POLYGYNY AND REPRODUCTIVE BEHAVIOR IN SUB-SAHARAN AFRICA: A CONTEXTUAL ANALYSIS*

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In this paper I examine the effect of polygyny on aggregate reproductive behavior. I argue that within countries there exist different polygyny regimes, each exhibiting a unique reproductive pattern. Using the 1988/1989 Kenya Demographic and Health Survey (KDHS1) data, I identify three distinct regimes: low-polygyny, mid-polygyny, and high-polygyny regimes. The results of the bivariate and multivariate analyses reveal strong differences in reproductive preferences and behaviors across polygyny regimes. High-polygyny regimes, for instance, maintain a value orientation that favors and encourages high reproductive performance. The force of this pronatalism operates equally for men and women; but whereas men in this regime attain their reproductive goals by marrying multiple wives, women attain theirs by maximizing their reproductive capabilities. This maximization occurs through early initiation of sexual/reproductive activity, universal marriage and minimal interruption of marriage, nonuse of contraception within a union, and a positive attitude toward high fertility.

Demographers have devoted much attention to the institution of polygyny—especially in sub-Saharan Africa, where the practice is particularly common. Most demographic studies, however, treat polygyny and monogamy as exclusive categories. For example, most studies on the polygyny-fertility relationship focus on whether monogamously married women have or desire more children than their polygynously married counterparts. This line of research is of limited utility in explaining the impact of polygyny on reproductive behavior because the dichotomization of marriage ignores the fluidity in marriage. For instance, currently monogamous unions in most of sub-Saharan Africa may become polygynous, whereas currently polygynous unions can become monogamous through widowhood or divorce. Indeed, the fluidity in marriage types may explain any observed differences or similarities in the fertility of polygynous and monogamous women (Ahmed 1986; Pison 1987). Men's desires for polygyny remain strong. In one study, about 40%–80% of currently monogamous men in Francophone Africa desire another wife (Speizer 1995).

Although a woman can be in only one marriage at any given time, her marital status may change several times during her life course. As a result, it is often not possible, even with rigorous statistical controls, to situate each conception or a birth in the exact marriage in which it occurred—especially with retrospective survey data. In fact, the boundary between monogamy and polygyny is often unclear in some societies. The changing pattern of polygyny in urban areas of Africa, where men maintain a separate dwelling unit for each partner and the partners are often unaware of the existence of other wives in the circle, makes this dichotomy unrealistic (Karanja 1994; Mann 1994; Obbo 1987). In a matched sample of husbands and wives in the 1989 Kenya Demographic and Health Surveys (KDHS1), 6% of husbands reported as monogamous by their wives reported having at least two wives; in 8% of the cases in which the wife reported her husband as having more than one wife, her husband reported having only one wife. That two people in a relationship could define their relationship differently in terms of this dichotomy further questions the utility of the dichotomy as a differentiating factor in reproductive behavior.

More important, the comparison of monogamous and polygynous women ignores certain salient factors that may have more relevance to reproductive behavior. In particular, it ignores the fact that polygynous and monogamous women within any given sociocultural setting usually share the same cultural values with respect to reproduction. Indeed, the ultimate goal of reproductive success in any given community may be highly dependent on these culturally defined values (Caldwell and Caldwell 1990; Irons 1979). These sociocultural values serve to engender a particular reproductive regime that transcends marriage types. This argument is central to diffusion as an explanatory framework of fertility decline in Western Europe. Empirical evidence suggests that the decline proceeded along ethnic, linguistic, or religious lines, suggesting the localization of reproductive values within geocultural systems (Cleland and Wilson 1987; Coale and Watkins 1986). In fact, different socioeconomic groups within the same geocultural system often experienced similar patterns of reproductive behavior compared with similar socioeconomic groups across different geocultural systems (Lesthaeghe 1978; Watkins 1986). Seen as innovative behavior, therefore, the adoption of fertility control may depend more on a culture's receptivity to the new idea than on the differences among groups within a culture.

Situational differences may exist between monogamously and polygynously married women in the same geocultural setting that could affect their reproductive performance at the individual level. Such individual-level differences, however, may be completely irrelevant in under-

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standing the overall effect of polygyny on a society's reproductive performance. For instance, frequency of intercourse has been used to explain the lower fertility of polygynous women (Musham 1956). Differences in coital frequency between monogamous and polygynous women, if they exist,[1] are unlikely to translate to an appreciable difference in fertility because the relationship between coital frequency and fecundability is not linear (Barrett 1971; Bongaarts and Potter 1983).

One consequence of this methodological approach in the analysis of the relationship between polygyny and reproductive behavior is the lack of a consensus among researchers on the effect of polygyny on reproductive processes. Researchers are equally divided among those who claim that polygyny reduces the fertility of individual women (see, for example, Garenne and van de Walle 1989; Handwerker 1986; Pison 1987), those who claim it has no effect at all (see Mulder 1989; Pebley and Mbugua 1989; Sichona 1992), and those who claim it increases women's fertility (see Ahmed 1986; Arowolo 1981). These studies, however, have led to an increasing understanding that the micro effect of polygyny on fertility at the individual level may be quite different from its macro effect on fertility at the aggregate level. While the former may be negligible and insignificant, the latter could be enormous (Bhatia 1985; Pison 1986). The importance of this potential effect of polygyny on aggregate fertility behavior has not been well documented in demographic literature. I seek to develop a framework for analyzing the effect of polygyny on fertility at the macro level and to outline the possible mechanisms through which this macro-level influence of polygyny on fertility operates.

I use data from the 1988/1989 Kenya Demographic and Health Surveys (KDHS1). In this data set, polygyny is shown to reduce fertility at the individual level. Polygynously married women have a total marital fertility rate (TMFR) of 7.2 for the five-year period preceding the survey; monogamously married women have a TMFR of 7.5 for the same period. I use this data set to show how a negative association between polygyny and fertility at the individual level may be consistent with a positive effect of polygyny on fertility at the aggregate level.

DATA

In the KDHS1, all currently married women were asked: Does your husband/partner have any other wives besides yourself? Those who answered "yes" are asked a second question: "How many other wives does he have?" A woman is said to be in a polygynous union if she answered "yes" to the first question or had a nonmissing value greater than zero in response to the second question.[2] The proportion of currently married women in polygynous unions is used as an estimate of polygyny level in each region.[3] The country is then divided into different polygyny regimes based on the observed pattern of regional variation in polygyny levels. All women in a given region, regardless of their current union type, belong to the polygyny regime identified with their region of residence.

Polygyny levels for the different provinces in Kenya are presented in Table 1. The table shows that polygyny has declined by 33% between the 1977/1978 Kenya World Fertility Survey (KWFS) and the 1993 Kenya Demographic and Health Surveys (KDHS2). In all three surveys shown in the table, there exists a large regional variation in polygyny levels. Central province consistently maintained the lowest polygyny level in all three survey periods, while Coast, Nyanza, and Western Provinces maintain the highest levels of polygyny. In KDHS1, the prevalence of polygyny ranged from about 8% in Central Province to more than 37% in Nyanza Province.[4] Clearly, three polygyny regimes can be identified in Kenya: low-polygyny, mid-polygyny, and high-polygyny regimes.

Using the KDHS1 data, I define the low-polygyny regime in Kenya as regions in which less than 10% of all currently married women are in polygynous relationships. Only Central province is identified as a low-polygyny regime. The mid-polygyny regime consists of provinces in which 10%–20% of all currently married women are in polygynous relationships: This includes Nairobi, Eastern, and Rift Valley provinces. The remaining provinces—Western, Coast, and Nyanza—belong to the high-polygyny regime; more than 20% of all currently married women in these provinces have co-wives. The figures from the 1977/1978 KWFS and the 1993 KDHS2 show that this categorization of polygyny regimes is realistic and enduring. Although there has been a decline in the overall level of polygyny in the country, regional variations in polygyny levels are maintained. Both the KWFS and the 1993 KDHS2 yield the same classification of provinces into polygyny regimes.

The number of polygyny regimes and the cutoff point for each regime in a country will depend on the general incidence of polygyny and on variations in polygyny levels across regions in the country. In Kenya, regions in the same polygyny regime often do not share geographic boundaries and often include diverse ethnic groups (see Appendix Figure A1). One implication of this is that groups within a polygyny regime may have very different approaches to polygyny. This is not problematic, however, because the goal is to see if different polygyny regimes, whatever their cause, maintain different reproductive patterns. It is possible, therefore, that religion (Islam) may be associated with the high polygyny of some groups in Coast and Eastern provinces

1. Some studies have shown no difference between polygynous and monogamous women in coital frequency (see Sichona 1993).

2. Two women who answered "yes" to the first question and "don't know" to the second question were classified as polygynous. Eight women who had missing values on the both questions were excluded in defining the polygyny variable.

3. Regional clusters in Kenya are referred to as provinces. The term region is therefore used interchangeably with province in this paper.

4. Three districts making up the whole North-Eastern province and two districts in both Eastern and Rift Valley provinces were not included in the 1988/1989 KDHS. These seven districts comprise the whole northern nomadic group. (See Appendix Figure A1.)

TABLE 1. PERCENTAGE OF CURRENTLY-MARRIED WOMEN IN POLYGYNOUS UNION BY REGION, KENYA, 1977–1993[a]

Region	Percentage Polygynous (Weighted)			Number of Observations (KDHS1)	
	KWFS 1977/1978	KDHS1 1989	KDHS2 1993	Unweighted *N*	Weighted *N*
Central	12.6	8.35	7.49	786	648
Nairobi	21.6	15.47	11.22	517	333
Eastern	23.5	19.53	14.49	559	802
Rift Valley	24.9	19.85	19.30	740	1,045
Western	38.1	28.08	26.43	742	708
Coast	32.6	34.09	28.99	529	350
Nyanza	41.9	37.40	26.13	894	871
Total	29.5	23.41	19.50	4,767	4,757

(Kelly 1992; Makoteku and Ocholla-Ayayo 1988), whereas family wealth and type of agricultural production may be more important for some groups in Rift Valley, Nyanza, and Western provinces (Cronk 1991; Mulder 1990; Rubin 1990). The central question is whether groups in the same polygyny regime, given their similar levels of polygyny, have reproductive patterns that on average are significantly different from those of groups in other polygyny regimes.

One reason for choosing regional clusters in defining polygyny regimes is the lack of variations in polygyny levels within regions. Districts within a province generally have similar characteristics, including similar polygyny levels and reproductive preferences.[5] Although regional variations exist in the indices of socioeconomic development, mortality, and health conditions, regions in the same polygyny regime differ remarkably with respect to these indices (see Muhuri and Rutstein 1994). Also, available evidence on program efforts suggests that Coast, Eastern, and Central provinces (representing all three polygyny regimes) were areas of initial private missions and government-sponsored program activities in family planning and maternal and child health (Goldberg, McNeill, and Spitz 1989; Njogu 1991). The common factor identifying regions in the same polygyny regime, therefore, is their level of polygyny. Consequently, the reproductive patterns associated with the different polygyny regimes may depend more on the culture of polygyny than on the level of socioeconomic development of the provinces in a given polygyny regime.

METHODOLOGY

At the macro level, polygyny is defined to approximate the odds that a union is, or will become, polygynous (or the odds that a woman will be in a polygynous union notwithstanding the status of her union). These odds are derived from the prevalence of polygyny in the area. Those taking this approach argue that monogamously and polygynously married women within the same geocultural system are subject to similar sociocultural factors that may condition their reproductive behavior. These factors are derived in part from the nature of gender relations produced by the polygyny level in the society. In particular, it is argued that high-polygyny societies place high premiums on reproductive performance, and women in these societies—whether polygynously or monogamously married—both *desire* and *have* more children, on average, than those in low-polygyny societies. Given their strong fertility desires, women in high-polygyny areas are expected to adopt behavioral patterns that are consistent with the achievement of large family size goals. Consequently, they will be less likely to adopt practices such as contraception that may reduce fertility.

The basic assumption in contextual analysis is that the actions, attitudes, and preferences of individuals are influenced in part by the group to which they belong, and the effects of individual-level predictor variables may vary systematically as a function of the context (Iversen 1991; Mason, Wong, and Entwisle 1983). The relevant context could range from very small aggregations of individuals (such as friends or classmates) to national groupings. For Kenya, however, regional variations in polygyny levels are higher and much more important than variations across districts in the same province.

Regional boundaries, especially in sub-Saharan Africa, often correspond to ethnic boundaries (Emereuwaonu 1988; Ominde 1974; Udo 1979). Given the high levels of ethnic homogeneity in the marriage market in sub-Saharan Africa, regional boundaries represent a meaningful level for aggregating a cluster of women who share similar reproductive

5. For instance, of the 34 districts in the 1988/1989 KDHS, only two districts with a sample size of at least 100 cases would have been misclassified if district boundaries were used to define polygyny regimes.

values.[6] Indeed, for some ethnic groups, a woman's inability to attract a suitor from the same ethnic group may mean that she will never marry.[7] In the subsample of couples in the KDHS1, 93% of husbands and wives reported the same ethnic origin; this proportion increases to 95% when foreigners and those with unspecified ethnicity are excluded. Again, for women with specified ethnicity, 86% belong to the dominant ethnic group(s) domiciled in their region of residence.[8]

In the next section, I describe the bivariate associations between polygyny regimes and the reproductive behaviors, socioeconomic characteristics, and demographic characteristics of all women and of currently married women. Subsequently, I explore the mechanisms through which polygyny regimes affect fertility at the aggregate level.

POLYGYNY REGIMES AND INDIVIDUAL CHARACTERISTICS

The bivariate association between polygyny regimes and women's socioeconomic and demographic characteristics is shown in Table 2. Data for all women are presented in the first column of the table, and data for only currently married women are shown in the second column. The table shows that average age for all women is similar across all polygyny regimes. For currently married women, however, average age declines with increasing levels of polygyny. Currently married women in the low-polygyny area are, on average, about one and 1.5 years older than their counterparts in the mid- and high-polygyny areas, respectively.

A greater percentage of women in the low-polygyny regime live in rural areas compared with those in the mid- and high-polygyny regimes: Less than 8% of all women in the low-polygyny regime live in urban areas compared with 20% and 17% of all women in the mid- and high-polygyny regimes, respectively. A similar pattern is also observed for currently married women. Women in the low-polygyny regime are more likely to have some formal education than those in the mid- and high-polygyny regimes. Only 13% of women in low-polygyny regime have never been to school compared with 25% of those in the mid-polygyny regime and 30% of those in the high-polygyny regime. The same pattern is also observed for currently married women.

Husbands' education (as reported by wives) is also shown in Table 2. Although husbands in the low-polygyny area are more likely to have some formal education, the distribution of husbands' education is similar across the three polygyny regimes. More important, the gender gap in educational attainment widens as polygyny level increases. Because male education does not vary much (in absolute terms) across polygyny regimes, the negative association between female education and polygyny level is not due to limited access to formal education in high-polygyny areas. Instead, it is a function of the exigencies of the reproductive norms in the high-polygyny areas that constrain most of women's reproductive years to childbearing. On average, districts in the low-polygyny regime have the lowest ratios of mean number of schools per 1,000 school-aged children, whereas those in the high-polygyny regime have the highest ratios (See Government of Kenya and UNICEF 1989).

POLYGYNY REGIMES AND FERTILITY

In this section, I describe the relationship between polygyny regimes and actual or desired fertility. To measure actual fertility, I use two indices: mean number of children born in the five-year period preceding the survey and total fertility rates (TFR). The number of children born in the five-year period preceding the survey reflects more recent fertility behavior and is less prone to reporting errors due to lapse in memory often associated with measuring the number of children ever born.[9] The TFR is a current fertility measure that adjusts for differences in the age distributions of the populations being compared. Table 3 shows that for all and for currently married women, these two indices increase with level of polygyny. Thus at the aggregate level, polygyny fosters high reproductive performance. For both samples, women in low-polygyny areas have the lowest mean number of children born in the five-year period preceding the survey. For the all-women sample, the mean number of children born in the five-year period preceding the survey increases from 0.87 for those in low-polygyny areas to 1.07 for those in high-polygyny areas. For currently married women, the increase is from 1.22 for those in low polygyny areas to 1.35 for those in high-polygyny areas. These are significant differences given that the period covered by the estimate (1984/1985–1988/1989) generally precedes or coincides with the early stages of changing fertility behavior in Kenya (Frank and McNicoll 1987; Kenya Central Bureau of Statistics 1984; Njogu 1991).

The TFR was calculated for the five-year period preceding the survey. This measure is generally preferred as a measure of fertility for comparative purposes. As shown in Table 3, TFR increases with increasing levels of polygyny for all women and for currently married women. The TFR for women in high-polygyny areas of Kenya is 1.07 and 0.42 children more than those of women in low- and mid-polygyny areas, respectively. The difference in TFR across regimes is lower, but statistically significant, for currently married women.

6. Several studies have shown that marriage patterns in sub-Saharan Africa are characterized by clan exogamy and ethnic endogamy (Caldwell 1976; Cazès 1990; Conte 1979).

7. This level of aggregation of polygyny may not apply to every country. A region may not always be homogenous in its ethnic or linguistic composition, and polygyny may not occur uniformly across any given region. To the extent that this applies to any given country, a lower level of aggregation (i.e., districts or counties) may be more appropriate. Also, ethnic homogeneity in the marriage market may not apply to highly urbanized areas such as national capitals.

8. In calculating this percentage, I excluded Nairobi province because it is the national capital and has no dominant ethnic group.

9. There was substantial displacement of children at age five in KDHS1 (see Macro International, Inc. 1993). I obtain similar results, however, when using births in the six-year and three-year periods preceding the survey. These results are available on request to interested readers.

TABLE 2. POLYGYNY LEVEL AND WOMEN'S SOCIOECONOMIC CHARACTERISTICS, KENYA, 1989

	Polygyny Level							
	All Women				Currently Married Women			
Individual Characteristics	Low	Mid	High	Significance	Low	Mid	High	Significance
Mean Age	28.20	28.35	28.57	n.s.	32.35	31.42	30.87	**
Percentage Urban	7.71	20.49	17.30	**	8.36	18.50	14.98	**
Wife's Education								
None	12.82	25.00	30.44	**	17.89	31.84	35.94	**
Primary	60.06	54.63	51.66	**	60.34	50.73	49.11	**
Secondary	26.80	20.23	17.85	**	21.29	17.39	14.89	**
Husband's Education[a]								
None	11.97	18.29	17.07	**	11.06	17.65	16.64	**
Primary	53.29	51.15	49.49	n.s.	52.87	51.22	49.95	n.s.
Secondary	34.74	30.55	33.43	+	36.07	31.13	33.41	n.s.
N	1,121	3,342	2,687		648	2,185	1,933	

[a]Husband's education was asked only of ever-married women. The corresponding number of observations (weighted) are 695; 2,310; and 2,049 for the low-, mid-, and high-polygyny areas, respectively.

+.01 < $p \leq .05$; *.001 < $p \leq .01$; **$p \leq .001$; n.s. = Not statistically significant

I argued earlier that, on average, women in high-polygyny areas both have and desire more children than those in the low-polygyny areas. I used two independent variables to measure fertility desires: women's reported ideal family size preference and parity-specific percentages of women desiring no additional children. As shown in Table 3, mean ideal family size preferences increase with polygyny level. For all women, the mean ideal family size increases from 3.8 in low-polygyny areas to 4.3 in mid-polygyny areas and 4.9 in high-polygyny areas. The same pattern is also observed for currently married women. Women in high-polygyny areas are also more likely than those in mid- and low-polygyny areas to give nonnumeric responses to the question on ideal family size preferences.

The proportion of currently married women who desire no additional children at each parity are inversely related to polygyny levels in Kenya. For women with the same number of surviving children, those in low-polygyny areas are less likely than those in mid- and high-polygyny areas to desire another child. Overall, the proportion of currently married women who do not want any more children declined from 70% in low-polygyny areas to 55% and 43% in mid- and high-polygyny areas, respectively. Similarly, the proportion desiring more children increased from 27% in the low polygyny area to 40% in mid-polygyny areas and 49% in high-polygyny areas. Taken together, these results suggest strongly that women in a higher polygyny regime are more pronatalist than those in a lower polygyny regime. This pronatalism may result from a value orientation that favors and encourages high reproductive performance. The force of this reproductive value operates equally for men and women in the high-polygyny regime. While men attain this reproductive goal through having multiple wives, however, women attain it through repeated childbearing. In fact, the mean ideal family size for the husband sample increases from 4.0 for husbands in low-polygyny areas to 4.4 for those in mid-polygyny areas and to 6.3 for those in high-polygyny areas. Polygyny level, therefore, could be a reliable indicator of the strength of this high-fertility norm.

Although the force of pronatalism operates equally among men and women in the same polygyny regime, gender differences in reproductive desires increase with polygyny regimes as shown in Table 3. Men and women in low-polygyny areas express similar reproductive desires, whereas men in high-polygyny areas desire more children, on average, than women in the same regime. This large difference in high-polygyny areas is not surprising. Whereas female desires may be influenced by the length of the reproductive life span and the normative birth interval in the area, male desires may depend more on how many wives a man can afford to marry and his expected number of children from each wife.

INTRODUCING CONTROLS

Because some individual characteristics of women that may affect their reproductive behavior differ by polygyny level, I controlled for the effect of these differences to see if the relationship observed between polygyny level and reproductive behavior is still valid. I examined four fertility-related outcome variables: (1) number of children born in the five-year period preceding the survey; (2) ideal number of children; (3) desire to stop childbearing; and (4) current use of contraception. I used the Poisson maximum-likelihood pro-

TABLE 3. POLYGYNY LEVEL AND ACTUAL REPRODUCTIVE BEHAVIOR, KENYA, 1989.

	Polygyny Level							
	All Women				Currently Married Women			
Fertility Levels	Low	Mid	High	Significance	Low	Mid	High	Significance
Actual Fertility								
Mean no. of children last 5 yrs.	0.87	0.98	1.07	**	1.22	1.28	1.35	+
Total fertility rate (15–44)	5.74	6.47	6.93	**	7.11	7.55	7.87	**
Total fertility rate (15–49)	6.00	6.65	7.07	**	7.43	7.76	8.01	**
Desired Fertility								
Mean ideal family size (IFS)	3.76	4.33	4.87	**	4.07	4.72	5.18	**
Percentage nonnumeric IFS	2.23	1.56	7.55	**	2.94	1.80	8.63	**
Husband's sample, mean IFS	—	—	—		4.03	4.35	6.29	**
Husband's sample, nonnumeric IFS	—	—	—		1.58	5.49	19.30	**
Percentage desire no more children, by parity[a]								
Surviving children								
0–1	—	—	—		13.59	10.49	6.35	+
2–3	—	—	—		43.23	33.34	24.35	**
4–6	—	—	—		84.48	68.43	52.64	**
7+	—	—	—		95.23	93.24	85.88	**
Total percentage wanting no more	—	—	—		69.62	54.77	43.40	**
Percentage wanting more children	—	—	—		26.87	40.06	48.75	**
N	1,121	3,342	2,687		648	2,185	1,933	

[a]The question on desire for additional children was asked of currently married women only.

+.01 < $p \leq .05$; *.001 < $p \leq .01$; **$p \leq .001$

cedure to examine the effect of polygyny regimes on births in the five-year period preceding the survey. The length of exposure over which birth outcomes are observed for each woman in the reference period is defined by the number of months in the reference period she has spent in union. This number ranges from 1 month for women who were interviewed in the same month they got married to a maximum of 60 months for those who were already married at the start of the reference period. I analyzed women's ideal family size preferences using ordinary least squares (OLS) regression; I examined women's desire to stop childbearing and their current use of contraception using logit models. The analysis in this section is limited to currently married women, but the results apply even more strongly to both the total sample of all women and the subsample of ever-married women.[10]

The results are presented in Table 4. The Poisson estimates for births in the preceding five-year period are reported as incidence rate ratios (IRR) in Table 4, Panel 1. For categorical variables, IRR are the rates at which women with a given characteristic (say, residence in low-polygyny areas) bore children during the reference period relative to those in the reference category (residence in high-polygyny areas). For numerical variables such as age, it is the change in the rate of childbearing during the reference period per unit change in the explanatory variable. The coefficients for ideal family size preference are also shown in Table 4, Panel 2. The odds ratios for desiring no additional child and for use of

10. I used the currently married sample because the question on polygyny and desire for additional children were only asked of currently married women. As shown in Table 3, differences in births in the five-year period preceding the survey across the three polygyny regimes is much stronger for the total sample (all women) than for the subsample of currently married women.

TABLE 4. POISSON, OLS, AND LOGIT MODELS OF REPRODUCTIVE BEHAVIOR, PREFERENCES, AND CONTRACEPTIVE USE: KENYA DEMOGRAPHIC AND HEALTH SURVEY, 1988/1989

Panel 1: Births Last Five Years; Type of Model: Poisson Maximum-Likelihood; Estimates Reported As: Incidence Rate Ratios

	Model 1		Model 2		Model 3		Model 4	
Variables	Incidence Rate Ratios	*Z*	Incidence Rate Ratios	*Z*	Incidence Rate Ratios	*Z*	Incidence Rate Ratios	*Z*
Polygyny Level (Ref. High)								
Low	0.909	−2.56+	0.899	−2.71*	1.018	0.28	0.954	−1.18
Mid	1.001	0.04	0.996	−0.14	1.019	0.55	1.009	0.30
Education (Ref. No Education)								
Primary			0.987	−0.40	0.966	−1.03	—	—
Secondary+			0.955	−1.07	0.934	−1.57	—	—
Urban Residence (Ref. Rural)			0.809	−6.31**	0.873	−3.15*	0.868	−3.47**
No. of Surviving Childrena			1.123	12.20**	1.122	12.05**	1.123	12.15**
Polygynous Union			0.957	−1.34	0.960	−1.23	—	—
Age (In Single Years)			0.907	−25.38**	0.907	−25.22**	0.908	−25.56**
Age at First Marriage			1.070	15.20**	1.069	14.82**	1.067	14.84**
Factor 1: Economic Development					1.050	2.67+	1.052	2.80*
Condition					0.932	−1.24	—	—
Kikuyu					1.119	2.93*	1.116	3.19**
Luhya					1.014	0.33	1.102	2.00+
Luo					1.092	1.73-	—	—
Model χ^2+ df; (R^2)	7.61	(2)	1,270.5	(9)	1,298.2	(14)	1,292.6	(9)
N	4,761		4,761		4,761		4,761	

Panel 2: Ideal Family Size; Type of Model: Ordinary Least Squares; Estimates Reported As: Coefficients

	Model 1		Model 2		Model 3		Model 4	
Variables	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*
Intercept	5.237	112.95**	5.447	29.65**	5.877	30.57**	5.887	31.49**
Polygyny Level (Ref. High)								
Low	−1.152	−13.11**	−1.108	−12.79**	−2.067	−9.23**	−2.171	−10.33**
High	−0.746	−11.09**	−0.556	−8.51**	−1.499	−9.97**	−1.577	−11.56**
Education (Ref. No Education)								
Primary			−0.632	−8.80**	−0.506	−7.01**	−0.519	−7.23**
Secondary			−1.025	−10.55**	−0.864	−8.90**	−0.881	−9.14**
Urban Residence (Ref. Rural)			−0.467	−6.37**	−0.881	−9.34**	−0.903	−9.90**
No. of Surviving Children[a]			0.099	6.13**	0.111	6.97**	0.111	6.96**
Polygynous Union			0.137	1.90-	0.106	1.49	—	—
Age (in Single Years)			0.014	2.65*	0.015	2.84*	0.016	3.05*
Age at First Marriage			−0.029	−3.37**	−0.021	−2.49+	−0.021	−2.45+
Factor 1: Economic Development					−0.375	−9.20**	−0.387	−9.67**
Factor 2: Mortality					−0.646	−7.76**	−0.682	−8.74**
Condition					−0.560	−4.65**	−0.521	−4.61**
Kikuyu					0.426	3.96**	0.486	5.25**
Luhya					−0.074	−0.81	—	—
Luo					−0.128	−1.09	—	—
Model χ^2+ df; (R^2)	4.6	(2)	16.5	(9)	19.1	(15)	19.0	(12)
N	4,521		4,521		4,521		4,521	

(Table 4 continued from the previous page)

Panel 3: Desires No Additional Child; Type of Model: Logit Maximum-Likelihood; Estimates Reported As: Odds Ratio

	Model 1		Model 2		Model 3		Model 4	
Variables	Odds Ratio	Z	Odds Ratio	Z	Odds Ratio	Z	Odds Ratio	Z
Polygyny Level (Ref. High)								
Low	3.300	12.90**	2.651	7.62**	2.208	2.46+	1.760	3.08*
Mid	1.599	7.00**	1.537	4.57**	1.697	2.43+	1.434	3.80**
Education (Ref. No Education)								
Primary			1.331	2.62*	1.300	2.37+	1.303	2.43+
Secondary+			1.228	1.48	1.184	1.20	1.181	1.20
Urban Residence (Ref. Rural)			1.445	3.61**	1.526	3.17*	1.414	3.38**
No. of Surviving Children			1.810	21.18**	1.803	20.89**	1.806	21.17**
Polygynous (Ref. Monogamous)			1.092	0.84	1.118	1.05	—	—
Age			1.121	14.45**	1.120	14.29**	1.121	14.54**
Age at First Marriage			0.948	–4.32**	0.946	–4.48**	0.947	–4.40**
Ideal Family Size Preference			0.665	–14.97**	0.670	–14.57**	0.667	–14.84**
Approves of Family Planning			1.437	2.32+	1.429	2.27+	1.432	2.30+
Factor 1: Economic Development					1.054	0.91	—	—
Factor 2: Mortality Conditions				1.103	0.82	—	—	
Kikuyu					1.586	2.74*	1.573	2.97*
Luhya					0.960	–0.27	—	—
Luo					0.936	–0.50	—	—
Kamba					0.976	–0.15	—	—
Model χ^2 + df (R^2)	184.4	(2)	2,386.9	(11)	2,397.5	(17)	2,395.1	(11)
N	4,372		4,372		4,372		4,372	

Panel 4: Current Contraceptive Use; Type of Model: Logit; Estimates Reported As: Odds Ratio

	Model 1		Model 2		Model 3		Model 4	
Variables	Odds Ratio	Z	Odds Ratio	Z	Odds Ratio	Z	Odds Ratio	Z
Polygyny Level (Ref. High)								
Low	4.537	15.28**	2.967	9.81**	1.254	0.73	1.475	2.32+
Mid	3.039	13.37**	2.464	9.90**	1.495	1.84-	1.691	5.05**
Education (Ref. No Education)								
Primary			1.508	3.92**	1.550	4.12**	1.533	4.04**
Secondary+			3.327	9.00**	3.438	9.10**	3.337	9.22**
Urban Residence (Ref. Rural)			1.250	2.30+	1.802	4.41**	1.826	4.56**
No. of Surviving Children			1.123	5.03**	1.127	5.12**	1.139	5.87**
Polygynous (Ref. Monogamous)			0.818	–1.92-	0.885	–1.15	—	—
Age			1.033	4.40**	1.029	3.81**	1.025	3.46**
Age at First Marriage			0.993	–0.62	0.986	–1.18	—	—
Ideal Family Size Preference			0.925	–3.10*	0.945	–2.26+	0.946	–2.22+
Approves of Family Planning			3.336	4.90**	3.216	4.72**	3.192	4.69**
Discussed Family Planning			3.460	11.63**	3.439	11.39**	3.428	11.42**
Factor 1: Economic Development					1.116	1.87-	1.134	2.36+
Factor 2: Mortality Conditions				0.928	–0.63	—	—	
Kikuyu					1.782	3.92**	1.775	3.92**
Luhya					0.644	–2.94*	0.610	–3.85**
Luo					0.522	–4.44**	0.517	–4.56**
Kamba					1.713	3.71**	1.653	3.733**
Model χ^2 + df (R^2)	(2)	877.7	(12)	958.0	(18)	954.6	(15)	
N	4,367		4,367		4,367		4,367	

[a]For births in the past five years, number of surviving children is defined as number of children ever born before the reference period.

-.05 < $p \leq .10$; +.01 < $p \leq .05$; *.001 < $p \leq .01$; **$p \leq .001$; — = Not applicable/Not included in the model

contraception are shown in Panels 3 and 4, respectively. For each of the four response variables, I estimate four models.

With the first model I examine the gross effect of polygyny regimes on each outcome variable. Next, I control for a set of individual-level variables that may affect women's behavior with respect to each of the outcome variables (Model 2). In Model 3, I control for some aggregate variables that may be related to both polygyny regimes and reproductive preferences and behavior. These aggregate variables include ethnicity[11] and two variables derived from a factor analysis of eleven regional variables.[12] The final model represents the preferred model and includes only polygyny regimes and the significant covariates for each of the four outcome variables. If the polygyny context is not a strong predictor of women's reproductive preferences and behavior, the observed effects of polygyny in Model 1 (if any) will disappear (or will become less important) after controlling for individual and aggregate characteristics in Models 2 and 3. If, however, polygyny level is an important and strong determinant of each of the outcome variables, I expect its effect in Model 1 to remain even after controlling for these other covariates. In the unlikely event that polygyny level is the sole determinant of reproductive behavior, Models 2–4, shown in Tables 4a and 4b, would yield no gain in precision over Model 1.

Births in the Five-Year Period Preceding the Survey

Model 1 shows that birth rates in the preceding five-year period increase with polygyny regimes: Those living in low-polygyny areas had a birth rate for the preceding five-year period that was 9% lower than the birth rate for those living in high-polygyny areas. No birth rate differences are observed between women in the mid-polygyny regimes and women in high-polygyny regimes during the reference period. These results are maintained when I control for women's individual characteristics in Model 2. The result shows that factors such as age, age at first marriage, and number of children ever born before the start of the reference period are more important than socioeconomic variables (e.g., education) in predicting recent fertility.

Living in an urban area reduces birth rates in the reference period by 19%. This strong urban influence is consistent with other results which show that the initial declines in fertility in Kenya were concentrated in the urban areas (see National Council for Population Development and Institute for Research Development 1989: tab. 3.5).

Of all the aggregate variables introduced in Model 3, only Factor 1 (socioeconomic development), Luhya, and Kamba ethnic groups have significant effects on recent fertility. All three variables are associated with increased rates of childbearing during the reference period. Number of children ever born before the start of the reference period, age at first marriage, level of socioeconomic development (Factor 1), and Luhya and Kamba ethnic groups are associated with higher birth rates while current age and urban residence are associated with lower birth rates during the reference period. The effect of polygyny regimes, however, becomes insignificant after controlling for the aggregate variables. Similar results are also obtained in the final model with the effect of polygyny regimes on recent fertility remaining insignificant. The high correlation between ethnicity and polygyny regimes and the restriction of the sample to currently married women may explain the insignificant effect of polygyny regimes on recent fertility in Models 3 and 4. When I exclude the ethnicity variables from Models 3 and 4 (results not shown), low-polygyny areas maintain a significantly lower birth rate in the five-year period preceding the survey. As I will show later, the aggregate-level polygyny effect on fertility operates mainly through early initiation of sexual and reproductive activity and minimal interruption of union once initiated. Limiting the sample to currently married women will generally underestimate the aggregate-level polygyny effect on actual fertility.

Ideal Family Size Preference

Mean ideal family size increases with polygyny levels. Model 1 shows that women in the low- and mid-polygyny areas reported ideal family sizes that are on average 1.15 and 0.75 children less, respectively, than those reported by women in high-polygyny areas. The same results are maintained in Model 2 after I control for women's individual characteristics. All individual characteristics included in the model are significant predictors of desired family size, except polygynous union, which has only a marginally significant positive effect. The effect of polygyny regimes on desired fertility becomes much stronger after I control for the aggregate variables. Net of their individual and aggregate variables, women in low- and mid-polygyny regimes reported ideal family sizes that are on average 2.1 and 1.5 children, respectively, lower than those reported by women in the high-polygyny regime. The Kikuyu—who predominantly live in low-polygyny areas—have lower desired fertility, wherease the Luhya—who predominantly live in high-polygyny areas—have higher desired family size than the other ethnic groups, net of the aggregate effect of polygyny. At the individual level, net of the other covariates in Model 3, being polygynously married does not affect desired fertility. Results in Model 4 are consistent with those in Model 3.

Desire for No Additional Children

Polygyny level is also a significant predictor of desires to stop childbearing. As shown in Panel 3 of Table 4, results from Model 1 shows that compared to living in a high-po-

11. Dummy variables are entered for four ethnic groups with at least 50 cases in more than one province.

12. The two variables from the factor analysis explain 78% of the variation in the eleven regional variables. The first factor relates to the level of socioeconomic development in a province. Of the 11 regional variables, 6 load on this factor; the direction of their effects suggests that provinces with low levels of socioeconomic development are positively identified with this factor. The second factor represents the health/mortality conditions in a province. Four variables load on this factor, and the direction of their effects suggests that provinces with high mortality or poor health conditions are positively identified with this factor. Details of the factor analysis are available by request from the author.

lygyny area, living in a low-polygyny area increases a woman's odds of desiring no additional children by 3.3 times. The odds of desiring no additional child are 1.6 times higher among women in mid-polygyny areas than among those in high-polygyny areas. In Model 2, net of her individual characteristics, a woman's odds of desiring no additional child are 2.7 and 1.5 times higher in low- and mid-polygyny areas, respectively, than in high-polygyny areas. All individual-level variables are significantly related to the odds of desiring no additional child, except being in a polygynous union. All, except the woman's ideal family size preference and her age at first marriage, increase the woman's odds of desiring no additional children. None of the aggregate variables in Model 3 are significant except the Kikuyu ethnic group, whose women are significantly more likely to desire to stop childbearing. A comparison of the parameter estimates in Models 2–4 for each covariate shows stability in the estimates across all three models. The only exception is the low-polygyny regime, and this is due to its high collinearity with Kikuyu ethnic group: The low-polygyny areas include only Central province, and 95% of the respondents in Central province are Kikuyu.

Current Contraceptive Use

Polygyny level is again shown to be a strong predictor of contraceptive use in Model 1. The odds of using a contraceptive method are 4.5 and 3 times as high for women in low- and mid-polygyny areas, respectively, as the odds for women in high-polygyny areas. The effect of polygyny levels on contraceptive use is still very strong after controlling for women's individual characteristics in Model 2. Net of these individual level covariates in Model 2, living in low- and mid-polygyny areas increases the odds of using contraception by 3 and 2.5 times, respectively, compared to living in high-polygyny areas. The effects of all the individual level covariates are significant except the effect of age at first marriage. The effect of being in a polygynous union, however, is only marginally significant ($p < .10$) and is negative.

In Model 3, all the variables representing different ethnic groups are significantly associated with the odds of using contraception. The effect of polygyny levels is still positive but not statistically significant. The effect of polygyny regimes is generally not significant after controlling for the individual and aggregate variables in Model 3. Women in mid-polygyny areas have marginally significant higher odds of using contraception than those in high-polygyny areas. Significant effects are observed for both low- and mid-polygyny regimes in the final model, net of the relevant individual-level and aggregate-level variables.

The results in Table 4 are consistent with the bivariate results presented earlier. They show clearly that women in areas of low polygyny, on average, have lower fertility desires than those in areas of high polygyny. They are also more likely than their counterparts in high-polygyny regimes to adopt reproductive behaviors, such as contraceptive use, that are consistent with small family size goals. It is not clear whether high polygyny is a response to or a cause of high reproductive norms. It is evident, however, that the two go together. Although high reproductive norms may exist without polygyny (the Hutterite were not polygynous), finding areas of high polygyny with relatively low reproductive norms may be more difficult.

ROUTES TO HIGH FERTILITY IN HIGH-POLYGYNY REGIMES

Fertility desires have been shown to predict actual fertility strongly (Pritchett 1994), and I have shown that women in high-polygyny areas of Kenya desire higher fertility than those in low-polygyny areas. To achieve these desires, individuals in different polygyny regimes may adopt different behavioral patterns with respect to reproduction. In this section, I explore the routes through which women in high-polygyny areas of Kenya achieve their fertility desires. I focus primarily on two principal proximate determinants of aggregate fertility: marriage and contraception. As shown in Table 4, Panel 4, the odds of using contraception decline with increasing levels of polygyny. This finding implies that the lower reproductive performance of currently married women in low-polygyny areas is accomplished in part through increased use of contraception. Consequently, I limit the discussion in this section to differences in marriage patterns among the different polygyny regimes.

In most societies, marriage often corresponds to the initiation of reproductive activity. Therefore, both the mean age at first marriage for women and the proportion marrying have been studied as key determinants of fertility at the aggregate level. All things being equal, the lower the mean ages at first marriage and the higher the proportion of women of reproductive age currently in union, the higher marital fertility will be at the aggregate level. By influencing these two indices, aggregate-level polygyny could affect overall fertility even if the fertility differences between polygynously and monogamously married women in a given sociocultural setting remained insignificant.

The distribution of mean age at first marriage, the mean duration since first marriage, the mean age at first sexual intercourse, the mean age at first birth, and status of marriage by polygyny levels in Kenya are presented in Table 5. As shown in the table, the mean age at first marriage is inversely related to polygyny levels in Kenya for ever and currently married women. In low-polygyny areas, the mean age at first marriage for ever-married women is 18.6 years; it declines to 17.9 years and 16.7 years for those in mid- and high-polygyny areas, respectively. In each polygyny regime, currently married women have the same mean age at first marriage as ever married women. Lower age at first marriage for women may be associated with lower age at first sexual intercourse and lower age at first birth. Table 5 also shows that both the mean age at first sexual relations and the mean age at first birth follow the same pattern as the mean age at first marriage. The mean age at first sexual intercourse for all women declines from 16.8 years in low-polygyny areas to 15.9 years and 15.4 years in the mid- and high-polygyny areas, respectively; for currently married

women, it declines from 17.0 years in the low-polygyny area to 15.8 years and 15.3 years in the mid- and high-polygyny areas, respectively. Women in high-polygyny areas, on average, enter marriage two years earlier, start sexual activity about 1.5 years earlier, and have their first birth about 1 year earlier than women in low-polygyny areas. These results show that higher levels of polygyny are associated with an early onset of sexual and reproductive activity in Kenya. Thus women in high-polygyny areas (whether polygynously or monogamously married), on average, spend a greater proportion of their reproductive life exposed to the risk of childbearing.

Because marital fertility is a major component of overall fertility, polygyny levels could significantly affect fertility by influencing the proportion of women of reproductive age who are currently in union. The proportion of women of reproductive age in the different marital status categories are shown in Table 5 for the different polygyny regimes. As shown in the table, the proportion of women of reproductive age who are currently in union is positively related to polygyny level; the proportion of never-married women is negatively related to polygyny level. In low-polygyny areas, only 58% of all women of reproductive age are currently in union. This proportion jumps to 65% for mid-polygyny areas and to 72% for high-polygyny areas. The main source of these differences is in the proportion of the never-married population, which declined from 34% in low-polygyny areas to 28% in mid-polygyny areas and to 20% in high-polygyny areas. Thus not only does polygyny increase the proportion of a woman's reproductive life spent exposed to the risk of childbearing, it also increases the proportion of women of reproductive age who are simultaneously exposed to the risk of childbearing. The early and universal marriage patterns in high-polygyny areas could be seen as an adaptive mechanism that enables women to maximize their reproductive potentials. Given these results, it could be concluded that polygyny produces a unique reproductive regime that favors high fertility.

CONCLUSION

I have argued for a new approach to the study of polygyny. I have shown that the distinction between women in monogamous unions and women in polygynous unions is conceptually weak and of limited utility in understanding the overall impact of polygyny on reproductive processes. Polygyny is not an individual-level variable. Therefore its impact on reproductive patterns cannot be understood by simply comparing the behavior of monogamously and polygynously married women (or men). Being in a polygynous union is not entirely an individual woman's choice—at least not for first wives in polygynous unions. The forces that determine a woman's odds of being in a polygynous union also affect her reproductive desires. These forces, however, apply to all women (and men) within any given sociocultural setting whether their union has already become polygynous or is still in the transitory stage of monogamy. Although an individual woman's type of union may change rapidly, the underlying level of polygyny in an area is relatively stable over time. At any time, therefore, the incidence of polygyny in a population could indicate the strength of pronatalism in that population. Although the force of this pronatalism may operate equally among men and women in the same polygyny regime, gender differences in reproductive desires were shown to increase with increasing levels of polygyny. Men and women in low-polygyny areas express similar reproductive desires, whereas men in high-polygyny areas desire more children, on average, than women in the same regime. This large difference in high-polygyny areas is not surprising: Women's expressed fertility desires may depend on female reproductive life span and the normative birth interval in the area, whereas men's desires may depend more on how many wives they can afford to marry.

The results show that women in areas of high polygyny have high fertility desires and that they adopt behavioral patterns consistent with the achievement of high fertility goals. Net of individual and aggregate characteristics, desired family size increases with increasing levels of polygyny. Also, the odds of desiring no additional child and of using contraception are much higher for women in low- and mid-polygyny areas compared to those in high-polygyny areas. Controlling for other aggregate factors, however, eliminates the negative effect of living in a low-polygyny area on recent fertility.

To achieve their high-fertility goals, women in high-polygyny areas start sexual and reproductive activity much earlier and are more likely to remain in union once initiated.[13] They are less likely to adopt practices, such as contraception, that will lower fertility. These reproductive patterns are seen as adaptive mechanisms that enable women in this polygyny regime to attain their fertility goals. Men in this polygyny regime, however, attain their high-fertility goals through marrying multiple wives. The different routes men and women adopt in reaching their reproductive goals lead to a divergence in the reproductive preferences of men and women in high-polygyny areas. In contrast, men and women in low-polygyny areas report similar reproductive desires and are more likely to discuss family planning issues with each other. They are, therefore, more likely to work together to achieve their similar and lower fertility desires.

Further research is needed on how male and female role in reproductive decisions may differ by polygyny regimes. Other areas of further research include the value of children to men and women in different polygyny regimes and the relative merit of using regional boundaries versus ethnic identity in defining polygyny regimes. The central issue here is whether individuals' odds of being in polygynous unions depend more on their ethnic identity or on their region of residence. Further research in these areas would greatly inform the development of appropriate programs for different reproductive regimes within a country.

13. Of all formerly married women, 47% of those in low-polygyny areas and 57% of those in mid-polygyny areas are divorced compared to only 24% of those in high-polygyny areas.

TABLE 5. INITIATION OF SEXUAL AND REPRODUCTIVE ACTIVITY BY POLYGYNY LEVEL, KENYA, 1989.

Sexual Activity and Nuptiality Patterns	Polygyny Level							
	All Women				Currently Married Women			
	Low	Mid	High	Significance	Low	Mid	High	Significance
Mean Age at First Marriage[a]	18.56	17.92	16.71	**	18.46	17.93	16.74	**
Mean Age at First Sex	16.84	15.87	15.39	**	16.95	15.81	15.31	+
Mean Age at First Birth	18.51	18.44	17.62	**	18.51	18.42	17.62	**
Percentage Never Married	33.84	27.99	20.35	**	—	—	—	**
Percentage Currently Married	57.85	65.39	71.95	**	—	—	—	
Percentage Formerly Married	8.31	6.62	7.70	n.s.	—	—	—	
N	1,121	3,342	2,686		648	2,185	1,933	

[a]Calculated for ever-married women only. (See Footnote 11.)

+.01 < $p \leq .05$; *.001 < $p \leq .01$; **$p \leq .001$; n.s. = Not statistically significant; — = Not applicable

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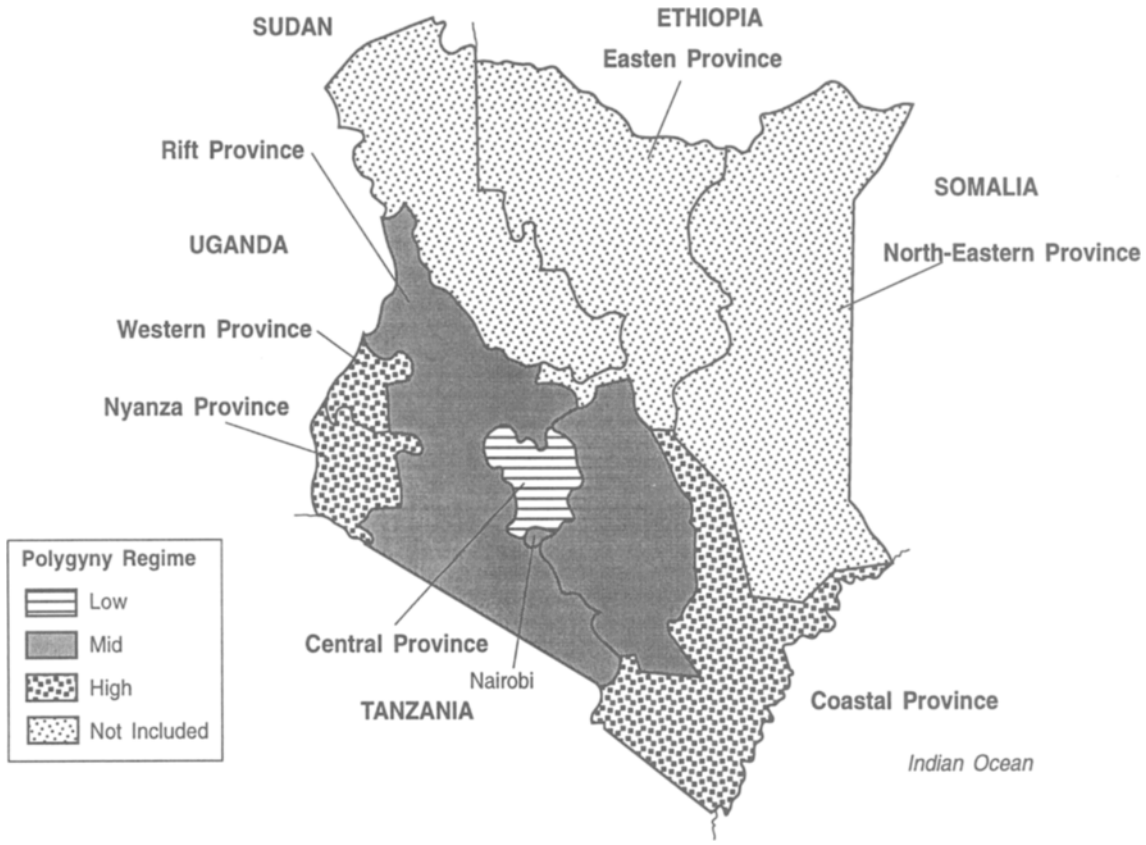
FIGURE A1. MAP OF KENYA



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