Boserup has assumed diminishing marginal returns to labour; however this was been contested by Bronson (1970) with empirical evidence, and critical review of her critiques by Grigg (1979). Further, out-migration, that Boserup regarded as sign of failure of the above endogenous development is however seen as part of response to population pressure: people go out to colonise new lands, out-migrate to town, in many cases temporarily, termed circular migration. The latter has been found by Gould (1999) to be an important response that keep rural families afloat.

Indeed these demographic responses, precursors to limitation of fertility, had been pointed out by Kingsley Davis (1963) in a theory of multiphasic demographic response to population pressure. It is a variety of responses, of out-migration, postponement of marriage and fertility regulation, both simultaneous and inter-temporal, depending upon the ease with which the community can relieve the strain through out-migration (Friedlander, 1969). Case studies of Davis' proposition abound. These are, for example, a wide range of simultaneous and inter-temporal responses in Costa Rica (Klijzing, 1985), Korea (Kim, 1992), the Philippines (Xenos, 1996), and Puerto Rico (Mosher, 1980). Changing relationship over time between fertility and socio-economic status, positive before fertility decline have been observed e.g. in Java (United Nations, 1984), the United States and Japan (Kuroda, 1977). In Asia postponement of marriage (a malthusian response) is reported to have been one significant factor for initial decline in fertility (Leete, 1987). The European experience caps it all: colonisation of new distant lands before 1870's onset of decline in fertility. Importantly, the traditional "nuptiality valve" (Hajnal, 1965) of low proportions married, e.g. in Ireland, kept natural fertility lower than that in developing countries, and was the determinant of fluctuations in pre-20th Century fertility (Smith, 1981, 1983).

The above two 'understandings' go to explain not only generally observed low contraceptive prevalence in Africa, but perhaps more importantly, that, as **homines sapientes et economici**, people know what is best for them. This has all along been put loud and clear by people themselves: they use family planning methods mainly for spacing, as per data from a number of developing countries (Bongaarts, 1991), and specifically in Malawi (Cohen, 2000). They attempt to limit fertility only at high parities, as reported from e.g. the Tanzania Demographic and Health Survey (TDHS) 1996 (Tanzania, 1997: 45-50). This reality lends much support to the main finding of the study: less poverty with higher household size.

The findings and interpretations thereof point to serious implications for both the enhancement of the population debate in general, and policy and direction of family planning efforts in particular.

The less poverty with higher household size finding of the study lends support to the side that there is little evidence of negative effects, on the protracted debate on the relationship between population growth and development. It may surprise many, but it is the state of the art. It is a phenomenon that has been observed right from Kuznets by 1965, through to his student Easterlin (1967), my teacher (1973-78). Of perhaps more significance, given the power-politics of the debate, are three high powered studies, two, 15 years apart, 1971 and 1986 sponsored by none other than the (American) National Academy of Sciences and National Research Council. The third study, is the World Bank's 1984 World Development Report. In all of them the scholar consultants saw no evidence of deleterious effects. This was to the chagrin of the sponsors who therefore just put out executive statements that 'on balance' lower population growth was preferred (see reviews in Population and Development Review 1985, 1986 respectively); but it did not amuse the 1986 study lead consultants (Simon, 1986). These studies in effect repudiate the Coale-Hoover thesis, fertility decline, the prime prescription of Coale and Hoover (1958).

Looking at this thesis further, it ironically sets a sure path to doomsday. Not only would it trigger population ageing with its negative consequences that current developed countries and Asia dread and actually fear. For ensuing would be the aggravating burden of care of an increasing proportions of the elderly by decreasing proportions of the working populations (see e.g. Ratnasabapathy (1994); JOICFP News, 1991, 1998), and the highly unlikely reversal of the trend by a rise in fertility, therefore being confronted with the disliked but inevitable option of immigration of dissimilar racial stock. Further, the thesis negates implications of findings of this study, less poverty with higher household size connected to labour supply in a labour demanding socio-economy of Africa.

Remaining therefore is the Boserup (1965) thesis of the positive power of population growth, lukewarmly put, but its long-term economics argued by Simon (1981, 1996). A succint evaluation of Julian Simon (RIP, 1998) by Ahlburg (1998) caps it all:

> …. Economics does not *conclusively* show that a greater number of people implies slower economic development or a lower standard of living. … Julian Simon made a

> valuable contribution to the population growth debate. He forced us to think harder about the issues and to consider the long-run positive consequences of population growth as well as the short-run negative impacts. … (**ibid.**: 324).

(emphasis in original; review of the population debate and schools of thought can be had in Kamuzora, 1999)

What does it abode for the family planning movement? It is to leave people to decide and be helped to have the number of children that they desire, which is actually a UN convention. Thus efforts especially by the family planning movement for young households to stop at just a few children, and they don't do that (!) as per data, may be misguided. Concentration should be on reproductive health in general, and specifically child spacing for healthy children, and let couples decide themselves on the number. Just as socio-economic changes has underlain that in still poor Bangladesh (Caldwel **et al.**, 1999)!

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Appendix 1 Construction of a possessions index

The construction of a possessions index goes in the following manner. A type of an item is given a weight or score: the value of the weight/score given is determined by an item's relative standing on level of value. For example a sewing machine is certainly more valuable and shows one having more wealth than a table or chair; so would be a motor vehicle compared to the sewing machine. Simply an arithmetic sum of the weights would give the possessions index: a higher weight value indicates more wealth. There are however important refinements that need consideration for a more proper index.

The value of the weight could be a score, e.g. 1,2,3,…., with any interval. This leaves room for arbitrariness, serious being the differences in the values between items. The problem can be avoided. We prefer what I call a hierarchical 'binary system'. An example explains it better. On the survey questionnaire, a household has (=1) or does not (=0) possess an item. With an item's relative standing as an indicator of level wealth (indeed here it is poverty) still valid, as explained above, an item is practically given a position, in the following way. Let us continue with the above items, namely chairs, tables, sewing machines and a car, valued higher in this order by taking positions one two to four respectively. Suppose we have two persons, one possessing chairs, tables and a car; the other person, chairs and a sewing machine. Their possessions indexes would be as follows:

	Chairs	Tables	Sew'ng M	Car	POSSESSIONS INDEX
Person No 1	1	1	0	1	1011
Person No 2	1	0	1	0	101

Note: The last position on the index is the position of lowest value.

Person No. 1 is certainly wealthier than No. 2. Their possessions indexes are respectively 1011 and 101. (The arithmetic of combining a person's items can easily be discerned.) The

advantage here is that, knowing an items position, one can tell what particular items a person possesses.

Grouping can be done into manageable 'Possessions classes': in this study the classes (they are actually a step to arriving at a poverty category, as will be seen later) are poorest, poor and less poor. It can be noted that the word rich is avoided because as will be seen in the results we are dealing with largely poverty conditions in the survey area.

The items going into the possessions index (with their value position in that order as explained above) are: motor car/lorrry, motor cycle, sewing machine, bicycle, radio, lantern, tables, chairs, cattle, and sheep/goats; an additional item going into the index is housing quality (materials making the roof, walls and floor, and number of rooms, where the latter is converted into a crowding variable of number of persons per room.

The three 'Possessions classes' (Posclass) are then as follows:

1. POOREST: owning a bicycle OR radio and any of the lower value items (including none);
2. POOR: owning a radio and a bicycle and any of the lower items;
3. LESS POOR: owning a sewing machine OR any of higher, and lower value items.

Housing quality (materials it is made of) was also determined with higher value put to the roof, then walls, and lastly the floor. A qualification was made by adding a crowding (persons per room) dimension. In the TDHS data, further poverty variables, namely type of water source and toilet exist, and were used. Three classes of quality were arrived at: poor housing (basically a thatched roof), improved housing (corrugated iron roof but basically with mud walls and floor), and modern (corrugated iron /tile roof and brick/stone/cement walls and floor).

Combining housing quality and possessions class we produced two 'Poverty Categories' (Poor=1 (1&2) and Less Poor=0 (3), PAUPE4), to facilitate logistic regression analysis.