

This work is licensed under a  
Creative Commons Attribution-NonCommercial-  
NoDerivs 3.0 Licence.

To view a copy of the licence please see:  
<http://creativecommons.org/licenses/by-nc-nd/3.0/>

This work is licensed under a  
Creative Commons Attribution-NonCommercial-  
NoDerivs 3.0 Licence.

To view a copy of the licence please see:  
<http://creativecommons.org/licenses/by-nc-nd/3.0/>

---

SEX- AND BIRTH-ORDER SELECTIVE UNDERENROLMENT IN THE PRIMARY SCHOOLS  
OF KENYA'S ARID AND SEMI-ARID DISTRICTS  
AND THE "KEPYLONG" PHENOMENON

By  
P. T. FONCI

INSTITUTE OF  
17 JAN 1989  
DEVELOPMENT STUDIES  
LIBRARY

WORKING PAPER NO. 462

67  
@  
INSTITUTE FOR DEVELOPMENT STUDIES  
UNIVERSITY OF NAIROBI  
P O BOX 30197  
NAIROBI

JULY 1988

Views expressed in this paper are those of the author and should not be interpreted as reflecting the views of the Institute for Development Studies or of the University of Nairobi.

This paper has protection under the Copyright Act, Cap.130 of the Laws of Kenya.

(832)

3.95

RESERVE

IDS Information Resource Unit  
University of Sussex  
Falmer, Brighton BN1 9RE, UK

PLEASE RETURN BY

2/10/98

ABSTRACT

SEX- AND BIRTH-ORDER SELECTIVE UNDERENROLMENT IN THE PRIMARY SCHOOLS  
OF KENYA'S ARID AND SEMI-ARID DISTRICTS AND THE "KEPYIONG" PHENOMENON

by

F T PONSI

The underenrolment found in primary schools of Kenya's arid and semi-arid districts is a well documented and persistent problem. After reviewing the initiatives of governmental and non-governmental organizations to encourage full school participation by all eligible children in those districts, and discussing the causes of underenrolment identified by previous research, this paper presents two additional factors relevant to the explanation of the lamented underenrolment.

It is argued that the higher rates of girls' underenrolment in upper primaries can be accounted for in part by the concurrence of the mean age of girls in upper primaries with the mean age of marriage for girls of the ethnic groups represented in those schools, and the parents' expectation that girls of upper primary age should stay home where they can be properly socialized into their prospective traditional roles of wives and mothers. Concerning the underenrolment of boys in the primary schools of the same districts, this paper has shown that a distinctive form of birth-order selectivity - the "kepyiong" phenomenon - does explain some of that underenrolment.

The findings corroborate the recommendation made by earlier researchers and education officers in this country and elsewhere that "mobile schools" and a Training Centre for Nomadic Teachers be set up to ensure that a sizable proportion of children in Kenya's arid and semi-arid districts presently left out of the primary school system may be reached and provided with basic primary education.

A - THE PROBLEM<sup>1</sup>

The underenrolment of children of primary school age in Kenya's arid and semi-arid districts is a well known and relatively well documented problem.<sup>2</sup> Table no. 1 summarizes the most recent information available on the subject. The last three columns report the ratios of boys, girls, and total children enrolled to the projected number of boys, girls, and total children six to twelve years old for 1984.

The ratios for enrolled girls are consistently lower, in some cases as low as fifty three percent (Garissa) and 32.3 percent (Mandera) of the corresponding ratios for enrolled boys. By contrast, the ratios reported for Baringo show overenrolment. However encouraging the latter figures might be, their plausibility is open to serious questioning. The projections for the 6 to 12 years old population may be excessively low because of unfulfilled conditions of assumed constant mortality and constant fertility rates derived from the 1969-1979 intercensal figures. Additionally or alternatively, the data on enrolled children may be inflated: they may include repeaters, or children migrating from neighbouring districts to take advantage of low cost boarding schools and favourable conditions for subsequent entrance in secondary schools, or overaged children.<sup>3</sup>

Policy makers, school administrators, non-governmental organizations, and researchers have addressed in various ways the problem of underenrolment in Kenya's arid and semi-arid districts. Their contributions have focused on one or another of the various factors presumed to effect the origin and/or contribute to the persistence of this problem: the colonial legacy; the type and adequacy of educational facilities; the pastoralists' lack of monetary resources for school fees and levies; the lack of food for children attending school; the school curriculum and the schedule of delivery of educational services; the pastoralists' physical mobility, and the lack of year-round water supply.

A.1 - The Colonial Legacy.

Schools are relatively new institutions in Kenya's arid and semi-arid districts. The low enrolment of the primary school-age population of those districts is first of all a consequence of the late introduction of the modern school system and the persistent scarcity of appropriate educational facilities.

TABLE NO. 1 - Primary School Enrolment in Kenya's Arid and Semi-arid Districts by Sex, 1984, and Projected 6-12yrs. Old Population by District and Sex, 1984.

DISTRICT	ENROLLED <sup>1</sup>			PROJECTED 6-12yrs Old <sup>2</sup>			RATIO ENROLLED		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Tana River	10,018	7,323	17,341	13,561	12,746	26,307	73.8	57.4	65.9
Garissa	3,846	1,814	5,660	20,673	18,317	38,990	18.6	9.9	14.5
Wajir	3,531	1,753	5,284	20,937	18,078	39,015	16.9	9.7	13.5
Mandera	4,548	1,313	5,861	13,762	12,301	26,063	33.1	10.7	22.5
Isiolo	3,986	3,356	7,342	5,124	4,750	9,874	77.8	70.6	74.4
Marsabit	5,877	3,191	9,071	12,760	12,049	24,809	46.1	26.5	36.6
Baringo	34,635	31,862	66,497	27,833	27,118	54,951	124.4	117.5	121.0
Kajiado	17,987	13,019	31,006	22,501	20,666	43,167	79.9	63.0	71.8
Narok	24,598	17,973	42,571	31,706	29,333	61,039	77.6	61.3	69.7
Samburu*	8,036	3,738	11,774	9,968	9,904	19,872	80.6	37.7	59.2
Turkana	12,530	6,630	19,160	16,126	14,745	30,871	77.7	44.9	62.1
West Pokot	19,564	13,023	32,587	23,332	22,304	45,636	83.8	58.4	71.4

\* Provisional

SOURCES: 1) Republic of Kenya, Ministry of Education Science and Technology Annual Report 1984 Nairobi: Government Printer, n.d., pp.32-33.  
2) Republic of Kenya, Ministry of Economic Planning and Development, Central Bureau of Statistics Population Projections for Kenya 1980-2000 Nairobi: Unicef, 1983.

Kenya's arid and semi-arid districts were never integrated into the colonial economy. Rather, they remained relegated to the role of outer periphery as "closed" or "special" districts. Economic development and investment in educational facilities were concentrated at the core and at the periphery of the colonial system. Nairobi, Eldoret, Kisumu, Mombasa, Nakuru, Uasin Gishu, Tiris Nzoia, Kericho & Laikipia constituted the core, where most Europeans and Asians thrived. Kisumu, Fort-Hall, Myerri, Embu, Meru, Kerbaland, Kakamega, Bungoma, Nyanza, and Gusii - the periphery - provided a rich reservoir of labour for the steadily growing agro-business and industrial and commercial ventures taking place at the core. The curley of funds by the government and the local population for the provision of separate educational facilities of disparate quality for the European, Asian, and African communities followed a pattern of regional concentration paralleled to the pattern of concentration of economic resources and initiatives.

The pastoralist districts - the backward or outer periphery of the colonial economy - were left almost completely of the process of modern educational development just as they had been excluded from the process of colonial economic development. On the eve of Independence (1960), for instance, the colonial administration pushed to put up schools in Garissa, El Wak, and Rhana. These Government African Schools (GAS) were to supplement the four primary schools already existing in the Northern Frontier Province: Marsabit (1940's, sponsored by the C.K.), Isiolo (1946), Wajir (1948), and Mandera (1955). However, the entire Northern Frontier Province had only one intermediate school in Wajir (1955), and no secondary school.

Where educational facilities did exist, even if in inadequate number as in the case of Kajiado<sup>6</sup> and Narok<sup>7</sup> districts, lingering memories of land expropriations for the construction of schools, cattle fines for failure to send children to school, and the fixed "quotas" of children from each clan expected to enrol discouraged full use of those facilities by the pastoralists' children.

#### A.2 - The Type of Educational Facilities.

At Independence (1963), the new government faced the massive challenge of integrating the pastoralist districts into the mainstream of Kenyan society, and of providing them with the same services available in other parts of the country. The task of redressing decades of neglect entailed setting up administrative structures, security and communication networks as well as health services and educational facilities for some eighty percent of the republic's territory.

At that time and for the subsequent two decades, the government's overriding effort in the field of education was focused on setting up adequate educational facilities to enable the school-age population of those districts avail themselves of educational services in areas where school participation was impaired by poor communication, low population density, the people's physical mobility, scarcity of year-round water supply, and enormous distances between the rare schools in existence. By 1984, the government's role in providing educational facilities to pastoralist districts had shifted noticeably. While continuing to implement the special programmes introduced in previous years in cooperation with the various District Education Boards, the government opted to develop livestock marketing facilities for pastoralist districts rather than formulating new educational programmes for them. The supporters of the new policy argue that, by gaining access to the necessary monetary resources through livestock marketing facilities, pastoralists would be in a position to meet the costs of sending their children to school, especially to the relatively expensive boarding schools in their districts, and would actually do so out of concern for their children's education.

a - Initiatives for Promoting Primary School Enrolment: 1963 - 1983.

During this period, the Kenyan government mobilized local churches and international donor agencies into building primary day school and primary boarding schools in pastoralist districts, reorganized the administrative structure responsible for developing and financing primary school facilities,<sup>8</sup> and launched its own Remote Areas Boarding Programme and its Experimental Programme in Mobile Teaching Units to promote school attendance by the children of nomadic pastoralists.

The Remote Areas Boarding Programme was launched during the 1970-1974 Development Plan to set up

"...boarding schools in Baringo, Samburu, West Pokot, Turkana, Kajiado, Narok, Wajir, Mandera, Garissa, Isiolo, Marsabit, Tana River, and Lamu districts which had registered less than 50 percent enrolment of primary school age population,"<sup>9</sup>

in a determined effort to meet the current target of 75 percent literacy for the eligible children. Clearly, ordinary day schools in pastoralist districts were inadequate for the purpose as they could not reach the nomadic pastoralists who are required by their way of life to be constantly on the move and cannot settle near ordinary day schools.



The programme's implementation was carried over the 1974-1978 Development Plan while the programme itself was revamped by the 1979-1983 Development Plan, and given a new name and additional functions. A special grant from the World Bank was used by the programme for the Arid-Zones Education Centres (or AZECs) - as the programme came to be known - to set up primary schools in Garissa, Isiolo, Kajiado, Mandera, Marsabit, Narok, Samburu, Tana River, Turkana, Wajir, West Pokot, Baringo East, and Lamu districts to cater for an additional 3,600 primary school boarding places. These primary boarding schools would also function as centres with facilities for adult education and various vocational training courses<sup>10</sup>. The programme was meant to facilitate the attainment of the country's current goal of Universal Primary Education of seven years free of charge for all eligible children in pastoralist districts as well; its implementation has continued during the 1984-1988 Development Plan. However, there are no apparent provisions for the expansion of that programme nor for the launching of new ones.

The reasons for the government's reluctance to renewed investment of monetary resources and personnel in such programmes are spelled out in its evaluation of the Remote Areas Boarding Programme. In the government's view, those institutions have not been cost-effective because they have been operating below capacity, and in many cases they have not been catering to the children indigenous to the areas for whom they were initially set up.<sup>11</sup>

Field investigations by independent researchers confirmed the government's analysis but reached opposite conclusions concerning the viability of boarding schools for promoting greater participation of nomadic pastoralists in primary school education. Data on the enrolment in primary boarding schools of pastoralist districts collected by Nkinyangi,<sup>12</sup> King,<sup>13</sup> and Gerham<sup>14</sup> showed that many pupils enrolled in those primary boarding schools - some time as many as 15 percent - came from non-pastoralist districts. The observed low participation of pastoralist children in the boarding school programme was partially accounted for by the relatively high costs the parents were expected to meet if they decided to send their children to such schools<sup>15</sup>, and by the influx of children from agriculturalist districts whose parents could more readily afford those expenses in an attempt to exploit the compensatory selection procedures introduced in pastoralist districts to enrol pastoral children in secondary schools.<sup>16</sup>

These findings, however, do not invalidate the effectiveness of boarding schools in promoting the pastoralist children's participation in primary education. They simply point at the urgent need for stopping flagrant abuses such as the intake of children from non-pastoralist districts, and at the equally urgent need of making the boarding schools accessible to nomadic pastoralists either by eliminating all levies, fees, and contributions to various funds, or by providing the pastoralists with monetary resources adequate to meet those costs.

An alternative type of educational facility for promoting primary school attendance among nomadic pastoralists was the Experimental Programme in Mobile Teaching Units. It was introduced during the 1974-1978 Development Plan in "the form of two pilot projects".<sup>17</sup> These "schools on wheels" did not prove viable; no mention is made of them in subsequent official documents although no formal evaluation of the innovation exists. The idea of "mobile" schools, however, has elicited the interest of some researchers who propose various versions of the initiative.

Drawing on the experience of Sudan and of French African Colonies, Dido<sup>18</sup> suggests that the teaching staff and the instructional material can move from one watering point or grazing area to another in consonance with the movements of the community's pastoral herds. The watering points or grazing areas would be equipped with semi-permanent school structures where children attend daily instruction while returning to their families at night.

Alternatively, when the nomadic group is too small to provide full intake for the partially mobile school, a single teacher partially mobile school can be set up in which one teacher instructs smaller classes of mixed ages and follows different syllabi. Finally, a further variation can be envisaged. It is the single teacher temporary mobile school. One teacher is attached to a nomadic community for a limited number of years. During that period, he educates a "reservoir" of children drawn from a wide range of ages. When this "reservoir" of children is exhausted, he moves to another nomadic community returning to the first when the "reservoir" has been filled up by new generations of children. These alternative forms of mobile schools have not been tested in Kenya.

b - Initiatives for Promoting Primary School Enrolment: 1984...

Since 1984 the responsibility of direct intervention in providing educational facilities conducive to increased primary school enrolment among nomadic pastoralists has devolved mainly to the respective District Education Boards consistently with the enactment of the District Focus Policy.<sup>19</sup> The occasional funds made available for Kenya's arid and semi-arid districts by international donors were used by the Ministry of Finance and Planning to set up new primary schools and boarding facilities in Turkana district, and to provide building material for the expansion of existing primary schools or the building of new ones in West Pokot and Elgeyo Marakwet Districts. Courses for the up-grading of untrained teachers in those districts as well as in Machakos, Kitui, Embu, Meru, Isiolo, Baringo, Laikipia districts were also made possible by those funds.<sup>20</sup>

During the 1984-1988 Development Plan, the Central Government's initiative for the promotion of primary school enrolment has become indirect. It has concentrated on a vigorous programme of development of livestock resources,<sup>21</sup> suitable marketing facilities for livestock in the gateway towns of Isiolo, Garissa, Narok, and Kapenguria,<sup>22</sup> roads, telephone and banking services to generate monetary resources among nomadic pastoralists. In February 1987 de-control of meat prices was introduced to increase the return rates in the meat industry and to boost the number of animals after the 1984 drought which took a heavy toll on Kenyan livestock. Since then animal prices have risen by 25 percent and meat prices by 45 percent.<sup>23</sup> The road between Kiganjo in Nyeri District and Nanyuki in Laikipia District is being resurfaced. A tannery has been built in Garissa, and plans have been drawn to transform the 124,000 hectares of the Isiolo livestock holding centre into the largest livestock market in Africa.<sup>24</sup> Banking services are available in all districts headquarters and automatic telephone exchange has been installed in all of them and in Moyale as well.

Any assessment of the impact of these measures in increasing the number of animals in arid and semi-arid areas, and in generating monetary resources among nomadic pastoralists would, however, be premature. Equally impossible at this time is to evaluate whether or not the ability of nomadic pastoralists to meet the costs of sending their children to school has improved thanks to the development strategy pursued by the 1984-1988 Development Plan.

A. 3 - Waving of School fees and Provision of School Feeding Programme.

The objective obstacle to primary school participation created by the scarcity of monetary resources among nomadic pastoralists was partially removed in 1973 when all school fees in the country's poorest district were abolished.<sup>25</sup> The directive benefited the districts of Isiolo, Marsabit, Lamu, Tana River, Garissa, Wajir, Turkana, Samburu, West Pokot, and Mandera; it did not affect, however, the eighty-nine boarding schools of the pastoralist districts. In 1978, it was extended to day-schools in all districts and milk free of charge was made regularly available to all children in primary schools.<sup>26</sup> In response to the 1982-1984 drought and ensuing famine, a School Feeding Programme for all pre-primary and primary school students in eighteen districts including all the arid and semi-arid districts was set up to provide the children with one daily meal. The programme continues to be implemented.<sup>27</sup>

A.4 - Curriculum and Schedule.

Additional obstacles to the participation of pastoralist children in primary education are the content of the educational services and the timing adopted for the delivery of those services.

Alex B. Gorham<sup>28</sup> argues that the content is largely irrelevant to the needs of subsistence pastoralists. A more occupationally oriented curriculum is needed in which water management, animal husbandry, and basic notions of veterinary science are taught. Gorham's suggestion has remained largely unheeded for fear of creating a second class educational system for nomadic pastoralists which would impair their competitiveness vis-a-vis children from other districts for occupational and career opportunities. Various non-government organizations and the Adult Education Programme have utilized that suggestion for setting up short courses of proven relevance to nomadic pastoralist communities.

Gorham<sup>29</sup> also argues that the regular school calendar interferes unduly with the nomadic pastoralists' movements and rhythm of life, thus reducing school attendance. He suggests the rainy seasons and the weeks immediately following as the time best suited for the delivery of classes which pastoralist children can attend with a minimum of difficulty. Again, only the Adult Education Programme and the NGO's have thus far appeared to have organizational structures flexible enough to successfully act on that suggestion.

A. 5 - Physical Mobility and Lack of Water.

Physical mobility is clearly a persistent obstacle to school participation for many pastoralist children. The introduction of demarcated group ranches with consequent reduction of the pastoralists' range of movement, and the provision of year-round water supply have resulted in significant rise of school participation and decline in drop-out rates in day stationary schools.<sup>30</sup> The degree of physical mobility of elders of the girls' extended family is also inversely related to the level of the girls' school participation.<sup>31</sup>

Other factors such as the teachers' qualifications morale and supervision, school equipment, and instructional material are more related to the performance in primary schools of pastoralist districts than to the participation in their educational services.

Primary school participation in Kenya's pastoralist districts has jumped from nearly null values in 1963 to an average of 64 percent for the children of primary school age in 1984.<sup>32</sup> The interventions of policy makers, school administrators, non-governmental organizations, researchers, and local leaders in the analysis and control of the various factors influencing primary school enrolment in those districts should be credited with the notable increase.

The proportion of children of primary school age still unreached by educational services remains, however, intolerably large especially when assessed against the country's reiterated goal of Universal Primary Education and when such education is viewed as an inalienable right for every citizen. Admittedly, two decades are a relatively short time in which to redress almost a century of neglect. Also, stubborn constraints on availing free primary boarding schools, viable variations of mobile schools and monetary resources to pastoralists, and the structural inability of the school system to adopt a more relevant curriculum or a more flexible school calendar may account in part for the persistently high rate of primary school abstention.

Alternatively, additional factors influencing primary school participation in Kenya's arid and semi-arid districts may exist which have been overlooked.

#### B - RESEARCH DESIGN

The search for those additional factors, which might explain the persistent underenrolment in primary schools of Kenya's arid and semi-arid districts, was one of the objectives pursued by the research project "Education for Survival: An Evaluation of Educational Services Available in Kenya's Arid and Semi-arid Districts".<sup>33</sup> Other objectives of the research project included the identification and analysis of the problems faced by teachers, pupils, and schools in those districts.

More specifically, the quest for an exhaustive understanding of the causes of underenrolment in those districts was guided by two parallel research designs. The first one was identical with the research plan adopted by the project "Education for Survival..." and was aimed at securing enrolment data. The second focused on the collection of data on birth order selective enrolment in the primary school system; it is discussed in detail in Appendix II. The following paragraphs will be confined to the presentation of the first research design as it relates to the phenomenon of underenrolment.

##### B. 1 - Concepts.

District primary school underenrolment is defined operationally as the ratio between the number of children enrolled in the district's primary schools and the number of children of primary school age within that district. The latter figure, however, is not the result of actual enumeration; rather, it is based on the relevant figures reported by the 1979 census projected forward on the assumption of constant mortality and fertility 1969-1979 intercensal rates.

The concept of district primary school underenrolment, even when qualified and even when differentiated into boys and girls underenrolment, is far too generic a concept to be used fruitfully in analysis. The needed enhanced specificity can be supplied by the concept of sex ratio for each standard of primary school.

District and standard sex ratio is defined operationally as the ratio between the number of boys and the number of girls enrolled in each of the standards that make up the primary school system of a district.

The advantage of introducing the concept of sex ratio for each primary school standard in the various districts lies in the intrinsic reference this concept carries to the expected as well as to the actual mean age of girls and boys for that standard and, by implication, to the probable mean age of marriage for girls of the ethnic groups represented. It also allows for the relative magnitude of the boys' underenrolment and of the girls' underenrolment to surface across the standards and with reference to the expected and to the actual mean age of each standard. In turn, variables such as sex, age, mean age of marriage, and societal attitudes to each one of these variables can be used to explain the observed variation.

E. 2 - Unit of Data Collection and Data Analysis.

Each standard constituted the unit of data collection and data analysis.

B. 3 - Data Collection.

Questions concerning the enrolment of boys and girls for each standard of the selected schools were included in the school questionnaire submitted to the school headmaster, and filled in his presence. The data thus obtained were further verified with the help of the Assistant Education Officer and District Education Officer. As a rule, the data represented the January enrolment figures. Data on seasonal variation in school attendance and drop-out rates were not available for the year under study.

B. 4 - Sampling.

Enrolment figures were obtained for the Garissa, Isiolo, Marsabit, Turkana, Kejiado, Samburu, Tana River, Barinzo, and Narek districts from selected primary schools in those districts. The selection of the schools was carried out from a roster of all primary schools for each district, stratified on the basis of administrative division, rural-urban classification of the schools, and on the basis of sponsorship by the District Education Board or by non-governmental organizations. Appendix I reports the planned sample design as well as the implemented sample design.

B. 5 - Data Analysis.

The analysis of the data relevant to the phenomenon of underenrolment - both those collected according to the research design discussed in the previous paragraphs and those collected according to the parallel research design reported in Appendix II - and the results of that analysis are discussed in the following two sections.

### C - GIRLS' UNDERENROLMENT

Table No. 2 underscores the serious underenrolment of girls in the primary school system of Kenya's arid and semi-arid districts; it also points out that the girls' underenrolment is more pronounced for higher standards. The table reports the sex ratios by standard for nine arid and semi-arid districts of Kenya.

The values of the sex ratios range between 89 for Standard IV in Narok and 700 for Standard VIII in Garissa. The considerable variation of the values of the sex ratios, however, is not random; on the contrary, within each district, the lowest values are recorded for lower primary classes, and the highest values for upper primary classes (i.e., for Standard V through Standard VIII). The sex ratios mean values for lower primary and for upper primary for Garissa, Isiolo, Marsabit, Turkana, Kajiado, Samburu, Tana River, Baringo, and Nerok districts are, respectively: 235.2 and 458.7; 131.2 and 219.5; 109 and 194; 232 and 257; 126 and 171.5; 174.7 and 198.7; 159 and 171.2; 212 and 293; 103.7 and 117.7. The pattern is not altered significantly by controlling for the rural urban location of the schools, or the sponsorship of the school.

The factors examined in the previous section - colonial legacy, type of educational facilities, curriculum, schedule, and physical mobility - clearly can not account for the girls' higher rate of underenrolment, nor can they explain the considerable difference between the values of the sex ratios in lower primary and those observed in upper primary since those factors affect both boys and girls equally and regardless of whether the pupils are to be found in lower or in upper primary. Equally inane - and for similar reasons - are those explanatory attempts which invoke the lack of proper appreciation of modern education by pastoralist parents; or the pastoralist parents' dismissal of modern education as useless or irrelevant to nomadic pastoralist existence; and the pastoralist parents' and elders' belief that modern formal education produces immoral young people forgetful of their traditions.<sup>34</sup>

More pertinent to the explanation of the girls' underenrolment is the attitude widely shared among nomadic pastoralist parents that, "it is a waste of time and money to educate a girl; once married, her learning will benefit her husband's family, not her family of birth". Similarly, the Muslim parents' reluctance to give their daughters a modern education can account for the low enrolment of girls in Garissa, Marsabit, Isiolo, and Tana River primary schools, but neither the former nor the latter attitude can explain the sharp differences between the sex ratio values observed in lower primary and those observed in upper primary in those districts or any other district included in Table No. 2.<sup>35</sup>



Table No. 2 - Socio Indices By Standard In Selected Arid and Semi-arid Districts of Kenya, 1987.

	STANDARD							
	1	2	3	4	5	6	7	8
Garissa*	159	232	303	247	379	414	312	700
Isiolo*	133	112	136	144	159	219	230	270
Marsabit	138	133	130	144	154	163	254	205
Turkana	203	239	221	265	242	291	260	235
Zejerato	125	113	117	149	148	156	144	238
Gumburu**	155	147	170	227	257	261	397	265
Tana River	194	123	164	155	109	197	185	194
Beriryo	199	224	231	194	287	214	254	417
Merck	111	104	111	89	107	108	129	129

\*\* Data Collected in 1985.

\* Data Collected in 1986.

I.D.S./WP NO.412

A plausible explanation of that difference can be located in the specific age groups that make up the lower and upper primaries, and the relation of those age groups to the girls' mean age of marriage for the ethnic groups represented in the schools.

There is strong evidence that the average age of both boys and girls enrolled in the various standards of Kenya's arid and semi-arid districts is two to three years higher than the national average for the corresponding standards.<sup>36</sup>

Accordingly, girls in upper primary belong to the 12-13 to 15-16 age group from which brides are chosen. It is at this age that prospective brides are taught the role expectations, values, and skills of a wife according to the time-honoured traditions of the tribe. That knowledge and those skills are imparted at home in appropriate circumstances and mostly in an informal style by the girl's mother, co-wives, aunts, and grandmother. Girls must stay home to profit most from this important phase of induction into full communion with the tribe, and to be available for dances, courting, marriage transactions, circumcision, marriage ceremonies, rituals, marital duties and newly won privileges.

The foregoing considerations are hardly relevant for the understanding of the underenrolment of boys of nomadic pastoralists. A more cogent explanation of their underrepresentation in the primary school system is more likely to be generated by factors such as birth-order selectivity and the "kepyiong" phenomenon.

#### D - BOYS' BIRTH-ORDER SELECTIVE ENROLMENT AND THE "KEPYIONG" PHENOMENON.

Factors such as colonial legacy, type of educational facilities, curriculum content, schedule of delivery of educational services, physical mobility, and negative parental attitudes toward modern education account in part for the boys' underenrolment reported in Table No. 1. Birth-order selectivity contributes additional considerable insights to the understanding of this stubborn problem.

(See Appendix II for detailed discussion).

The birth-order selectivity operative in the primary school enrolment results in the underrepresentation of first born sons of nomadic pastoralists. Such an underrepresentation actually constitutes a pattern of primary school enrolment distinctive of Kenya's arid and semi-arid districts. We can call this pattern the "Kepyiong" phenomenon and impute its origin and persistence to the nomadic pastoralists' reluctance to enrol their first born sons in primary schools. This reluctance is best captured in the words of Mr. Jeremiah Lekisanyal, a Samburu elder from Baawa: "Of course, the 'kepyiong' (or 'best' which is often synonymous of 'te kwe', 'first') are for the care of the cattle. We send to school the children who are not 'kepyiong'".

The nomadic pastoralists' reluctance to enrol their first born males in primary schools needs to be qualified.

It is an absolute reluctance when "only sons" are concerned. "Only sons" of nomadic pastoralists were absent from the primary schools surveyed.

It is a relative reluctance where the "first son of the first wife" (known as "senior son") or where "first born sons" in general are concerned. Approximately 36.1 percent of the "senior sons" of nomadic pastoralists are going to school or went to school as compared to 57.7 percent and 62.0 percent of the "senior sons", respectively, of farmers and of people working in the modern sector of the economy.<sup>37</sup> "First sons" in general constitute 17.2 percent of the sons of nomadic pastoralists in primary schools as compared to 26.1 percent of sons of farmers and 27.7 percent of sons whose parents are working in the modern sector of the economy.

How can this significant reluctance of nomadic pastoralists to send their first born sons to primary school be understood? The "causal chain" underlying the strong aversion of nomadic pastoralists to enrol their first born sons in primary schools touches on social, economic, and religious factors none of which can be exhaustively analyzed in isolation from the others. My interpretation follows the explanatory path brought out by the statistical analysis of the data on birth-order selectivity discussed in Appendix II.

The nomadic pastoralists' firm opposition to let their first born sons acquire modern education is deeply rooted in their struggle to preserve their way of life and their religious and cultural heritages. That way of life revolves on the centrality of "having herds".<sup>38</sup> Subsistence as well as affluence without herds are unthinkable. "Having herds", is not just a condition for survival and a source of material wealth and prosperity; it is also vested with deep religious significance: herds are God's gift; they, the rain and the grass by which they are kept alive and thriving are the subject of daily prayers by the elders; no proper thanksgiving sacrifice, propitiatory or expiatory rite, or major social event such as circumcision marriage or burial can take place without the slaughtering of a suitable head of cattle, sheep, or goat. "What is life without herds? How can anyone even conceive of the beauty of religious and social celebrations, the beauty of life, without herds?".

By custom, the care of the most important family herd - the father's herd - is assigned to the first born son. In all nomadic pastoralist societies surveyed,<sup>39</sup> at the father's death the first born son stands to inherit the father's herd in its entirety or, at least, has priority claims over it as the new titular head of the extended family. The first born son's future - and that of the extended family - accordingly, lies much more with a prosperous herd and with learning the art and skills of animal husbandry the father has developed over the years than with any scholastic achievement and fortuitous employment that might ensue. Of course, if the father's herd is small and can be tended through communal arrangements, the first born son can also be released to attend school,<sup>40</sup> where in addition to education he is provided with at least one daily meal; his already poor family is thus relieved of the burden of his up-keep.

In addition to the privileged relation first born sons enjoy vis-a-vis their fathers' herds - and perhaps because of that privileged relation - first born sons in nomadic pastoralist societies are also accorded prestigious religious and social status. Important rites such as circumcision, first marriage, and passage through the various age grades have to be performed for the first born sons before the other members of the age set from the same family are allowed to participate. First born sons thus lead their age group into the various levels of tribal society and unlock the access to the prerogatives and duties proper to any specific level of tribal life. They are the ones who are expected to be fully socialized in the roles the age group is taking on, and to be conversant with the religious traditions and cultural heritage of the tribe.

Such an intensive process of socialization into tribal religion, customs and skills can hardly take place away from the extended family, and certainly not within the alien confines of a modern school calendar and structure. "Schools are for the children who are not 'kepyiong'".

The "kepyiong" pattern of primary school enrolment - the selective enrolment of non-first born sons - can be viewed as a highly rational form of collective adaptation on the part of nomadic pastoralists to the modern culture of the national polity while attempting to carve out sufficient survival space for their own traditional heritages: first born sons are designated to care for the family herd, and the survival of the family and of its religious heritage, they are the keepers of the tribal fire: the non-first born sons may attend modern schools, develop new skills and attitudes, enter the service of the government or modern professions, and even turn to new religions.

### E - CONCLUSIONS AND RECOMMENDATIONS

This paper has discussed the underenrolment in the primary schools of Kenya's arid and semi-arid districts as well as the initiatives of governmental and non-governmental agencies to encourage full school participation by all eligible children in those districts.

In addition to the causes of underenrolment identified by previous research, this paper has argued that the higher rates of girls' underenrolment in upper primaries as measured by sex ratios can be accounted for in part by the concurrence of the mean age of girls in upper primaries with the mean age of marriage for girls of the ethnic groups represented in those schools, and the parents' expectation that girls should stay home where they can be properly socialized into their imminent traditional roles of wives and mothers. Concerning the underenrolment of boys in the same districts, this paper has shown that a distinctive form of birth-order selectivity - the "kepyiong" phenomenon - does explain some of that underenrolment.

More specifically, this paper has shown that:

1. A significant proportion of first born sons of nomadic pastoralists and a significant proportion of upper primary age girls are unlikely to be absorbed or retained into the primary school system even in the best scenario imaginable of full implementation of all the provisions introduced by governmental and non-governmental agencies over the past twenty five years to promote full primary school enrolment among nomadic pastoralists children in Kenya's arid and semi-arid districts. In addition to first born sons and marriage age girls, an unspecified proportion of non-first born sons of nomadic pastoralists will also remain outside the primary school system in the measure in which they are needed for the care of the family herds.

2. Since these vitally important groups of children of nomadic pastoralists will remain outside the modern school system as long as the nomadic way of life proves to be a viable alternative, appropriate mobile schools (not to be equated with "schools on wheels") with curriculum and calendar consonant with the nomadic way of life need to be set up. This recommendation does not stem from any messianic compulsion to save the nomadic way of life. Its plurimillennial persistence proves that it does not need any outside assistance to cope with the local ecology. Rather, it is prompted by the need for integrating these groups of pastoralist children with the mainstream of national life, and providing them with the literacy and skills necessary to interact with it and benefit from it. The criticism of second class noncompetitive education that would thus be offered to these children needs not be determinant in rejecting such a recommendation since those children would be outside the regular school system and eventual career and job competition anyway. It is rather a question of providing them with the knowledge and skills they would otherwise forfeit.
3. The proposed mobile schools could be developed as pilot mobile schools on a district basis drawing on the already established models of "partially mobile schools", "single teacher partially mobile schools", "single teacher temporary mobile school" and on other experience of "distance education" established in countries such as Kenya, Canada, and Australia.
4. Prior to any decision concerning the appropriate model of mobile school, a feasibility study is needed to identify for each nomadic pastoralist ethnic group the size and structure of the communities who move and graze their herds as a unit, and the number of children likely to be present in that community.
5. A feasibility study is needed concerning the components to be included in the curriculum to be followed in such schools, and concerning the possibility of including subjects that are directly relevant to the nomadic way of life such as veterinary science, animal husbandry, water management, preservation and amelioration of the environment, hygiene, preventive medicine, and home science.

6. A feasibility study is needed to determine the calendar and schedule suitable for both boys and girls, or for boys and girls separately, that would respect as much as possible the mobility patterns and the traditional work schedule of pastoralist boys and girls.
7. Teachers for the mobile schools should be recruited from among nomadic pastoralist graduates of primary and secondary schools who share the same language and are familiar with the traditions and hardships of nomadic life so that they can travel with the group of families whose children they are sent to teach, and adapt to the rhythm, pace, and priorities of nomadic life.
8. A feasibility study is needed to design the curriculum, funding, and staffing of a Nomadic Teachers' Training Centre, as well as appropriate policies for the recruitment, remuneration, supervision, and up-grading of nomadic teachers.

REFERENCES

1. This paper is a partial report of the findings of the research project "Education for Survival: An Evaluation of Educational Services in Kenya's Arid and Semi-arid Districts." The research project was funded by CEBEMO of Holland, and commissioned by Kenya's Catholic bishops whose dioceses are located in Kenya's arid and semi-arid districts.
2. I wish to acknowledge the generous cooperation of Mr. Kalikander and Mr. Gichohi of the Ministry of Finance and Planning; of Mr. L.G.K. Ngutter and Mr. Memia of the Ministry of Education, and Mr. Ogulla of the Kenya Institute of Education; of the D.E.O's, A.E.O's., headmasters and teachers of the Samburu, Marsabit, Garissa, Isiolo, Turkana, Tana River, Narok, Kajiado, and Baringo Districts. A special thanks to Mr. B.M. Makeu of IDS for valuable comments on the first draft of this paper.
3. The foregoing comments clearly apply to the other districts as well. For the significantly different age structure of children attending primary schools in arid and semi-arid districts compared to the age structure prevalent in primary schools elsewhere in the country see forthcoming paper on the subject. The districts included in Table No. 1 all register less than 760 mm. average rainfall per year. Survey of Kenya National Atlas (Nairobi: Survey of Kenya, 1970) pp. 14-15.
4. Ernest Stabler *Education Since Uhuru. The School in Kenya.* (Middletown, Conn.: Wesleyan University Press, 1969), pp 3-24, 58-158. John Anderson *The Struggle for the School.* (London: Longman, 1970), pp 1-99; Kabiru Kinyanjui "The Distribution of Educational Resources and Opportunities in Kenya" Discussion Paper No. 208, IDS, Nairobi, 1974; Naerman Anders "Regional Distribution of Educational Facilities in Kenya with Special Reference to Secondary School Teachers". University of Gothenburg, Sweden: Department of Human and Economic Geography, Research Reports, 1984:2.
5. E.R Turton "The Introduction and Development of Educational Facilities for the Somali of Kenya", *History of Education Quarterly*, Fall, 1975, pp. 347-365; and Philip Halake Dipo "The Problems of the Provision of Educational Services to Pastoral-Nomadic Societies with Particular Reference to Kenya." M.A. Dissertation, University of London, September 1985, pp. 34-49.
6. Alex B. Gorham *Education and Development in Kenya Maasailand 1920-1963.* (Stockholm University: Institute for the Study of International Problems in Education, 1979); "Development in Education in Kajiado District 1963-1975," Working Paper No. 297. Institute of Development Studies, University of Nairobi, 1977.
7. Kenneth King "Development of Education in the Narok District of Kenya", *African Affairs*, Vol. 71, No. 285, pp. 389-407.
8. Up to 1969, the development and financing of primary school facilities were responsibilities of municipal and county councils. The Local Government Act of 1969 transferred the overall responsibility for primary school education in rural areas to the central government to facilitate its intervention whenever municipal and county councils proved inadequate to the task. By 1971, much of that authority had been delegated to the District Education Boards. Republic of Kenya, Ministry of Economic Planning and Community Affairs, *Educational Trends 1973-1977.* (Nairobi: Unicef, n. d.) p.2.



9. Republic of Kenya 1970-1974 Development Plan. (Nairobi: Government Printer, 1969) p.454, nos. 17.12 - 17.14.
10. Republic of Kenya 1979/1983 Development Plan. (Nairobi: Government Printer, 1979) p. 154, which incorporates to some extent the programs proposed in Government of Kenya Arid and Semi-arid Lands Development in Kenya (Nairobi: Prudential Printers Ltd., n.d.) p.85.
11. Republic of Kenya, 1974-1978 Development Plan (Nairobi: Government Printer, 1974) Part I, p. 412; Part II, p.68.
12. John A. Nkinyangi "Education for Nomadic Pastoralists: Development Planning by Trial and Error", *The Future of Pastoral Peoples*: John C. Galaty et alii (eds.), (Ottawa, Canada: IDRC, 1981) p 191.
13. Kenneth King "Development of Education in the Narok District of Kenya", *African Affairs*, Vol. 71, No. 285, pp. 332-407, and "Education and Ethnicity in the Rift Valley: Maasai, Kipsigis and Kikuyu in the School System", Staff Paper No.13, Institute of Development Studies, University of Nairobi, 1970.
14. Alex B. Gorham "Education and Social Change in a Pastoral Society: Government Initiatives and Local Responses to Primary School Provisions in Maasailand", Report No.4, Studies in International Education, Stockholm University, 1980; Ole Sena Sarone "Education and Socio-Economic Change: Maasai Response in Kenya," Ph.D. Dissertation, McGill University, Montreal Canada, 1981.
15. John A. Nkinyangi, "Education for Nomadic Pastoralists...", pp. 188-191.
16. Ibid., p. 192; also Alex B. Gorham "Inter-ethnic Differences in Reading Achievement in Kenya Maasailand", Report No. 41, Institute for the Study of International Problems in Education, Stockholm University, 1979; and Philip H. Dido "The Problems of the Provision of Educational Services..." pp. 65-66.
17. Republic of Kenya, 1974-1978 Development Plan (Nairobi: Government Printer, 1974), part II, p.69.
18. Philip Halake Dido "The Problems of the Provision of Educational Services...", pp. 76-78.
19. Republic of Kenya, 1984-1988 Development Plan (Nairobi: Government Printer, 1983); pp. 82-97.
20. Conversation with Mr. Kalikandar, May 9, 1988.
21. Republic of Kenya 1984-1988 Development Plan (Nairobi: Government Printer, 1983) p.56.
22. Ibid., p.59; also, Republic of Kenya Sessional Paper No. 1 of 1986 for Renewed Growth (Nairobi: Government Printer, 1986) pp. 41-61, 84-86.
23. Daily Nation, May 15, p.21.
24. Daily Nation, May 17, p.3.
25. Republic of Kenya, Ministry of Economic Planning and Community Affairs *Educational Trends*. (Nairobi: Unicef, n.d.) p.7.

26. Ministry of Education Annual Report. (Nairobi: Government Printer, 1980) p.3. For the impact of the abolition of school fees on school enrolment, see Philip H. Dido "The Problems of the Provision of Educational Services...", pp. 25-33.
27. Ministry of Education Science and Technology Annual Report 1984. (Nairobi: Government Printer, 1984) p.15.
28. Alex B. Gorham "Educational Development in a Pastoral Area: The Impact of Group Ranching on the Schools of Kenya Maasailand", Report No.33, Institute for the Study of International Problems in Education, Stockholm University, 1979, pp.4-5; and The Design and Management of Pastoral Development. The Provision of Education in Pastoral Areas. (London: ODI, 1978) pp.29-32.
29. Ibidem, pp.20-29.
30. Ibidem, and Educational Development in a Pastoral Area..., pp.71-72.
31. Amos Chege "Education for Maasai Girls: Socio-economic Background", M.A. Thesis. University of Nairobi, 1983, p. 156. Chege's findings identify the level of education and the occupation of the girls' parents and the girls' older family members, the religious affiliation, and land ownership of the girls' parents as important factors influencing Maasai girls' participation in education.
32. See p. 2, above.
33. See reference no. 1, above.
34. The foregoing factors, as well as those which follow, were identified and discussed by secondary school students from Wamba, Maralal, and Baragoi secondary schools in a one-day seminar on the causes of underenrolment in Kenya's arid and semi-arid districts, held in Wamba on April 2, 1988.
35. Ibidem.
36. See forthcoming paper on the subject.
37. See Appendix II, Table No. 5".
38. Gudrun Dahl and Hjort Anders Having Herds. Pastoral Herd Growth and Household Economy. (Stockholm: University of Stockholm, Department of Anthropology, 1976).
39. Paul T. W. Baxter Social Organization of the Borana of Northern Kenya (Oxford: Oxford University Press, 1954); A. W. Beaman "The Rendille Age-set System in Ethnographic Context: Adaptation and Integration in a Nomadic Society". Boston: Boston University, Ph. D. Thesis, 1981; Mervyn W. H. Beech The Suk: Their Language and Folklore. (Oxford: The Clarendon Press, 1911); Gudrun Dahl Suffering Grass. Subsistence and Society of Waso Borana. (Stockholm: Stockholm University, Studies in Social Anthropology, 1979); Elliot M. Fratkin "Concepts of Health and Disease among the Arian Rendille. Herbal Medicine, Ritual Curing, and Modern Health Care in a Pastoral Community in Northern Kenya". University of London. Ph. D. Thesis in Social Anthropology, Faculty of Economics, 1980; Pamela Gulliver The Central Nile Hamites. (London: International African Institute, 1960); Philip H. Gulliver The Family Herds; A Study of Two Pastoral Tribes in East Africa: The Jie and Turkana. (London: Routledge & Kegan Paul, 1955); Richard Hogg

"The Social and Economic Organization of the Borsn of Isiclo District, Kenya". Manchester: University of Manchester, Ph. D. Dissertation, 1961; Allan W. Jacobs "The Traditional Political Organization of the Masai". Nuffield College: Ph. D. Thesis, 1965; David D. Laitin "Politics, Education, and Language Relativity: A Study of the Somalis in Kenya's Northeastern Province", African Studies Association, 1973; Bernie Kettel "The Tuken of Kenya: A Brief Ethnographic Report, Pro Manuscripto, 1970; David W. W. Kettel "Passing like Flowers: The Marriage Regulations of the Tugen of Kenya and Their Implications for a Theory of Crow-Omahe". Urbana, Ill.: University of Illinois, Ph. D. Thesis, 1975; A. Merker "Die Masai. (Berlin: Mimeograph, 1910?) chapter XX; Enos H. N. Njeru "The Farming Herders: Irrigation, Reciprocity, and Marriage among the Turkana Pastoralists of North-western Kenya", Santa Barbara, California: University of California, Ph. D. Thesis, 1984; K. David Patterson "The Pokot of Western Kenya 1910-1963: The Response of a Conservative People to Colonial Rule". Syracuse: Syracuse University, Maxwell Graduate School, Ph. D. Thesis, 1969; Paul Spencer "The Samburu. A Study of Gerontocracy in a Nomadic Tribe. (Berkeley, Cal.: University of California Press, 1965) pp.58-70; Paul Spencer "Nomads in Alliance. Symbiosis and Growth Among the Rendille and Samburu of Kenya. (London: Oxford University Press, 1973) pp.38-41; P. Tablino "I Gabbra del Kenya. (Bozoma: EMI, 1980); William I. Terry "Subsistence Ecology Among the Gabbra: Nomads of Kenya/Ethiopia Frontier". New York: Columbia University, Ph. D. Thesis, 1973; Edmund R. Turton "The Pastoral Tribes of Northern Kenya, 1800-1916". London: University of London, Ph. D. Thesis, 1970.

40. See Appendix II, pp.38-39.

## APPENDIX I

Table No.1'- "Education for Survival..." and Primary School Enrolment Survey: Summary Data on its Research Design and Implementation.

Districts	Divisions	Number of Schools Surveyed
Baringo	Kabarnet	-
	Kabartonjo	-
	Eldema Ravine	-
	Marigat	1
	Nginyang	16
Elgeyo Marakwet	Tot	4
	Northern	1
	Central	3
	Southern	1
Garissa	Central	5
	Fura	2
	Masalani	-
	Hulugho	-
	Dadaab	1
	Liboi	2
	Balambela	2
	Mudogashe	-
Isiolo	Central	5
	Merti	5
	Gerba Tulla	5
Kajiado	Loitokitok	4
	Marači	-
	Central	2
	Ngong	3
Marsabit	North Horr	2
	Laisemis	2
	Loiyangalani	1
	Mountain	3
	Sololo	2
	Movale	-
Narok	Mau	9
	Osupuko	3
	Kilgoris	-
	Lolgorian	1
	Olokurto	1
Samburu	Lorok	24
	Wemba	5
	Baragoi	5
Tana River	Bura	4
	Madoyo	-
	Caloie	-
	Garsen	-
Turkana	Lokitaung	2
	Kalokol	2
	Nakuma	2
	Katilu	1
	Lokori	2
	Central	1
	Turkwell	3
<b>TOTAL</b>		<b>137</b>

NE. Mandera, Wajir and West Pokot Districts were included in the original research design but could not be covered in this survey.

APPENDIX II

ELABORATION AND ANALYSIS OF THE DATA  
ON THE STUDENTS' ORDER OF BIRTH.

This appendix discusses the logical procedures and the statistical techniques employed in the elaboration and analysis of the data on the students' order of birth.

A detailed discussion of the logical procedures and the statistical techniques chosen, as well as of the way these procedures and techniques have been used, is necessary for any critical assessment of one of the main arguments adduced in support of the setting up of a Training Centre for Nomadic Teachers, i.e., the underrepresentation of first born sons in the primary schools of Kenya's arid and semi-arid districts. Such underrepresentation has been established through the logical procedures and statistical techniques analyzed in this appendix. Any evaluation of the likelihood and magnitude of that underrepresentation, which failed to assess also the methods used in establishing it, would be seriously incomplete.

Accordingly, a discussion of the research design and hypotheses formulation, data elaboration, and hypotheses testing follows.

A - RESEARCH DESIGN AND HYPOTHESES

The decision of collecting data on the students' order of birth among primary school students of Kenya's arid and semi-arid districts was prompted by a conversation with an elder from Beawa, Samburu district, in November 1985. Commenting on my statement that there seemed to be too few first born children in the local primary schools ("Kepyiong" in Kisamburu, which means "best" and is often synonymous with "te kwe" or "first") Mr. Jeremiah Lekisanyal remarked, "Of course, the 'Kepyiong' are for the care of the cattle. We send to school only children who are not 'Kepyiong'". Similar comments were voiced in conversations with other Samburu elders.

If the attitude towards school enrolment of first born children expressed by Mr. Lekisanyal was shared by nomadic pastoralists in Samburu district and more generally by nomadic pastoralists of Kenya's arid and semi-arid districts, then the underrepresentation of eligible children in the primary schools of Kenya's arid and semi-arid districts should be attributed at least in part to factors associated with the children's birth order rather than exclusively to the shortage or type of educational facilities and to the difficulties peculiar to those areas.

1/10/86

A more rigorous formulation of this conclusion can be found in the two following hypotheses.

A.1-Hypotheses

- 1.Ho: First born children in Kenya's arid and semi-arid districts are equally likely to enrol in primary schools as children of any other birth order regardless of the children's ethnic origin, regardless of the occupation of the children's fathers', and regardless of the size of the fathers' families.
- 2.Ho: "Only Sons" in Kenya's arid and semi arid districts are equally likely to enrol in primary schools as children from families with more than one child, regardless of the children's ethnic origin, and regardless of the occupation of the children's fathers.

A.2-Concepts.

The socio-cultural factors associated with the underenrolment of first born children and, consequently, with the underrepresentation of eligible children in Kenya's arid and semi-arid districts, are ethnicity, fathers' occupation, and size of the fathers' families.

The arid and Semi-arid districts covered by this study of birth order selective enrolment in primary schools are Baringo, Marsabit, Narok, and Turkana. They share similar ecological, demographic, and economic characteristics: they all receive an average annual rainfall of less than 760 millimeters<sup>1</sup>, they have an average population density lower than four persons per square kilometer, they all have low economic potential, and the majority of their inhabitants draw their main livelihood from nomadic pastoralism.<sup>2</sup>

Ethnicity and Occupation. Most of the ethnic groups inhabiting the districts under study as well as the majority of their members practice subsistence pastoralism. Their livestock include cows, goats, sheep, camels, and donkeys. During extended spells of drought, many of the animals perish because of lack of water and grass. Some communities practice crop production in addition to livestock raising when there is adequate rainfall or where irrigation water is available. In such cases, maize sorghum millet vegetables and other food crops are grown.

The Turkana and the El-molo are also involved in fishing. Finally, a number of ethnic groups who have recently migrated into the districts as well as a growing segment of the ethnic groups native to the districts are employed by various branches of government, private industry, or are self-employed. The values of the variable "fathers' occupation" have been compressed into three: "herdsman", "farmer", and "employed in the modern sector of the economy".

Family size of the students' fathers. This variable has been conceptualized as an indicator of the fathers' wealth and number of wives. The category breakpoint -"6"- has been selected because it constituted the median for the mothers' number of children in three of the four districts (for Turkana that median was "5").

#### A.3-Unit of Data Collection.

Primary school students were the units for data collection. Their selection is discussed below under A.5.

#### A.4-Data Collection.

Data relevant to the birth order selective school enrolment were assembled both by administering ad hoc questionnaires and by perusing extant ethnological and anthropological literature on pertinent nomadic pastoralist groups.

A questionnaire for primary school students was prepared which contained questions on the following variables: sex, tribe, number of father's wives, father's literacy, mother's number of children, student's order of birth, father's number of children, number of father's children less than six years old, number of father's literate children, literacy of first born of first wife, student's reasons for attending school, father's occupation, father's wealth as measured by number of cows, sheep, goats, camels, and property, and one way distance of student's home from school. Patterns of inheritance and transmission of the cultural heritage among the various nomadic pastoralist groups studied were gleaned from existing ethnological and anthropological literature.

A.5-Sampling.

The questionnaires were administered to standard five pupils (Kiswahili version) and to Standard Seven pupils (English version) in selected primary schools of the districts.

The selection of the school was made from a roster of all the primary schools in each district, stratified on the basis of administrative division, rural-urban classification, and on the basis of sponsorship by the District Education Board or by non-government organizations.

Where two or more streams were found in Standard Five or Standard Seven, the enumerators were instructed to inquire about the criteria used in forming the streams. If it transpired that no systematic bias had been operative in stream formation, they were expected to select a stream at random. Otherwise, they were expected to select at random half or a third of the pupils from each stream and administer the questionnaires to the group of students formed that way.

B-- DATA ELABORATION

The logical procedures followed in the elaboration of the data on the students' order of birth are highlighted by Tables Nos. 1", 2", and 3". These tables report the percentage distribution of first born children, males and females, by ethnic origin and the changes in the percentage distribution of first born children, males and females, resulting from the introduction of test factors such as fathers' occupation and fathers' number of children.

The path followed in the elaboration of the data on the students' order of birth can be summarized by the diagram:

Ethnic Group → Fathers' Occupation → Fathers' Number of Children → Students' Order of Birth.

It is based on the assumption that the students' order of birth is dependent to some extent on the occupation of the students' fathers, and on the size of their fathers' families.



A discussion of each of the three summary tables follows.

B.1-Percentage Distribution of First Born Children by Ethnic Group.

Table No. 1" reports the percentage distribution of first born males and females by ethnic origin. The distribution of first born males ranges between 17.4 for Kikuyu boys and 44.0 for Somali boys, while that of first born females ranges between 10.0 for Somali girls and 39.4 for Gabbra girls. While the arithmetic mean of the percentage distribution for first born boys and the arithmetic mean of the percentage distribution of first born girls are the same, i.e., 30.0, the considerable variation observed within each distribution suggests some degree of dependence of the students' order of birth on ethnicity.

B.2-Percentage Distribution of First Born Children By Ethnic Group Controlling for Fathers' Occupation.

Table No. 2" reports the percentage changes in the enrolment of first born boys and first born girls by ethnic group resulting from the introduction of the occupation of the children's fathers as a test factor.

Inspection of Table No. 2" reveals a distinctive pattern for first born boys. The percentages of first born boys decrease sharply for children of nomadic pastoralists for every ethnic group represented (the entry "does not apply" refers to the Kikuyu ethnic group for which no herdsmen were recorded), while they decrease less sharply for the children of farmers, and actually increase for the students whose parents work in the modern sector of the economy. Exceptions to the pattern of falling percentages for the first born sons of farmers are observable for the Pokot and the Maasai. The Suri and Somali children have been aggregated in the residual category of "others" because of their low number (less than thirty each). The arithmetic mean of first born sons subsequent to the use of the test factor fell to 18.6 for sons of herdsmen and 24.3 for sons of farmers while climbing to 34.7 for sons of parents active in the modern sector of the economy.

No corresponding pattern is observable for first born girls. Increases in the percentage of first born girls are alternated with decreases within each category of the test factor, fathers' occupation, suggesting that this variable does not have a consistent effect on the enrolment of first born girls. The arithmetic mean of the percentage of first born girls for each category of the test factor is 21.8, 16.3, and 29.5 for the daughters of herdsmen, farmers, and parents active in the modern sector of the economy, respectively.

30/

Table No. 1" - Percentage Distribution of First Born Primary School Students  
by Ethnic Origin: Baringo, Marsabit, Narok, and Turkana Districts,  
1987

ETHNIC GROUP	SEX	
	Male	Female
Pokot	28.8	29.8
Turkana	24.2	24.9
Maasai	20.3	25.9
Kikuyu	17.4	21.5
Samburu	29.7	10.0
Rendille	27.4	29.4
Somali	44.0	38.5
Borana	36.4	38.6
Gabbra	28.4	39.4
Burji	37.1	34.9
Arithmetic Mean	30.0	30.0

TABLE NO. 1

Table No. 2" - Changes in the Percentage Distribution of First Born Primary School Students by Ethnic Origin, Controlling for Fathers' Occupation: Baringo, Marsabit, Narok, and Turkana Districts, 1987.

ETHNIC GROUP	FATHERS' OCCUPATION		
	Herdsmen	Farmer	Modern Sector
<b>A. Males</b>			
Borana	-8.6	-0.6	2.5
Gabbara	-7.2	-3.4	23.8
Kikuyu	*	-3.1	3.2
Maasai	14.7	6.0	0.4
Pokot	-6.5	2.8	2.2
Rendile	-1.8	-16.3	0.4
Samburu	-22.6	-28.7	23.2
Turkana	-9.2	-0.3	7.0
<b>B. Females</b>			
Borana	-38.6	17.0	-4.4
Gabbara	-10.4	-39.4	18.6
Kikuyu	*	-11.7	2.0
Maasai	-3.7	5.5	-2.9
Pokot	-13.1	3.5	7.2
Rendile	-12.7	-29.4	18.6
Samburu	30.0	-10.0	-10.0
Turkana	3.7	-24.9	3.6

Note: The symbol "\*" means that no frequencies of any birth order were recorded for that cell, percentages are therefore not applicable.

B.5-Percentage Distribution of First Born Children by Ethnic Group Controlling for Fathers' Occupation and for Fathers' Number of Children.

Table No. 3" carries the process of specification one step further by introducing an additional test factor - the number of fathers' children - a variable conceptualized in this context as an indicator of the fathers' wealth and number of wives.

The assumed initial dependence of the students' birth order on ethnicity is shown to be conditional on the number of the fathers' children as well. The percentages of first born sons from families of more than six children decline regardless of the fathers' occupation, regardless, that is, of whether the fathers are nomadic pastoralists, farmers, or people active in the modern sector of the economy (the only exceptions to this pattern of falling percentages are observable for the Turkana and Maasai herdsmen with marginal positive values of 0.8 and 1.5, respectively). The arithmetic means of the percentages of first born sons of herdsmen, farmers, and parents active in the modern sector of the economy are 14.0, 14.5, and 23.5 - a considerable decline from the corresponding values of 18.6, 24.3, and 34.7 recorded for the previous step of data elaboration. Conversely, the percentages of first born sons from families of less than seven children increase regardless of the fathers' occupation (the only exception to the pattern of rising percentages are observable for the Turkana herdsmen and the Rendille whose parents are active in the modern sector of the economy with marginal negative values of 1.4 and 1.5, respectively). The arithmetic means of the percentages of first sons of herdsmen, farmers, and parents active in the modern sector of the economy are 29.9, 28.3, and 43.1, respectively, a significant rise from the corresponding values of 18.6, 24.3, and 34.7 recorded for the previous phase of data elaboration.

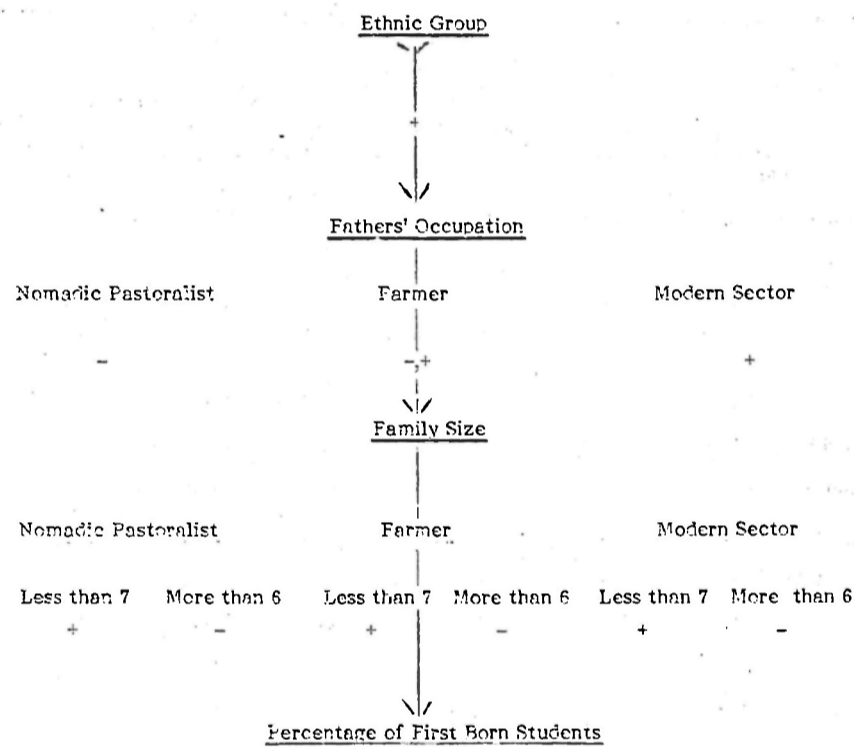
No corresponding pattern is observable for first born girls. Increases in the percentage of first born girls are alternated with decreases within the two categories of the test factor, the fathers' number of children. The only regularity observable is the consistent increase in the percentages of first born daughters of parents active in the modern sector of the economy with less than seven children, and the contrasting decline in the percentages of first born daughters of parents active in the modern sector of the economy who have more than six children.

Table No. 3" - Changes in the Percentage Distribution of First Born Primary School Students by Ethnic Origin, Controlling for Fathers' Occupation and Fathers' Number of Children: Baringo, Marsabit, Narok, and Turkana Districts, 1987.

ETHNIC GROUP	FATHERS' NUMBER OF CHILDREN					
	One to six children			Seven or more children		
	Herdsman	Farmer	Modern Sector	Herdsman	Farmer	Modern Sector
A. Males						
Borana	9.7	14.2	20.4	-7.8	-21.0	-20.4
Gabbara	6.4	0.0	7.8	-8.2	0.0	-2.2
Kikuyu	*	7.9	5.7	*	-4.6	-8.6
Maasai	19.4	13.7	17.4	1.5	-2.9	-9.9
Pokot	21.7	18.4	3.8	-5.0	-1.9	-1.3
Rendille	4.8	3.2	-1.5	-6.8	-11.1	1.6
Samburu	17.9	0.0	8.6	-7.1	0.0	-27.9
Turkana	-1.4	1.1	7.0	0.8	-1.3	-6.0
B. Females						
Borana	-27.8	-45.7	19.1	0.0	-55.6	-11.5
Gabbara	11.4	0.0	13.6	-28.6	0.0	-21.4
Kikuyu	*	4.5	15.0	*	-3.1	-13.2
Maasai	-22.2	68.6	12.7	2.8	-14.2	-12.2
Pokot	-16.7	-33.3	18.6	1.5	0.0	-9.2
Rendille	-5.6	0.0	22.5	16.6	0.0	-15.0
Samburu	10.0	0.0	0.0	-6.7	0.0	0.0
Turkana	16.9	16.7	14.6	-13.8	0.0	-9.1

Note: The symbol "\*" means that no frequencies of any birth order were recorded for that cell; percentages are therefore not applicable.

The findings which have emerged from the process of data elaboration can best be described by the following modification of the initial diagram:



The diagram specifies the direction and the conditions under which the students' order of birth is dependent on ethnicity. In other words, the initial relation of dependence of the students' order of birth on ethnicity is shown to be a conditional relationship contingent upon the value of two test factors, the Fathers' Occupation and the Fathers' Number of Children or Family size.

Other test factors were used such as fathers' literacy, mothers' literacy, mothers' marriage order, fathers' wealth measured by number of cows goats sheep camels and other property. The first two variables proved to be irrelevant at this time given the low number of literate parents, especially among nomadic pastoralists. Mothers' order of marriage turned out to have a very small effect as suppressor variable, while the fathers' wealth as measured in cows sheep goats camels and other types of property did not appear to have any significant explanatory power.

Formal testing of the two hypotheses follows.

C - HYPOTHESES TESTING

C.1 - Formal Testing of the First Hypothesis.

The first hypothesis posits a relation of mutual independence among the four variable: ethnicity, fathers' occupation, fathers' number of children, and students' order of birth.

Such a hypothesis can be formulated as follows:<sup>4</sup>

$$H_0: p_{ijkl} = p_{i...} p_{.j..} p_{..k.} p_{...l}$$

where  $p_{ijkl}$  represents the probability of an observation occurring in the  $ijkl$ th cell and  $p_{i...}, p_{.j..}, p_{..k.}, p_{...l}$  are the marginal probabilities of the row, column, layer, and sub-layer variables, respectively.

To test this hypothesis we calculate the estimates of the frequencies when  $H_0$  is true. Second, we compare these values with the observed frequencies by the means of the usual chi square statistic. Lastly, we compare the computed chi square with the tabulated chi square value having the relevant number of degrees of freedom.

Contrary to the procedure recommended by Marija J. Norusis<sup>5</sup> and contrary to the programme incorporated in the Statistical Package for the Social Sciences (SPSS) for the computation of measures of association in tables, carrying out such a test involves much more than simply adding the results of the chi square tests successively computed for the bivariate tables resulting from all possible combinations of the four variables under study. The procedure recommended by Norusis fails to address a number of conceptual problems peculiar to multi-dimensional tables and obviously absent from bivariate tables.

..8/

..36/

First, the number of degrees of freedom considered in the recommended sum of the chi squares computed for the various bivariate tables should be somewhat lower than the degrees of freedom for the bivariate tables taken as a group, but a convenient correction is not known. Second, such a procedure is limited to a single hypothesis, namely that of the independence of the two variables involved in the bivariate table - or a succession of single hypotheses in a series of bivariate tables - and fails to address the hypothesis of all variables being mutually and simultaneously independent of each other as it is the case in a multidimensional contingency table; nor does it address the hypothesis of one variable being independent of the remainder or of a combination of the remainders; finally, it does not tackle the hypothesis of conjoint relationship among the variables in a multi-dimensional contingency table.

Accordingly, an exhaustive test of the first hypothesis would entail: a) testing for mutual independence among the variables in the four-dimensional contingency tables under study; b) if test a) proved to be significant, it would be of interest to proceed to a test of partial independence; and c) of conditional independence or second order or higher order association. For the purposes of this appendix, I'll confine myself to testing the first hypothesis for mutual independence among the four variables.

The process followed is parallel to the one used for the data elaboration discussed in the previous section: a) test for mutual independence between ethnicity and students' order of birth; b) test for mutual independence among ethnicity, fathers' occupation, and students order of birth; and c) test for mutual independence among ethnicity, fathers' occupation, fathers' numbers of children, and students' order of birth. The characteristics and results of these three successive steps are reported in Table No. 4".

C.1.3 - Testing for Mutual Independence Between Ethnicity and Students' Order of Birth.

Contrary to the initial assumption, the association presumed between ethnicity and students' order of birth in the districts under study turned out to be nearly non-existent. Even at such low level of confidence as 0.10 that association was not significant, and the conclusion that the variation observed in the students' order of birth was independent of ethnicity had to be accepted.



Table No. 4 - Summary of the Results Obtained from Testing for Mutual Independence Among Ethnicity, Fathers' Occupation, Fathers' Number of Children, and Primary School Students' Order of Birth By District and Sex.

TEST CHARACTERISTICS	DISTRICT							
	Barinco		Marsabit		Narok		Turkare	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Tribe and Order of Students' Birth:								
Sample size	273	80	572	233	268	284	607	289
Degree of freedom	8	9	24	24	8	8	12	12
Level of confidence	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Computed chi square	10.3	4.8	21.5	24.0	4.5	4.7	17.3	12.6
Tabulated chi square	13.4	13.4	33.2	33.2	13.4	13.4	18.5	18.5
Tribe, Order of Students' Birth, and Fathers' Occupation:								
Sample size	244	72	466	232	515	250	567	270
Degree of freedom	22	22	64	64	36	36	22	22
Level of confidence	0.1	0.1	0.001	0.001	0.001	0.001	0.005	0.005
Computed chi square	13.8	22.3	253.5	118.1	87.7	71.9	46.3	45.7
Tabulated chi square	48.3	48.3	108.2	108.2	68.5	68.5	42.8	42.8
Tribe, Order of Students' Birth, Fathers' Occupation, and Fathers' Number of Children:								
Sample size	244	72	466	231	515	250	567	270
Degree of freedom	51	51	138	138	80	80	51	51
Level of confidence	0.1	0.1	0.001	0.001	0.001	0.001	0.001	0.001
Computed chi square	49.3	39.4	410.7	238.91	267.8	130.7	106.9	108.1
Tabulated chi square	64.5	64.5	215.6	205.6	205.6	129.8	88.4	88.4

C.1.b - Testing for Mutual Independence Between Ethnicity, Fathers' Occupation, and Students' Order of Birth.

The introduction of the test factor - fathers' occupation - brought out a positive association between ethnicity and students' order of birth. The test factor - fathers' occupation - acted as a suppressor variable: for Marsabit, Narok, and Turkana districts a strong dependence emerged between students' order of birth and ethnicity, for both boys and girls. These results were obtained through manual computations as the Statistical Package for the Social Sciences (SPSS) does not make provisions for the computation of chi square values beyond the level of bivariate tables, and as no alternative computer programme was available at this time.<sup>5</sup>

C.1.c - Testing for Mutual Independence Among Ethnicity, Students' Order of Birth, Fathers' Occupation, and Fathers' Number of Children.

The additional test factor - fathers' number of children - strengthened the dependence of students' order of birth on ethnicity. The computed chi square values for Marsabit, Narok, and Turkana districts all became significant at the 0.001 level of confidence.<sup>7</sup>

This additional test factor also revealed the conditions under which that dependence is operative, i.e., it revealed that such dependence is contingent on the fathers' number of children. More specifically, small families or families with less than seven children tend to have a larger percentage of first born children enrolled in primary schools regardless of the fathers' occupation, while larger families or families with more than six children tend to have significantly lower percentage of first born children in primary schools.

C.2 - Testing of the Second Hypothesis.

The second hypothesis cannot be tested formally as "only sons" of pastoralists and of farmers are totally absent from the primary schools surveyed in Baringo, Marsabit, Narok, and Turkana Districts, while "only sons" of people working in the modern sector of the economy are represented in the same institutions though by very low incidences. Even so, this absence of "only sons" of pastoralists from the primary schools provides some evidence for rejecting the second hypothesis and for assuming some degree of association among ethnicity, fathers' occupation, and students' order of birth in arid and semi-arid districts of Kenya.

#### D - CONCLUSIONS

The processes of data elaboration and hypothesis testing, to which data on the students' order of birth have been subjected, show that for the Marsabit, Narok, and Turkana districts there exists a significant underrepresentation of first born sons in the primary schools, and that such underrepresentations is explained to a large extent by ethnicity, fathers' occupation and fathers' number of children. More specifically, only about 14 percent of the children of large nomadic pastoralist families found in primary schools in those district are first born sons, as compared to 30 percent of the children found in the same schools when fathers' occupation and family size are not controlled.

For first born daughters, similar conclusion is not warranted.

#### REFERENCES CITED IN APPENDIX II

1. Survey of Kenya National Atlas (Nairobi : Survey of Kenya, 1970) pp. 14-15.
2. The four districts were selected to represent the various classification categories of Kenya's arid and semi-arid lands. Marsabit and Turkana districts are representative of category A districts, i.e., districts completely or nearly completely in zones V and VI or arid and very arid zones; Baringo was selected to represent Category C districts, i. e., districts with more than 50 percent of their territories in zones IV and V or semi-arid and arid zones; Narok is representative of Category D districts, i. e., districts with less than 50 percent of their territories in zones IV and V. Kejiindo was initially selected to represent Category B districts, i. e., districts with more than 85 percent of their territories in zones IV, V, and VI; unfortunately, the data collected for this district were not sufficiently complete to be included for discussion. Government of Kenya Arid and Semi-arid Lands Development In Kenya (Nairobi: Prudential Printers, n. d.) pp.12-13.
3. Morris Rosenberg The Logic of Survey Analysis (New York: Basic Books Inc., 1968) pp.84-158.
4. B. S. Everitt The Analysis of Contingency Tables (London: Chapman and Hall, 1977) pp.71-79.
5. Marija J. Norusis SPSS/PC+TM FOR THE IBM PC/XT/AT (Chicago, Ill.: SPSS INC., 1986) B-86.
6. *Ibid.*
7. B. S. Everitt The Analysis of Contingency Tables (London: Chapman and Hall, 1977) pp.72-79.
8. See p. 2, above.

Table No. 5" - Enrolment of First Born Sons of First Wife by Tribe, Controlling for Fathers' Occupation and Fathers' Number of Children, Barinzo, Marsabit, Narok, Turkana, 1987.

TRIBE	FATHERS' OCCUPATION	NUMBER OF FATHERS' CHILDREN	ENROLMENT OF "SENIOR SONS"		TOTAL
			Yes	No	
Rendille	Herdsman	1 - 6	22	31	53
		7 or more	5	31	36
	Farmer	1 - 6	2	5	7
		7 or more	2	-	2
	Modern Sector	1 - 6	14	13	27
		7 or more	19	8	27
Borana	Herdsman	1 - 6	8	2	10
		7 or more	7	9	16
	Farmer	1 - 6	29	18	47
		7 or more	16	24	40
	Modern Sector	1 - 6	30	9	39
		7 or more	45	7	52
Gabbra	Herdsman	1 - 6	11	18	29
		7 or more	7	15	22
	Farmer	1 - 6	3	-	3
		7 or more	4	1	5
	Modern Sector	1 - 6	20	4	24
		7 or more	7	10	17
Maasai	Herdsman	1 - 6	1	5	6
		7 or more	4	19	23
	Farmer	1 - 6	19	2	21
		7 or more	45	7	52
	Modern Sector	1 - 6	48	-	52
		7 or more	61	12	73
Turkana	Herdsman	1 - 6	38	45	83
		7 or more	53	94	147
	Farmer	1 - 6	20	23	43
		7 or more	21	19	40
	Modern Sector	1 - 6	100	88	188
		7 or more	134	113	247
Pokot	Herdsman	1 - 6	5	6	11
		7 or more	16	38	54
	Farmer	1 - 6	7	7	14
		7 or more	15	31	50
	Modern Sector	1 - 6	22	9	31
		7 or more	30	48	78
TOTAL			894	775	1669