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Can Formal Education Reduce Risks for Drought-Prone Pastoralists?: A Case Study from Baringo District, Kenya

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This article addresses an increasingly important but under-researched and controversial topic in anthropology, the role of formal education in pastoral societies. Only minimal research on the benefits and costs of education for pastoralists has been conducted, in part because, until recently, formal education has not been widespread among herding communities. It argues that education should figure prominently in discussions of contemporary pastoral risk management strategies since engagement in labor markets currently is a critical component of pastoral livelihoods, and this is facilitated by education. Through a case study of the Maasai-related Il Chamus people of Baringo District, Kenya, a group that has experienced rapid gains in education over the past 20 years, the paper assesses two related questions: (1) does formal education actually reduce risks for pastoralists; and (2) what social and economic conditions facilitate positive roles for herder education? By building on data from two different time periods, 1980-1981 and 2000-2004, the authors document local trends in education achievement, contributions of education to local livelihoods, and the effects of a tightening labor market and budget reductions on opportunities for education. The article concludes with a discussion of the policy implications of the study's findings and points to areas that require further research.

Key words: risk management, pastoralism, education, development, drought, livelihood diversification

Introduction

Considerable controversy surrounds the topic of formal education among pastoral populations around the world (see Dyer 2006). On the one hand, advocates espouse the need for herders to acquire the skills to reduce dependence on an increasingly volatile livelihood and to meet the challenges of contemporary society. In their support, the highly touted United Nations (UN) Millennium Development Goals identifies universal primary education as one of its eight development goals for poor populations, including low-income pastoralists (see UN 2007). Critics, on the other hand, point to poorly adapted, sedentary models of instruction delivery that jeopardize mobile livelihoods and benefit only those who opt out of the system. They view formal education as incompatible with the rigors and needs of pastoralism. Part of the misunderstanding between the two groups stems from the fact that roles and consequences of formal education in pastoral communities are not well understood. There also is little known about what pastoralists themselves think about the value of formal education. With a few noted exceptions (Dyer 2006; Fratkin, Roth, and Nathan 1996; Holland 1996; Kratli 2001), little systematic research on the benefits and costs of education for pastoralists has been conducted, in part because, until recently, formal education has not been widespread among herding communities.[1] The rangelands of northern Kenya are not unusual in this respect and educational levels are generally much lower there than in other parts of the country.

The limited research that has been done, however, shows a much more complex relationship between pastoralism and education than is commonly represented (Dyer 2006; Leggett 2005; Roth 1991). In most cases, pastoralism is perceived as irreconcilable with formal education because the pursuit of

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education often requires settlement and withdrawing youthful labor away from herding, both major challenges for sustaining a pastoral economy. The debate often is presented in starkly dichotomous terms: either herding families pursue formal schooling for their children as a way to diversify, even escape from pastoralism, or reject it outright because of its incompatibility with their livelihood. There often is little compromise between the two extremes and most formal educational institutions are seen as inherently anti-pastoralist (Kratli 2000).

The strategy of this paper is to purse a 'middle ground' between these opposing views of formal education for herders and to explore what pastoralists themselves think about formal education. It suggests that education should figure prominently in discussions of contemporary pastoral risk management strategies, regardless of its infrequency in the past and its outdated modes of delivery. Indeed, engagement in labor markets currently is a critical component of pastoral risk management strategies and this is facilitated by education (Little et al. 2001). It does not guarantee a job but, as will be shown in this paper, it does enhance the probability of acquiring 'salaried' employment, which can be an important, supportive supplement to pastoralism, especially during droughts. To quote Kratli (2001:ii), "Pastoralists use it [education] as a security net and a way to strengthen the pastoral enterprise. Education is seen as a way of accessing resources outside the pastoral circuit (mainly financial and social capital), particularly sought after by the growing number of households whose entitlements within the pastoral settings have been eroded for various reasons, and who feel increasingly vulnerable to destitution." We also would add that education is being pursued not just by the vulnerable and destitute, but also by 'better off' pastoral families that view it as a means of diversifying their investments and livelihoods.

This paper addresses two related questions: (1) does formal education actually reduce risks for pastoralists; and (2) what social and economic conditions facilitate positive roles for herder education? Through a case study of the Maa-speaking (Maasai-related) Il Chamus of Baringo District, Kenya, a pastoral community where gains in education were especially high during the 1980s and 1990s, the paper tries to address these two questions (for background on the Il Chamus, see Little 1992). Because Baringo, a highly drought-prone area, experienced rapid investments in formal education during the past 20 years—perhaps as much as any pastoral district in eastern Africa—it is an ideal location to examine the role of education in pastoral risk management. Some of this growth was related to the political preference that Baringo received in Kenya under former President Daniel Arap Moi, the district's most famous citizen (see Little 1998). Other contributing factors were a decline in livestock holdings and communal grazing lands that pushed herders to pursue non-pastoral options, including formal education.

By building on data from two different time periods, 1980-1981 and 2000-2004,[2] the authors document local trends in education achievement, contributions of education to local livelihoods and drought-coping strategies, and the effects of a tightening labor market and budget reductions on opportunities for education.[3] In both research periods, Il Chamus experienced major droughts and losses of cattle herds in excess of 60 percent in many locations (Little 1992; McPeak and Little 2004). In fact, the separate studies covered two of the most devastating droughts of the past 50 years, as well as the recovery periods that immediately followed them. Although disadvantages persist when comparing "snapshots" of a community from two different time periods, strong climatic similarities between the two eras make such a comparison especially insightful. The paper suggests that homesteads[4] whose members have some secondary and/or post-secondary education fare better than others during droughts because they receive more remittances, rely less on food aid, and experience higher expenditures on food. However, despite recent impressive gains, those homesteads with family members who have salaried employment still only represent a relatively small group (about 25% of the total). In terms of drought-induced livestock losses, however, it is argued that the better educated did as poorly, if not worse, as other units.

The article is divided into five sections. The first part discusses the data, methods, and the research area as background to subsequent sections. This is followed by an assessment of education trends in the Il Chamus area, and a section that addresses the effects of education on employment and livelihood diversification. In the fourth part of the paper, the analysis turns to the question of whether or not formal education has assisted homesteads to cope with drought and food insecurity, the area's two major risks. The conclusion discusses some of the policy implications of the article's findings and points to areas that require further study.

Methods, Data, and Research Setting

This paper builds on several different sources of data from the 1980s and 2000s. These include a survey by the Baringo Pilot Semi-Arid Area Project (BPSAAP)[5] and a homestead study in 1980-1981 (see Little 1992); data from the PARIMA project (2000-2004); follow up research by Little in 2000 and 2003-2004; and M.Sc. thesis research in 2001 by Lenachuru (see Lenachuru 2002). The physical locations and neighborhoods covered by the different studies covered the same locations—Eldume, Ngambo, and Salabani—negating the possibility that some households had better spatial access to schools than others. Only data from the BPSAAP project that covered these three locations were included. These three locations have received the vast majority of the educational benefits in the Il Chamus area. Finally, about 40 percent of the homesteads covered in Lenachuru's project were either the same or direct descendants (sons and daughters) of homesteads that were included in Little's original 1980-1981 study.

Nonetheless, there were some inconsistencies in data collection methods among the studies and the seasonal timing of when data were collected. These include:

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- The original Little study (1980-1981) was an 18-month activity where data were collected weekly and it mainly covered a drought and part of a recovery period;
- Little's follow-up research (2000, 2003-2004) covered three months of research that included drought and non-drought/recovery periods and involved one round of interviews;
- [a] BPSAAP survey (1981) consisted of only one round of data collection (approximately two months) during a very dry period;
- Lenachuru's study was one-round of data collection (10 weeks) following a prolonged drought when rainfall still was below normal; and
- the PARIMA study included both quarterly interviews with 30 households that covered both drought (2000) and recovery years (2001-2002) and annual repeat interviews (2003 and 2004) that covered above average rainfall years.

Despite some methodological and measurement inconsistencies, the structures of the different data sets were similar enough to assess general trends and education achievement and their contributions to local welfare and livelihoods between the different eras.

Even prior to recent education gains, the Il Chamus economy has always incorporated activities other than livestock, including agriculture (rainfed and irrigated) and "casual" waged employment (see Little 1992). Involvement in salaried ("permanent") employment, however, was relatively minimal until the 1980s (see Little 1992; Little et al. 2001). In looking at formal education trends, it also is important to examine what has happened to livestock holdings in the area during the past two decades. A series of especially severe droughts beginning in 1979/1980 greatly reduced herds in the area and sparked a new appreciation for the benefits of education and the need to diversify livelihood options (see Little et al 2001). By most pastoral standards, Il Chamus were never a wealthy livestock community even in 1980, but their numbers were especially low in 2000, even when accounting for the 1999-2000 drought. Major droughts also hit the area in 1984, 1991-1992, and 1996. Table 1 shows herd sizes per homestead during 1980-1981 and 2000, as well as the percentage of very poor stockowners (those who own the equivalent of three or fewer cattle). As the data show, average herd sizes per household have declined considerably during this period, while the number of very poor owning three or fewer Tropical Livestock Units (see Table 1 for explanation) has grown and represented 30 percent of the sample in 2000.

Coupled with smaller herds, the land available for grazing declined over the past 25 years due to increased human population, agricultural expansion, insecurity, and loss of pastures due to invasive plant species, such as *Prosopis juliflora*. The *Prosopis* problem mentioned here stems from the introduction of the hardy, fast growing specie by a United Nations agency in the mid-1980s, which has resulted in the loss of key dry season pastures and strong resentment by the local community (see Mwangi and Swallow 2005; Nation correspondent 2007). In addition, during the past five years, Il Chamus have lost as much as 30 percent of their seasonal grazing areas east of Lake Baringo due to violent cattle raids and encroachment by well-armed Pokot. Even without the terrible problems of prosopis and violence, land has been constrained by human population growth in the area. The location almost doubled in population between 1980 and 2000, from 8,782 to 15,592 (Kenya 1984:9, 2001:144). While most pastoral areas in East Africa support human population densities between 4 and 10 per square kilometer, in Il Chamus it averages about 32 per square km and as high as 48 in western parts of the study area. In short, the area is increasingly crowded for a livestock-based economy that depends on seasonal mobility of herds and communal grazing. Yet, population pressure would be even worse were it not for increased numbers of Il Chamus working and living outside their home area. While very few Il Chamus worked outside Baringo prior to 1980-1981, about

Table 1. Homestead Livestock Holdings, 1981 and 2000

Date	Avg. Cattle	Avg. Small Stock	Range of Cattle Holdings	Range of Small Stock Holdings	% with 3 or less Tropical Livestock Units[2]
1981 (n=29)[1]	16	55	0-83	0-216	10%
2000[3] (n=30)	4	24	0-10	0-75	30%

Notes:
1. Based on data from Little study, 1980-81 (see Little 1992).
2. Tropical Livestock Unit = 1 head of cattle or 10 small stock (goats and sheep)
3. Based on PARIMA data.

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10 percent either were working or in school outside the district by 1999 (Kenya 2001).

It also is important to note the unique aspects of the Il Chamus area and its form of pastoralism that facilitate school enrollment without major costs to herding. These include: (1) a relatively sedentary form of pastoralism and (2) a general lack of wild animals that allows livestock to be left unherded.[6] Labor shortages can be a problem, but compared to pastoral systems of nearby Pokot and Samburu (see Bollig 2006), the Il Chamus system requires considerably less management and labor since it faces fewer predator threats and requires limited mobility. The proximity of settlements to large expanses of wetland grazing in the Lake Baringo basin also allow herders to remain relatively sedentary throughout the year, except during severe droughts. Consequently, a relatively large number of children can be freed up to attend school without creating the kinds of labor shortages that are experienced elsewhere. In addition, livestock raiding and theft is not as bad in Baringo as in neighboring areas—even though they have been hit hard by raids in the past few years (2005-2007)—so fewer herders are required to protect herds and, thus, are available to attend school.[7]

Trends in Formal Education

When Peter Little began to work in the area in 1980, there were only five secondary school graduates in an administrative location of about 8,700, and the only relatively close secondary school was outside the area in Marigat town.[8] In 1980, none of the secondary school graduates were women. The first females did not graduate from secondary school until 1982, and there were only two university-educated Chamus (both males) in 1980 (see Little 1992). During 1980-1981, it was not unusual for primary schools to lose up to 50 percent of their male student population during dry seasons when herding demands and mobility needs were high. Little observed one primary school in February 1981 that had to close for two months because it lost 75 percent of its student population due to high herding and animal watering demands. Fathers simply would take their children out of school because of labor and mobility needs and then would allow them to return during the rainy season when water and pastures were plentiful and nearby. By 2002, the situation had changed dramatically and large seasonal drops in student population were the exception rather than the norm. Moreover, by this time, there were more than 35 university-trained Il Chamus, including three women, and more than 150 secondary school graduates. Another three women and nine men either were attending university at the time or were about to enroll within a few years.

In terms of facilities, the expansion and construction of new schools was impressive during 1980-2002. The number of primary schools in the Il Chamus area increased from 5 to 14 and several of the existing schools, in order to handle increased enrollments, experienced major expansion projects during these years. The number of secondary schools, in turn, went from zero to three, with two of these having facilities for boarding students. A fourth secondary school without boarding facilities has been constructed and should open soon. The availability of boarding facilities is especially important in pastoral areas since children often move with herds and/or live in relatively remote areas that make it difficult to commute daily to secondary school. As will be discussed below, the expansion in educational infrastructure did not necessarily mean better schools as there is little doubt that the quality of instruction has declined in many schools, especially during the 1990s when government budgets were slashed by structural adjustment reforms (see Abagi 1997).

Table 2 shows the extent to which the number of Il Chamus attending school has increased during the past two decades. The figures demonstrate a remarkable upward trend. For example, the average number of school children per homestead was 0.68 in 1980-1981 but 2.17 in 2000, and the average number of female students per homestead increased five-fold from 0.16 to 0.93. The growth has taken place despite the fact that the average size of homesteads remained relatively stable, with an average of size of 6.72 members in 1980-1981 and 6.84 members in 2000-2002 (see Table 2). Furthermore, the percentage of household members with at least a primary school level of education improved from 3 to 18 percent during the approximately 20-year period. Perhaps the most dramatic changes, however, have been in secondary and post-secondary school attendance. In fact, most of the growth in average years of education in Table 2 relates to the increasing number of Il Chamus now going on to secondary and post-secondary institutions. The percentage of household members who have attained 10+ years of education increased more than 10-fold between the two different time periods, while those who attained some post-secondary training (either teacher training college or university) grew from about zero in 1980-1981 to three percent of total homestead members in 2000. Intermediate field observations by Little in 1985 and 1986 showed a spike in secondary school attendance after the mid-1980s when the first secondary school (Ngambo) in the area was opened. By 1986, there were 38 students enrolled in secondary, of which 10 were girls, an almost doubling of female and total enrollments since 1981 (fieldnotes, January, 1986). About 40 percent of these students were enrolled at the new Ngambo Secondary School.

Unfortunately, despite periodic enrollment increases, most gains in education among females have been mainly limited to primary school education, with only about one-fifth as many females as males attaining any post-primary education. Moreover, only about one-sixth as many of them compared to males go on to post-secondary training (see Table 2). Higher post-primary dropout rates among girls than boys have been noted as a problem for other pastoral areas of Kenya (Holland 1996) and probably relates to early marriages and differential employment conditions in the labor market. That most daughters (educated or not) move to their husband's compound after marriage, and are not as readily available to assist their parents as other family members, may also make parents reluctant to invest in their post-secondary school education.[9]

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Table 2. Differences in Education Indicators 1981 and 2000-2002

	1981 (n=56 households)[1]	2000-2002 (n=30 households)[2]
Avg Household size	6.72 members	6.84 members
Avg years of education per HH[3] member	0.76	3.53
Avg Members in School per HH	0.68 (0.52 male, 0.16 female)	2.17 (1.23 male, 0.93 female)
Total and % with at least Grade 7 level of education	18 (12 male, 6 female) 3%	40 (22 male, 18 female) 18%
Household Members with Secondary Education at 10+ level	2 (2 males) 0.3%	15 (11 males, 4 females) 7%
Household Member with Post-Secondary Education	1 (1 male) 0.15%	6 (5 male, 1 female) 3%

Notes:
1. Based on data from Little study (see Little 1992).
2. Based on PARIMA data.
3. HH=homestead or household.

Nonetheless, there are important exceptions to this pattern. Melumba,[10] an elderly man of 65 years, discusses why he invested in the college education of his daughter:

> I educated my daughter with a lot of difficulty despite the discouragement from my relatives. But there have been benefits—she received employment after school and she supports her family and relatives since she is the only one employed. She supports the children of relatives by paying for food, clothes, and school fees; and supports her own family [Melumba's] even if she is not married. Unmarried women can do better on their own if they have education. (fieldnotes, August, 2000)

Based on the deteriorating livestock and land situation described earlier, investment in formal education was an important diversification strategy throughout the 1980s and 1990s and remains so today. Two male homestead heads express the income and employment benefits associated with formal education as such:

> With education one can get a job.... Salary is more reliable than livestock and one can easily buy/restock his herd with salary. (fieldnotes, September, 2000)

> I send children to school with the expectation of them helping us since livestock are no longer reliable. We used to be proud of our many animals to support the family, but not now. Only an educated child has value in the family for he can do many things—supply food, clothes, educate others, etc. After school I expect them to help any person in the family who needs assistance, educate others, and support their parents and relatives. (fieldnotes, September, 2000)

The sentiments of such comments reflect new patterns of social status and new meanings of social and economic well-being. In repeated interviews in the area, children with education and salaried employment emerge as important new measures of parental and family success. Formal education, and the salaried employment that can accompany it, are viewed as the most secure form of social security for the family. A female respondent describes how these changes affect local attitudes toward education:

> Wealth is different now. Even about nine Il Chamus own vehicles and salaried employment is considered a means of wealth. A wealthy herd owner now owns 30-40 cattle and maybe about 100 goats and sheep. He is a rich man if he has so many sons with education who have salaried jobs. (fieldnotes, August, 2003)

Individuals who obtain salaried positions are those with secondary or post-secondary education. Until recently, most of these jobs have been in the public sector but government "downsizing" and budget problems reduced these opportunities (see endnote 3). Because of their longstanding involvement with contract (temporary) agricultural work on the nearby Pekerra Irrigation Scheme (see Little 1994), Il Chamus differentiate between different types of waged work and attribute especially high status to "salaried" employment. Salaried employment is relatively permanent and often comes with benefits, including health insurance and pensions.

It is difficult to underestimate recent commitments toward education on the part of Il Chamus families, a pattern—as shown earlier—that differs markedly from the early 1980s. Despite the fact that per capita livestock holdings have declined considerably since 1980-1981, most education still is financed through the sale of livestock. Based on a small set of interviews (5) in 2001, it was noted that household heads sold up to 3-4 cattle and several small stock (15-20), as well as relied on *harambee* (local community fund-raising) and government bursaries (aid) to meet the four-year costs of secondary school education (approximately $2,000-$2,200 in 2001). As noted earlier, Baringo District as a whole, including the Il Chamus area, did relatively well in terms of public funding for education in the 1980s and 1990s under former President Moi's government.

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The case of Lenaro Ladapana is illustrative both of the economic demands that education places on the family and the willingness of parents to expend considerable resources on their children's education:

> Lenaro Ladapana is about 53 years of age and practices irrigated agriculture, as well as keeps a relatively large numbers of cattle and goats and sheep. In 1991, his family's herd was 74 cattle, 100 sheep, and 74 goats, but following the 1999-2000 drought they remained with only 18 cattle, 30 sheep, and 12 goats. By 2000, five (four boys and one girl) of his children had graduated from secondary school, and one had gone on to complete a certificate from a teachers training college, and another earned a degree from a national university. To finance the children's secondary school education, he sold an average of 10 cattle and 15 goats/sheep to finance each child's education costs. The costs of university and college training were likely to have been covered from harambee, assistance from clan members, and government funds, as well as Lenaro's own cash savings. For a person with limited resources, Lenaro clearly disposed of a large amount of family assets to finance the children's education. In terms of their status in 2000, the daughter was married and working at home, while another educated son was herding and working on the farm and lived at home. The other three sons held the following positions: teacher, employee in the prison system, and civil servant for a large government agency based outside Baringo. Lanaro was extremely positive about the benefits of education: "Schooling is important to me because children do not depend on you anymore. In case there is a problem in the family, we can move together and help solve it, financially or otherwise. Their living standards will improve through better housing, food, and health and they can be wealthy because money can be found to buy more livestock or educate other children." (fieldnotes, September, 2000)

Lenaro viewed education as the means to achieve a salaried position, even though the respondent himself had never completed primary school. Unfortunately, the job market was considerably tougher in the 2000s than the 1980s and 1990s. Two of the family's recent secondary school graduates had not gained salaried employment by the time of the interview. Because the Kenyan job market during the past decade has not grown nearly fast enough to meet the demands of a growing population, recent graduates are less successful in finding jobs than previous ones. Based on the PARIMA and Lenchuru data sets (see earlier description), more than 60 percent of secondary school graduates who are 22 years or younger were without jobs in 2001, but only 30 percent of older graduates were unemployed. In 1980-1981, even primary school graduates had as good, if not better, employment prospects than recent secondary school graduates. The very few educated Il Chamus in the 1980s provided an advantage to even those who had graduated from primary school, and many ended up working in local government positions, including as office clerks and sub-chiefs.[11] It also is likely that a primary school graduate in 1980-1981 had better job-related skills than a current primary school graduate since, according to most Kenyan educators, the quality of education has declined in the past two decades both in Baringo and Kenya generally (see Abagi 1997).

Effects on Income Diversification and Labor Markets

One indicator for measuring education's impact on local livelihoods is to examine its effects on employment patterns. As noted earlier, with the state-owned Pekerra Irrigation Scheme nearby, Il Chamus have usually been able to find undesirable, low paying agricultural contract work. Doing "contract" work has always been a necessity for poor households, but not one for which they aspire (Little 1994).

How has increased education among Il Chamus affected local employment patterns and household welfare levels? Table 3 shows differences in waged employment between 1980 and 2002. From the data, there is little doubt that "regular" (salaried) waged employment has grown between the time of the Little study (1980-1981) and the latter field research (2000-2002). In the recent project, almost 25 percent of homesteads included a salaried worker with some earning as much as $350 per month, while in 1980-1981 only 8 to 10 percent included a waged worker, and most of these earned very low salaries (less than $50 per month). Both in the 1980-1981 and 2000-2002 studies, salaried workers assisted their families through cash or in-kind contributions.

What is disguised in Table 3 is the type of relatively high-paying employment that has been attained by some individuals in recent years. While no persons held professional positions except primary school teaching positions in 1980-1981, our limited homestead samples from 2000 (30) and 2002 (13) included a lawyer, a Nairobi-based businessmen, and a salaried employee for a major tourist enterprise. Further analysis is required to determine the extent to which education benefits have been captured mainly by wealthy households, although preliminary observations show that this has occurred in most cases. "Contract" waged work impacted more than 20 percent of households in 1980-1981, but still was very prevalent among poor Il Chamus households in 2002, which would imply that good jobs have gone to the wealthy who also control the resources to invest in education.

There also has emerged a new pattern of labor mobility and waged employment among Il Chamus. The increased education has allowed them to compete for lucrative positions outside Baringo, both at regional and national levels. While most wage workers (98% of total) worked within Baringo District itself in 1980-1981, almost 50 percent of salaried workers in 2000-2002 worked outside of Baringo, with the most popular destinations being Nairobi and Kisumu cities.

Livelihood and income diversification also has increased along with the growth in education levels. Table 4 depicts homestead income sources from 1980-1981 and 2000-2002, respectively. It should be noted that these represent "averages" and that there is significant differences between "better off" and poor homesteads (see Little 1992:112). Nonetheless,

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Table 3. Education, "Salaried" Employment, and Income Remittances in 1980-1981 and 2000-2002

STUDY	Sample Size (households)	% Homestead with Income Remitter and "Salaried" Waged Position
PARIMA Study + P. Little Re-Study (2000-2002)	43	25%[1]
Lenachuru Study (2000)	198	26%[3]
P. Little Study (1980-1981)	56	10%
BPSAAP Survey (1981)[4]	78	8%

Notes:
1. All of these employed individuals were said to help their household in some way – either through direct income or other material transfers.
2. Data were collected by Clement Lenachuru as a part of his M.Sc. thesis at Egerton University (see Lenachuru 2002). The analysis in this table was done by Peter Little.
3. Only reflects occupation of household head. Twenty-one percent of total households (80% of those with salaried employment) had a member working outside of the district and 78% of those households who had a member working outside of the area remitted at least some income or in-kind transfer – about 40% of these remitted income on a monthly basis, while 22% remitted very infrequently at intervals of more than six months. Seventy-one percent of individuals in migrant labor work had some kind of salaried position.
4. Data were collected as part of the Baringo Pilot Semi-Arid Area Project (BPSAAP) and analysis was done by Little.

there are important variations in income patterns between the 1980-1981 and 2000-2002 studies. For example, homestead income was far more dependent on livestock (76%), and less reliant on waged (including salaried) (18%) and agricultural incomes (3%) in 1980-1981. In 2000-2002, livestock still accounted for 43 percent of income but waged income had increased in importance to 38 percent, while trading income was 7 percent of total income. The latter category was virtually nil in the 1980-1981 study, but there was some fishing income (3%) at that time. With drastic declines of fishing stocks and a recent government ban on fishing in nearby Lake Baringo, fishing as a source of income was absent in the 2000-2002 study. Overall the key trends that can be noted since 1980-1981 are the reduced dependence on livestock-based income and the greater reliance on salaried income and trading. This increased dependence on salaried employment is a direct result of improved education levels in the area, since virtually all salaried workers have attended secondary school and many have graduated from or attended post-secondary institutions.

Coping with Drought and Food Insecurity

Has increased education and the income growth and diversification associated with it allowed homesteads to better manage droughts and food shortages? Here, it is important to distinguish between the effects of drought on livestock herds and productivity, on the one hand, and food security, on the other (see also Devereux 2006). These often are conflated in reports of drought in the region (see IRIN 2006). Large losses of livestock usually, but not always, results in a humanitarian/food crisis for pastoralists. As McPeak and Little argue

Table 4. Sources of Homestead Income, 1980-1981 and 2000-2002

	% of Total Income					
Years	Live-stock	Agriculture	Trade[3]	Fishing	Wage employ, salary (incl. remittances)	TOTAL
1980/1981[1]	76 %	3 %	--	3 %	Est.18%[4]	100%
2000/2002[2]	42 %	13%	7 %	0 %	38%	100%

Notes:
1. Based on Little study (1980/1981).
2. Based on PARIMA study; data analyzed by John McPeak.
3. Petty trade included sales of small quantities of vegetables, local beer, firewood, and other petty consumer items.
4. Very little of this income (less than 15%) was accounted for by regular salaried employment.

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(2004), herds can be severely damaged by drought but food security not overly jeopardized if there is non-pastoral income to purchase food. Thus, in terms of managing livestock during those "boom and bust" (drought/recovery) cycles so characteristic of pastoral economies, we would argue that pastoralism has declined in Il Chamus during the past two decades while food security has improved for many. For example, based on the PARIMA data more than 80 percent of local herds were lost due to the 1999-2000 drought, a figure that was even greater than the die-offs of 1979-1980 and 1984 (see Little 1992).

The devastating effects of recent droughts on herd stocks have occurred despite the rapid growth in formal education. In fact, according to interviews with local elders, education may actually constrain pastoral production by forcing homesteads to rely on hired herders and absentee managers, and by fomenting pressures to sub-divide communal grazing lands. Indeed, strong local opinions are expressed by some elders that those youth with high levels of formal education have little respect for customary tenure and management rules and are vocal proponents of privatizing and fencing Baringo's rangelands. These actions actually hurt pastoral production in the area and make the local livestock economy more vulnerable to drought. In the words of Lekeese, an elder from the Sintaan area:

> Pastoralism is discouraged by education. They cannot be compatible. Educated people do not care about pasture management. In the past, immediately after drought, land used to be sanctified or cleansed so that animals get well immediately—but nowadays no. Education also encourages privatization of land. It is better when land is communal so that people can move freely, searching for water and grass wherever they are available. Local rules on use of water and pastures no longer hold. (fieldnotes, September, 2000)

Others blame the recent spate of spontaneous private enclosures in the area on educated, salary workers. As a young, educated woman pointed out to me, those homesteads with "large metal fence and barbed/cactus fences around them—those are the folks who have salaried employment (fieldnotes, June, 2004)." In some cases, educated elites have fenced off up to two to three acres of communal land around their homesteads and then use the compound for their own animals and farms. These enclosures especially are prevalent in the crowded settlements in the western part of Il Chamus land, further aggravating population density problems in the area. Once the first large enclosure went up, their numbers grew rapidly and increasingly encroached onto customary seasonal pastures (see Little 1985a, 1987). As an educated civil servant from the area explained, "I had to fence off a large area because others were beginning to encroach near my homestead (fieldnotes, June, 2004)." Within these new enclosures, modern-style rectangular houses of wood and sometimes stone and cement blocks are found, often next to a customary compound with mud walls and thatched grass roof.

Another negative impact of education on pastoralism is its increased demands on youths' time: "Education and pastoralism cannot go together because education limits children from going to take care and following animals. Time to take care of animals is reduced if one goes to school (fieldnotes, August, 2000)." In the words of one of the first Il Chamus school teachers, "Education is killing pastoralism slowly by slowly (personal communication, August, 2000)."

Despite these noted effects on the pastoral economy, when one looks at local issues of food security and welfare, the picture is quite different. In fact, there is little doubt that education and non-pastoral employment, especially salaried work, have had important positive impacts on local food availability and expenditures. Income from employment is used to help cover food shortfalls resulting from drought and other disasters, such as floods. Table 5 shows that "with secondary education" homesteads (including those with post-secondary schooling) are about 10 times more likely to have salaried employment, twice as likely to remit income, six times as likely to find employment outside the area, and expend almost three times as much on "sharing with relatives" as "without education" homesteads. This latter factor is extremely important and salaried employees, when requested, often hand out food and small amounts of cash to relatives when they return to their home areas. One salaried worker in Nairobi complained in 2007 about the numerous requests that kinfolk make upon him when he returns home:

> It costs a lot of money—you support so many people. When I come home, I have to give 10 and 20,000 KSh ($143 and $286) to relatives. Why come home then—just send money to your immediate relatives. I just sent some medicines to my hired herd boys and sent them some medicines and cash to pay them. I do not have to go there myself. (fieldnotes, June, 2007)

The respondent went on to say that with the widespread use of cell phones, he can communicate with relatives and even arrange to have money sent to them without visiting. This process has been facilitated by the recent emergence of money transfer companies in Kenya that allow their members to transfer/remit funds through the use of cell phones.

As Table 5 depicts, "with education" homesteads also spend more money on food, have better food availability, and depend less on food aid than other homesteads. The vast majority of remittances from salaried employment are used to purchase foods, an option that only was minimally available in 1980-1981 (see Little 1985b). Even immediately after the 1999-2000 drought, only 23 percent of "with education" homesteads were using food aid, as opposed to 66 percent of "without education" families.

The data also demonstrate that overall food availability was better among "with education" than "without education" homesteads because of the former's ability to purchase food on the market, rather than rely on livestock production and sales. Local narratives confirm these findings. For example, a local elder named Lekipiri states that:

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Table 5. Social and Economic Effects of Formal Education, 2000[1]

	Homesteads "with secondary education"[2]	Homesteads "without secondary education"
% with member in salaried employment	57%	2%[1]
% who receive assistance from members "living away"	78%	30%[1]
Annual expenditures assisting relatives (Ksh)	4,441	1,670
Annual food expenditures (Ksh)	16,995[3]	10,230[3]
Total Annual Cash Income (Ksh)	55,593[3]	26,542[3]
% income derived from animal sales	21%	34%
% who claim "good" food availability	70%	49%
% who use food aid	23%	66%
% with household members in "good" health status	91%[b]	80%[b]
Average number of animals owned	9.8 cattle, 41 shoats	6.4 cattle, 30 shoats
Number of animals lost in drought	19.5	12
Losses as % of total cattle owned	67%	65%
Annual cash savings (ksh)	5,634[3]	999[3]

Notes:
1. Based on the PARIMA Study (30 homesteads); and analysis of Lenachuru data (198 homesteads) by P. Little.
2. Of course, these also include homesteads with members who also have post-secondary school education.
3. These figures are inflated because they were based on monthly recall after a drought when food expenditures were very high and sharing among relatives was high.

> The 1999-2000 drought was the worst ever and it killed cattle, goats, and sheep. During this time, education has assisted because it provided income (jobs) so one could buy food. In a drought, education is the way to provide food. Those without anyone working in the family fared very badly in 2000. (fieldnotes, September, 2000)

The perception that education and waged employment assisted Il Chamus to cope with food shortages during the 1999-2000 drought is shared by others. Letwapi, a homestead head with educated children, notes that:

> The salary from my son and my son's wife, who went to school and both are working, was used to buy food. Education has benefited me because there is no other way that I could have gotten food during the drought. If you succeed in education, life is enhanced because it [education] does not die, but animals die with time. (fieldnotes, September, 2000)

It should be noted, however, that while herders acknowledge the importance of education, there remains a commitment to pastoralism and investing in livestock, especially in recovery periods after droughts. This is in spite of the fact that educated individuals actually lost disproportionately more livestock than others during the recent drought (Table 5). However, as the table shows, their average herd sizes after the drought were still almost 50 percent larger than those for the "without education" group. Educated respondents frequently remarked on the fact that income from salaried employment allows them to purchase animals, especially after disasters.

Nonetheless, there is a small group of salaried workers who now are reluctant to invest in livestock because of the recent problems with pastoralism in the area. One Nairobi-based civil servant, who lost 70 cattle in 2005 due to a Pokot raid, said he is hesitant to buy many animals because of land constraints and insecurity: "I only have three cattle with calves now and did not buy this year because there is no place to graze.... Prosopis has now taken over Larrok and we cannot graze Rugus or Nasoguro [both prime dry season grazing zones] because of insecurity (fieldnotes, June 2007)." This kind of story was told by two other educated workers in 2007 but was rarely heard in 2000-2002, which implies that returns to livestock investments may have deteriorated even more in the past few years.

Mothers in polygynous households recognize the "social and food security" dimension of education and frequently negotiate with their husbands to educate their own children. The oldest son often is responsible for taking care of the mother during her elderly years, and wives often negotiate hard with husbands to cover the education costs of their oldest son. In August 2000, one husband with three wives indicated that "there seems to be a kind of competition among many wives, each trying to push her children to school. Each one wants to see that her children are going to school among others (personal communication, August, 2000)." Lenturur, another male household head, noted the same social process: "Women want their children to go to school; they show concern. There is definitely competition from each wife for her children to go to school (fieldnotes, September, 2000)." In a few very successful cases, educated sons have constructed new homes for their mothers in the Il Chamus area, or arranged for them to live with them in the city where they are employed.

Overall, non-pastoral income has aided households to cope with food problems associated with drought, even

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when livestock losses are high. As noted earlier, it is those homesteads whose members have more education that are more likely than others to have non-pastoral income, especially from salaried employment. Investment in education is a key diversification strategy that increasingly allows herders to cope with the vagaries of drought and other economic shocks. While there have been increased investments in businesses, land, and other assets, education has been the key non-pastoral investment pursued by Il Chamus. As noted earlier, many herders with education still invest considerably in livestock, and despite the recent devastations caused by the 1999-2000 drought, many were actively rebuilding their herds as of 2005.

Conclusions

The preceding discussion has shown that the effects of formal education on Il Chamus welfare and livelihoods are mixed but generally positive in most areas. Clearly, formal education has favorably impacted employment and food security and, thus, reduced famine risk for Il Chamus homesteads, which explains why a majority favor it (see also IRIN 2007). They are the ones who have the assets and resources (and social and political connections) to invest in education, especially at the post-secondary school level, and most of the beneficiaries have been males. Those "with education" homesteads have fared better than others along a range of food security and income indicators. They even have larger livestock holdings than others because their incomes allow them to purchase animals and to avoid selling livestock at distressed prices in order to buy food during bad years. However, as the paper has argued, it is critical to distinguish between the effects of education on income and food security and its effects on pastoralism. As the paper suggests, education does not necessarily have a positive effect on herd management and can actually have several negative impacts on pastoralism, including increased pressures to privatize communal grazing zones and encouraging absentee herd ownership with all its negative environmental effects (see Little 1992). This explains why there is some local ambiguity expressed about the benefits of education, since the educated Il Chamus are the ones pursuing privatization, range enclosures, and other processes that are threatening to pastoralism. Such contradictory trends associated with education need to be carefully examined in the future, since even with widespread diversification, pastoralism likely will remain the core of Il Chamus livelihoods.

Although we have argued that the Il Chamus area is unique in several respects, there are practical lessons that can be noted from our study. First, pressures on pastoralists to diversify and the diversification process itself are only likely to accelerate in the future. A key element in facilitating beneficial diversification among pastoralists will be formal education, a necessary prerequisite in competing for the more remunerative options, such as salaried employment. Second, because households can buy their way to food security, formal education (and the resulting employment) can have a favorable impact on pastoral food security. The cash from employment also keeps many families from having to engage in very risky and often environmentally-damaging dryland farming. In spite of what the reality was in the past, pastoralists in Africa today are highly dependent on cereals and, except in those limited cases where cultivation is feasible, this requires having cash to purchase them. Formal education is one means of achieving employment and the necessary cash to buy food.

However, there are other ways for pastoralists to earn cash and combat food insecurity that also might relate to formal education. Preliminary observations by one of the co-authors (Little) show that some educated pastoralists have been able to tap higher value livestock markets in Nakuru, Nairobi, and other favorable markets that are poorly known to many local pastoralists (see also McPeak and Little 2006). In doing so, they are able to search out the best prices, most of which are found outside Baringo District. Educated individuals also seem to be able to better time animal sales according to market conditions because they are not driven as much by cash requirements and the need to sell animals, often at "throwaway" prices, in order to procure food. They can wait out unfavorable markets, which cash-strapped and hungry pastoralists find hard to do. The effects of increased education on pastoral market behavior is a topic that requires additional research.

Third, on the less positive side, the paper has shown that educational opportunities for females greatly lag behind those for males. The Il Chamus case of gender bias is not too discrepant from what has been documented for other pastoral areas, but nonetheless it is a problem that needs to be remedied for the benefit of different social groups (see Aikman and Unterhalter 2005; Dyer 2006). Administrative interventions and scholarship opportunities need to be disproportionately made available for females until the wide gender inequities in pastoral education are reduced. These actions are especially needed at the secondary school level where female opportunities are particularly constrained, but where achievement is critical for going on to post-secondary training and/or salaried employment. As the paper has shown, both of these have disproportionately positive effects for those who acquire them. That the Kenyan government recently has considered making secondary school education free may help alleviate some of the gender-based inequities in education that currently exist (Clark 2007).

Fourth, under current labor market conditions, investments in secondary education do not guarantee salaried employment, as they often did in the past, even in areas like Baringo that still have a limited pool of educated workers relative to other parts of the country. Public sector employment, for example, declined considerably in the 1990s as budget reforms and structural adjustment programs reduced the number of government employees, as well as workers at government-owned enterprises. Increasingly, university and other forms of post-secondary education are required to enhance one's chances of obtaining gainful employment,

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and this requires an investment that is beyond the means of most Il Chamus even if free tuition for secondary schools is introduced. Education generally has paid off for the Il Chamus, but this may be less likely in the future for those who are unable to go beyond secondary school education. That is why governments need to invest in pastoral education at all levels and not just at the primary school stage. As we have shown, the Kenyan government's recent declaration of state support (including free tuition fees) for secondary school education is an important step in the right direction.

Finally, although livelihood diversification will continue to increase in pastoral areas, such as in Il Chamus, pastoralism will remain critical to the economies and residents of Africa's arid and semi-arid regions. In these areas where pastoralism is still very important, such as in many parts of the Kenyan rangelands, investments in education must not jeopardize this critical livelihood. School calendars should adjust to the cyclical nature (both spatially and temporarily) of mobile pastoralism, especially in peak dry-season periods, and school location needs to reflect the pattern of key water points and pastures. As we have suggested in this paper, formal education should be viewed as a supplement in support of pastoralism rather than a replacement for it. Under current conditions, there are few better uses of these dry areas than pastoralism and the majority of local populations will continue to practice it regardless of whether or not a family member attains formal education. Policy makers who plan for these areas need to recognize this and invest in education programs that improve the welfare of pastoralists and their ability to manage a risky environment.

Notes

[1]The old cliché that a pastoral family usually sent its least capable herders to school still holds true for many parts of eastern Africa. This stereotype is challenged in certain areas, such as Baringo, Kenya, where labor markets proliferate and education can mean the difference between attaining a well-paying job or being unemployed.

[2]Little also conducted some follow-up interviews during short visits (four weeks) in 2006-2007.

[3]In the 1990s, reductions in public sector employment and funding for education under IMF/World Bank structural adjustment programs eliminated free education at primary schools and increased fees at secondary schools, while reducing government job prospects for the educated. Like other Kenyans, Il Chamus distinguish "salaried positions" from other less permanent forms of employment, such as temporary contract and self-employed work.

[4]The term homestead and household are used interchangeably in the paper, although the former term better reflects the reality of living arrangements in Il Chamus society. An *en-kang* (homestead) refers to an enclosed dwelling made up of one or more related households. It usually contains a husband and wife(s), their children, and perhaps the husband's elderly mother or father. In polygynous homesteads, each *en-kaji* (house) is headed by a wife, and her children reside in that household.

[5]BSAAP was a Ministry of Agriculture (Kenya)/World Bank project which was active in Baringo District while Little was in the field during 1980-1981 and 1984. Little helped BPSAAP with the design of a survey questionnaire and was provided copies of completed survey forms for the Il Chamus area. To our knowledge, the project never computerized or analyzed the raw data.

[6]In a visit to Baringo in 2006, Reuben Lemunyette, field coordinator on the PARIMA project, remarked to Little about the lack of wildlife in the area. He suggested that this also might be a reason for increased school attendance in the area, since herders are not needed to protect herds from predators. He contrasted this situation with his own home area of Ngurunit, Samburu District where livestock must be carefully herded to avoid losses from lions and other wild animals.

[7]It is not known the extent to which the violent cattle raids during 2005-2007, which killed more than 10 Il Chamus, impacted school enrollments in the area. However, we are aware that at least two primary schools in the eastern part of Baringo were closed for much of 2007 due to insecurity and were still not open as of March 2008. Moreover, in many areas, herd owners are no longer willing to allow their animals to graze alone, but now have armed (with spears and swords) male youth watching them.

[8]In 1980, the Il Chamus area was administered under one Location (called Njemps Location), but by 2000 it had been sub-divided into six separate administrative Locations, a pattern of administrative "balkanization" that marked the Moi era during the 1990s.

[9]This pattern, however, seems to be changing and key informants indicate that educated daughters are as likely to support their parents now as are educated sons regardless of post-marital residence.

[10]Pseudonyms are used in the paper to protect the identity of respondents.

[11]In Kenya, chiefs head up administrative locations, while sub-chiefs administer sub-locations and report to the locational chief. The positions are appointed and their salaries are paid for by government. They were created by the colonial state, and they have no counterpart institutions in Il Chamus social structure.

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