

**Avoiding Disaster: Diversification and Risk Management
among East African Herders**

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Abstract:

This paper addresses processes of livelihood diversification among pastoralists in the rangelands of northern Kenya and southern Ethiopia. The objectives of the paper are threefold: (1) to suggest a theoretical framework for addressing income diversification among pastoralists with reference to current literature and data bases; (2) to present a case study on pastoral income diversification based on preliminary field research in northern Kenyan and southern Ethiopia; and (3) to summarize current understandings of pastoral diversification while pointing to additional empirical research needs. By showing how comparative analyses in the region have been constrained by theoretical and data deficiencies, the paper explores ways in which diversification differs by what are termed conditional, opportunity, and local response variables. Climate, distance to market towns, gender, wealth, and education are attributes covered by these variables and discussed in the paper. The conceptualization and case study provide useful bases for conducting comparative research on pastoral diversification in East Africa, specifically, and in sub-Saharan Africa, generally.

INTRODUCTION

Pastoralists of East Africa increasingly pursue non-pastoral strategies to meet consumption needs and to buttress against risky shocks caused by climatic fluctuation, animal disease, market failure, and insecurity. While herders have always sought a degree of herd diversification and pursued different land-use strategies, contemporary patterns reflect an important transformation. Recent studies in the region show marked changes in diversification strategies that increasingly engage the market, even in areas considered to be very remote (Holtzman 1996; Kituyi 1990; Little 1992; Little et al. 1999; Straight 1997). To assess the benefits and costs of these changes, the relationship between income diversification and pastoral risk management should be examined. Has diversification allowed herders to better cope with the region's high levels of economic, political, and ecological risk?

While the theme of income diversification among East African pastoralists has received descriptive treatment in the literature, little comparative work has been done. This gap is especially notable when compared with the substantial analytical work on diversification that has been conducted in agrarian regions of Africa (see Reardon 1997; Reardon et al. 1994).¹ What has hampered comparative studies of pastoral diversification is the absence of good longitudinal data; an agreed upon definition of what constitutes diversification among African herders; and the lack of conceptual frameworks to distill theory from the region's excellent descriptive, ethnographic materials. These constraints have resulted in numerous contradictory statements about the potential role(s) of diversification in minimizing risk among pastoral herders. For example, cultivation is seen by some as a viable risk management strategy (Campbell 1984; Smith 1998), while others view it as an unsustainable (even destructive) option (Hogg 1987, 1988). Similar inconsistencies are revealed in debates about market-oriented diversification in

pastoral areas, with some condemning and others applauding the practice (see Fratkin 1991; Hogg 1986; Holtzman 1996; Little 1992). Local differences--in terms of market town proximity, access, and market dependence on consumption needs (i.e., grain)--that might explain discrepancies in market benefits and costs are usually left out of such deliberations. In short, too much discussion remains anchored on single site studies rather than systematic comparisons across ethnic groups and locations.

This article is a preliminary attempt to explore the issue of income diversification across different herding groups of East Africa. It is not meant to be a definitive statement about the causes and consequences of pastoral diversification; the objectives are more modest. They are to (1) suggest a theoretical framework for addressing income diversification among pastoralists with reference to current literature and data bases; (2) present a case study on pastoral income diversification based on preliminary field research in northern Kenyan and southern Ethiopia (see Smith et al. 1999); and (3) summarize current understandings of pastoral diversification while pointing to additional empirical research needs. The article draws on research and literature that covers an area of approximately 10,000 square km and encompasses the rangelands of southern Ethiopia and northern Kenya. The study region is bounded by the towns of Hagre Mariam and Negelle in Ethiopia and Isiolo and Marigat in Kenya (see Figure 1) and includes Boran, Gabra, and Guji in Ethiopia, and Ariaal, Boran, Il Chamus, Gabbra, Rendille, Samburu, and Tugen peoples in Kenya.² All of these ethnic groups are historically herders, although most currently include segments of non-herders.

INSERT FIGURE 1

In this article, we treat pastoral diversification as the pursuit of any non-pastoral income-earning activity, whether in rural or urban areas. This definition includes (1) any form of trading

occupation (e.g., selling milk, firewood, animals, or other products); (2) wage employment, both local and outside the area, including working as a hired herder, farm worker, and migrant laborer; (3) retail shop activities; (4) rental property ownership and sales; (5) gathering and selling wild products (e.g., gum arabica, firewood, or medicinal plants); and (6) farming (both for subsistence and cash incomes). The selling of livestock and milk products at the 'herd-gate' are not included in this definition, nor are herd diversification strategies (for example, the shift from one animal species to another). The definition approaches diversification as a cyclical rather than unilinear process, whereby herders can combine different diversification strategies at different points in their life cycle (see Holtzman 1996; Little 1992). For instance, a male pastoralist may engage in wage employment to earn income for bridewealth and then later on move back into full-time pastoralism.

A comment is warranted here about the relationship between risk and diversification. While risk is an important reason why herders might wish to diversify their income sources, it is not the only one and in many cases it may not be the most important. The causes of pastoral diversification are multi-faceted and resistant to mono-causal explanations. Part of the reason for this is that within the designated study area we are dealing with heterogeneous populations and ecosystems. Considerable intra-community differences add to the complexity, in that motivations for diversification vary considerably along both wealth and gender lines. Rich and poor herders pursue diversification for different reasons, and risk may not be the most important factor for both groups. Despite these differences, it is commonplace in the literature to simplify and homogenize the relationship between risk and diversification, and to assume that diversification is (1) a strategy that always lowers exposure to risk and (2) 'scale' neutral in that all members of a community have similar exposure(s) to risk and coping opportunities (see

Bernstein et al. 1992; Dercon 1998; Ellis 1998). In this article, we will demonstrate that important exceptions are found for each of these points.

COMPARATIVE FRAMEWORK

Borrowing from Smith et al's definition, risk is defined in this paper as "uncertain consequences, and in particular exposure to potentially unfavorable circumstances" (1999: 4). If risk can be avoided or minimized without undue economic and social costs, herders will try to do so because it is an undesirable state of affairs. Although this is a simple characterization of risk, it will suffice for this discussion and is compatible with pastoralists' own concept of the term.

There is little doubt that herders of East Africa are exposed to high and endemic levels of climatic, economic, and political risks, even when compared to other risk-prone areas of the region. This is especially true for the rangelands of northern Kenya and southern Ethiopia (the study region), where herders often inhabit areas of widespread insecurity and conflict; climatic instability; destructive livestock diseases; and unreliable markets and infrastructure. While there are clear geographic differences in levels of risk exposure in the study region and in East Africa generally, there also are considerable differences in terms of opportunities to diversify. These differences have not been well understood by development planners in the region, who still pursue 'one fits all' policies and programs, nor by researchers who fail to appreciate how differences in social, economic, and ecological variables affect opportunities for diversification.

A Model of Pastoral Livelihood Diversification

The model presented here supports the position that diversification mainly affects the wealthy and poor herders, and not middle-wealth groups of pastoralists who may lack sufficient motivations and/or pressures to diversify.³ For the relatively rich herders it is a strategy of accumulation or investment; for the impoverished diversification is a matter of survival (see

Barth 1964; Little 1985). In our study region, it is the impoverished group that is growing most dramatically. As a start, three different sets of variables are distinguished in the model that influence herder decisions to diversify or not; and what types of strategies to pursue (see Figure 2). These include (1) conditional variables, (2) opportunity variables, and (3) local response variables. For heuristic purposes, each category can be treated independently, although interactions among them often exist.

(INSERT Figure 2: A Model of Pastoral Livelihood Diversification)

Conditional variables: These factors address system-level phenomena and indicate whether conditions are conducive for pastoral diversification. They include such measurements as per capita livestock holdings, population density, and availability of rangelands.

Opportunity variables: These help to explain the types of diversification opportunities available. They include measurements of climate (e.g., rainfall), distance to market, proximity to towns of various sizes, and education. Opportunities for diversification will vary considerably vis-à-vis these variables.

Local response variables: Even if system-level conditions and opportunities favor certain patterns of diversification, local-level variables can facilitate or constrain responses. These variables help to explain which herder groups will respond or not respond; who will share in the benefits and costs of diversification; and how certain social processes may facilitate or constrain diversification. Local response variables include measurements of gender, wealth, age, and so on.

Comparative Analysis of Variables

Discussions of pastoral diversification often fail to appreciate the ways in which the simplest variables—for example, annual rainfall—can explain particular patterns. We opted to

include in our model a limited number of variables that could be measured relatively easily, although data on them were not always available.⁴ In doing this, important qualitative factors, such as local social capital and exchange networks, have been omitted.

The model presents eleven general variables to assess pastoral diversification. These are indicated in Figure 2, while the application of a subset of these in the study region are presented in Table 1. Although not in the study region, Orma of Tana River District, Kenya; Maasai of Kajiado, Kenya; and Mukugodo of Laikipia, Kenya, are included in Table 2, because they are related to groups in the region; are located relatively nearby; and good data exist for them. Despite an effort to include variables that are easily identified, certain inconsistencies exist. Some variables are not treated at all in the literature, while others are defined differently across study sites and thus constrain comparative work. For example, in some cases livestock are converted into Tropical Livestock Units (TLU)⁵, while other times they are equated with a Standard Stock Unit (SSU) based on market value or on local exchange rates.

(INSERT Table 1: Application of Model to Existing Studies and Data)

Some of the variables in Figure 2 and Table 1 require explanation, as well as empirical examples. Climate (annual rainfall), for example, provides an indication of aridity and the feasibility of rainfed agriculture. Although not always the best indicator of agricultural and drought risk, these data are generally available for the study region. As Table 1 depicts, annual rainfall varies from over 1000 mm in the highland areas of the study region, to less than 200 mm in northern Kenya's deserts. A more accurate assessment of climatic risk requires analyses of variance and standard deviations--rather than statistical means--and data on daily and monthly rainfall distributions. For the purposes of this exercise a measurement of average annual rainfall is adequate.

Human population density and per capita livestock holdings also are ‘conditional’ variables in the model that point to certain pressures affecting pastoral diversification. While population density is a crude measurement that varies considerably across the study region, it gives an indication of grazing availability and of the need to intensify into non-pastoral activities. Generally, the more people there are, the less land is accessible for communal grazing and the greater the need to diversify (A better indicator than population density is per capita rangeland availability, but this measurement is unavailable for most of the study region.). In the study region, human population densities varied from a high of 41 (highland Baringo, Kenya; Vedeld and Lusenaka 1991) to a low of 1 per square kilometer (Chalbi Desert, Kenya; O’Leary 1985). While demographic data are helpful in understanding diversification, their aggregation at district levels⁶ reduce their usefulness since population distribution in the region is highly uneven (see Little 1994). Nonetheless, groups in Table 1 with relatively high average population densities (Tugen, Il Chamus, and Mukugodo) depend heavily on non-pastoral sources of income, while those (Rendille and Gabbra) with low population densities show minimal levels of diversification.

A fourth variable in the model, wealth differentiation, is used to capture household-level differences in diversification. Although few studies differentiate income-earning strategies by wealth level, even fewer disaggregate income activities by gender. This critical ‘local response’ variable is included in the model, but requires additional research. Gender-specific diversification strategies are presented in some databases, and an effort was made to address this variable. For example, good qualitative information is available on the frequency with which a non-pastoral activity is dominated by a particular gender group: petty trading (milk and

firewood) and small-scale vegetable production are prevalent among women (Fratkin and Smith 1995; Smith 1998), while men control many aspects of livestock trading (Little 1992).

Another variable, 'external income transfers', mainly addresses food-aid transfers, which are prevalent in many parts of the study region (especially Baringo, Samburu, and Marsabit Districts, Kenya). Although rarely addressed in sufficient detail, food aid is a critical 'conditional' variable since it can (1) create disincentives to diversify by creating artificial income subsidies and (2) encourage poor herders to settle around food-relief centers. In most studies, only the absence/presence of food-aid transfers is indicated, and only anecdotal data on food aid amounts per recipient and their income value are provided (see Table 1). In certain parts of the study area, more than 40 percent of the population receive some food aid during the year (GFA 1993; Kielmann et al. 1994). As Table 1 demonstrates, more than 80 percent of studies indicate the presence of food aid, with data more readily available for Kenyan than Ethiopian sites.

Distance to urban centers and the scale of services and infrastructure available in centers are critical 'opportunity' variables. Opportunities for trade, informal sector activities, and waged employment are often affected by these factors. For instance, small rural market centers open up petty trading opportunities, but do not offer the types of wage employment opportunities that are found in a regional or primate city. In general, Kenyan sites at the southern end of the study region, where access to major urban centers is relatively easy, show higher levels of diversification than other locations.

If we look at the data under the headings "sources of income" and "data by wealth category" in Table 1, several trends emerge. The first is that diversification is a relatively recent phenomena dating from the 1970s in some areas and from the 1980s in others. A comparison of

the Maasai data from the 1970s (Campbell 1978) with those of the 1980s (Bekure et al. 1991) shows that dependence on livestock (LS) income has decreased considerably, from over 93 percent of household income to less than 70 percent for some herders. Reference to other ethnic groups with longitudinal data in Table 1 show similar patterns of diversification away from livestock. In the case of Ariaal, the number of household members engaged in wage labor (WL) almost doubled between 1976 and 1985 (see Fratkin 1991).

A second set of observations from Table 1 is that diversification away from livestock generally correlates with decreased wealth and that engagement in wage labor tends to increase among poorer herders. The most detailed data on pastoral wealth differentiation are provided for Orma (Ensminger 1992), Rendille (O'Leary 1985, 1990), Il Chamus (Little 1992), Maasai (Bekure et al. 1991), and Mukugodo (Herren 1991). As Table 1 shows, each of these groups reveals increased patterns of income diversification as wealth status declines. While the percentage of income from livestock is above 80 percent for the wealthiest strata, most 'poor' or 'very poor' depend on livestock for less than 50 percent of their income. Among herders classified in the lower wealth groups, most depend heavily on wage labor, remittances (RM), beer brewing (BB), and 'other' (O) activities to survive.

To conclude, virtually no existing studies contain data on all of the variables in the model (Figure 2). Important groups in the region, like Borana and Samburu, have good information but it is limited in scope and comparability. Indeed, most of the Samburu data on diversification strategies are presented in terms of frequencies rather than income amounts, and are disaggregated by generation or age set rather than wealth category (see Holtzman 1996; Sperling 1987; Straight 1997). These limitations constrain comparisons with other studies. Moreover, with the exception of Coppock's (1994) work and a recent dissertation by Desta (1999), little is

known about diversification in southern Ethiopia. We know from qualitative data that the Boran of southern Ethiopia are focused more on pastoralism than their Kenyan counterparts, and that waged labor is relatively infrequent while trading is growing in importance (Desta 1999; Diriba 1995:117) (see Table 1).⁷

FIELD-BASED CASE STUDY

This section presents data from the study region based on one year of fieldwork by one of the co-authors (Smith) from March 1998 to March 1999. It provides further insights into the variables and relationships presented in the model (Figure 2). The information on income-earning activities was gathered through participant observation, unstructured interviews with key informants, and focus group interviews. Respondents were asked to list (in order or priority) the most important means of earning income, including both pastoral and non-pastoral activities (see Smith et al. 1999). Visits to communities in the region lasted from one to several days, although two of the co-authors (Little and Smith) have spent long periods of time in the region prior to 1998. Because of their opportunistic and limited nature, the data in this section are meant to be illustrative rather than definitive of diversification patterns.

General Context

Interviews and field observations highlight several of the critical factors identified in the previous section that help to explain pastoral diversification in recent times. As noted earlier, various ‘push and pull’ factors drive diversification. Some people are pushed out of pastoralism because they no longer have enough animals upon which to survive. They are among the first to migrate to towns in search of food aid or ways to make money to support themselves. They may also be the first to embrace farming, a production strategy that takes far less time to get back on one’s feet than does pastoralism (Smith 1997). All of these strategies in the region are directly

related to proximity to towns or, for farming, climate. Those who are pulled out of pastoralism, perhaps only partly, seek to expand their assets and income, securing food and reinvesting in animals in the process. People in this latter situation tend to be wealthier pastoralists who can afford to diversify into business activities that include shopkeeping or constructing and renting building space as a way to sell fewer animals.

Options to sell animals or to diversify out of the pastoral economy have much to do with the size and composition of towns, an important factor when comparing the differences in our study region between Ethiopian and Kenyan towns. Towns in Kenya offer more in the way of tradable goods, public services, and education, than do those in southern Ethiopia. Recent figures show that Ethiopia's per capita gross national product (GNP) is about 60 percent of Kenya's (Turner 1998), which may partially account for the discrepancies in commercial activities and services in the region. The following tables (2 and 3) divide town infrastructure by country, with the exception of Moyale town which lies on both sides of the border. Residents, both Kenyan and Ethiopian, on either side of the border can easily cross over to the other side for different activities. The Kenyan side has more schools, however, and is the only side with a livestock market.

(INSERT Table 2: Average town population and number of facilities ...)

(INSERT Table 3: Average number of services and facilities per town by country)

One note of caution when interpreting Table 2: the inclusion of Negelle town skews the figures in favor of Ethiopia. There are reportedly 1,078 shops and 74 wholesalers in this Ethiopian town of 26,000 residents. The town in the region with the next closest number of shops and wholesalers, Marsabit, Kenya (population 13,500) has 390 shops and 10 wholesalers.

With the exception of Moyale, Negelle is also the only Ethiopian town in our study area with public electricity, although it does not operate continuously. Marsabit, Marigat, Maralal, Isiolo, and Suguta Mar-Mar are all Kenyan towns in our study area that have 24-hour electricity.

Opportunities to buy goods or to sell livestock and agricultural produce (Table 2) appear to be greater in southern Ethiopia when Negelle is included in the calculations. As noted above, however, the inclusion of Negelle inflates the figures for Ethiopia. Table 2 shows that removing Negelle from the Ethiopian sample drops the average town population to 3,933 and the average number of shops and wholesalers to 26 and 0.2, respectively. In addition, more pastoralists in southern Ethiopia live further from towns than do pastoralists in northern Kenya, making trips to town and the employment of services there less feasible.

The potential for receiving public and private services is greater on the Kenyan than on the Ethiopian side (Table 3). Religious organizations, namely the Catholic Church and Africa Inland Church (AIC), provide many of the public services—hospitals, clinics, and schools—in northern Kenya. Missionary activity is not as prevalent in Ethiopia, owing to the government's resistance to foreign influences and the Orthodox (Coptic) Church's dominance. The Ethiopian government has assumed almost all the responsibility for public services, with the Catholic Church and (Protestant) Mikena Yesus having a comparatively small presence. Table 3 indicates this disparity by showing opportunities for education to be greater in northern Kenya than in southern Ethiopia. This is especially true if Negelle is excluded, in which case the figures for primary and secondary schools drop to 1.13 and 0.13 per town, respectively, in Ethiopia.⁸ Education can lead to economic diversification, especially for those who believe they can or must support themselves outside the herder economy. Roth (1991) discovered that poor families who lived in the Rendille town of Korr, Kenya, sent more children to school because

they had less need for their labor and because they wanted to maximize the chance that these children will obtain wage jobs in the future. Learning how to read and write also allows pastoralists to make more informed decisions in relation to the money economy and other economic options.

Application of the Model

As money has become an ever-increasing part of daily rural life, examining the ways people generate income is important for understanding diversification. Money-making options, by frequency of mention and rank of importance, were elicited from a participatory rural appraisal (PRA) study of 38 communities within our study area. Communities were selected by one of the authors (Smith) and his field assistants, based on the criteria of differing proximity to towns, environment, economy, and wealth. While not random or exhaustive, the aim was to capture variation within the sample and to quickly assess the ways that pastoralists attempt to diversify their livelihood strategies. The findings help us to understand the complexity of diversification and the importance of the cash economy in the region.

Scatter diagrams show both frequency of mention, in percentage terms, and rank of importance of the activities. Activities were ranked by an index method because different groups mentioned different numbers of activities. The most important activity was assigned a value of one, the least important two, and activities in between took on equally spaced integer values. The number of categories and their relative importance (rank) were left up to the groups of interviewees (see Smith et al. [1999] for discussion of a similar PRA study). The groups of informants listed a total of sixteen ways to make money: livestock (lstock), crops, milk, rent (building space), butchery (butcher), butter, poles (gathered for house construction), charcoal (coal), firewood (wood), wage jobs (wage), retail shop, chicken, skins, gum arabic, alcohol, and

contraband. This last category consists of goods such as tea, soap, and plastic items that are bought on the Kenya side of Moyale and sold in Ethiopia.

As is to be expected in a pastoral region, livestock is the main income generator, the only variable in the lower right quadrant of Figure 3. Crops are second to livestock and are as important for making money for the communities that farm. When possible, it is better to sell crops because animals are the more valuable investment both socially and economically. Rarely mentioned as diversification options but extremely profitable are butcheries, rental activities, and butter sales. All other options appear less important, occupying the upper left quadrant of Figure 3. Milk is an important product, although it generates less income than crops because it is usually consumed (Fratkin and Smith 1995; Smith 1998). Charcoal and firewood generate little income and are labor intensive, while wage jobs in the study area are few and far between.

INSERT FIGURE 3

Opportunity Variables

As depicted in the model (Figure 2), variables that explain opportunities to diversify have to do with climate – or its proxies such as altitude or precipitation – education, and distance from towns. Rural towns in the study region have experienced rapid growth in recent years, providing new opportunities for diversification out of the pastoral economy. Poorer pastoralists who previously attached themselves to wealthier relatives or neighbors until their herds had been replenished can now shift to towns and sell their labor or goods. For those who have enough animals on which to subsist, towns provide a demand for their milk products. Furthermore, business opportunities in the form of running shops, operating butcheries, or renting buildings can meet the demands of an expanding settled population.

Proximity to Town: Income options by proximity to nearest town reflect the various activities people can pursue based on demand for their products or services. Not surprisingly, the closer one lives to a town, the greater the number of options available. Persons living within a 39 kilometer radius of towns mention up to eleven different income activities compared to seven activities for those who live more than 40 kilometers away (i.e., more than a day's walk). The further one gets from market centers, the less important certain items become, especially those that are difficult to transport, spoil easily, or generate little income. Trend lines for milk and charcoal (coal) show decreasing frequency of mention and importance as distance to town increases (see Figure 4). Firewood (wood), crops, and wages (wage) are variables mentioned only by people who live less than 40 kilometers from towns; more so by those who live within nineteen kilometers (a roughly three hour walk) of towns.

INSERT FIGURE 4

Livestock sales (lstock), the most common income generator, are positively correlated with distance from towns, as reflected by its presence in the lower right quadrant of Figure 4. This indicates that people who live far from towns have fewer options to diversify, nor do they have as much need to because of access to better quality pastures and livestock (see Little 1994). Their incomes from livestock are higher than herders who reside near towns. Those who cannot support themselves but remain in the distant pastoral settlements work for their wealthier relatives or borrow animals through various lending arrangements. However, town life offers the allure of food aid and public services, such as schools and health clinics, that often are difficult to resist (Fratkin 1992:127).

As with livestock sales, renting buildings (rent), making alcohol, or operating shops (shop) out of one's house are more important activities for those who live furthest from towns

because they do not require daily interaction with town customers. They do, however, require enough cash for initial investment. All three of these activities appear in the lower left quadrant of Figure 4 for those who live at least 40 kilometers from towns. Shopkeeping itself increases in both frequency and rank the further one gets from towns, which is probably because shop ownership is dominated by non-pastoralists in the larger towns. There is a general trend for wealth and distance from towns to be positively correlated for pastoralists within our study area (Little 1994; Nathan et al. 1996), and this affects opportunities. Startup and maintenance costs of shops are too high for poorer households to engage in, as indicated by Figure 6 (discussed below) that show only people from rich and middle-level strata owning shops. The fact that the upper left quadrant does not include renting out buildings reflects the high cost of construction. Only wealthier pastoralists, who usually live furthest from towns with their animals, can afford these costs.

Climate: In the case study, altitude is used as a proxy for climate, since rainfall amounts in the study region generally correlate well with changes in elevation. Altitude is a convenient, albeit very general indicator that was measured using a handheld Geographic Position System (GPS) locator. We differentiated altitude zones in the region according to: (a) 0-2,500 ft a.s.l.; (b) 2,501-5,000 ft a.s.l.; and (c) 5,001 plus ft a.s.l. Money-making options that are correlated with altitude reflect the ability to farm and to pursue activities around towns of higher populations. The largest towns in our study area are located in higher elevations, where rainfall permits farming and sufficient water to support permanent settlement. Understandably, farming and selling crops is not a strategy pursued by those who live below 2,500 feet, where desert and semi-desert conditions prevail (see Figure 5). It is interesting to note, however, that some communities situated above 5,000 feet, where rainfall is adequate for agriculture, do not

produce surplus crops. Most of these sites are on the Borana Plateau, southern Ethiopia, where crop production is mainly for consumption. Additionally, wealthy outsiders or immigrant farmers have appropriated some of the rangelands that lie within areas of good potential for farming; they were not captured in the survey. For example, highland wheat farms around Maralal (5,800 ft), Samburu District, and maize farms around Marsabit (4,586 ft) are under the control of outside (non-pastoral) groups.

It should be noted that income from agriculture (i.e., crop sales) is generally important for herders of northern Kenya who reside in areas above 2,500 feet (lower left quadrant of Figure 5). Not all of the people within our study area are near enough to towns to sell the crops they grow. Some Boran in Ethiopia, for instance, live too far from towns to sell crops, even though they now farm as a hedge against food insecurity. They prefer to grow maize that they would otherwise have to buy, thus allowing them to sell fewer animals for consumption needs. They readily admit, however, that farming is not reliable because of their general lack of farming knowledge and because of the typically insufficient rainfall on the Borana Plateau.

Some pastoralists still live near towns even though they have not diversified into agriculture. A case in point is pastoralists selling poles for house construction and those who depend heavily on food aid. Although quite rare (upper left quadrant of Figure 5), those who live around the highland Samburu town of Maralal, Kenya can collect timber from the hillside forests to sell in town.

Local Response Variables

As noted earlier, how people respond to diversification options is related to wealth⁹, gender, and other social factors. For example, milk trading is an activity dominated by women. While not ranked very high, people identified from middle wealth communities depend the most

on milk sales, the only activity that occupies the upper right quadrant of Figure 6. Women from rich and poor communities sell milk less often. Among these two groups, women from poor communities sell milk more often, although it is a less important income generator than are crops, charcoal, or firewood. Poor women sell milk to buy more calories worth of food than they could otherwise obtain from drinking the milk (Fratkin and Smith 1995:447).

Wealth Differentiation: An investigation of money-making options among herders shows the importance of wealth (Figure 6). Members from poor and middle groups list ten activities, while members of rich communities list nine. However, the way in which these communities diversify varies. Only members identified as rich or middle indicated activities that have significant cash start-up costs. Renting buildings in town (rent), for instance, is an option only wealthy individuals can afford to pursue. Some of the wealthier Boran pastoralists around Negelle are doing this; while two Samburu visiting Rendille areas told one of the authors (Smith) that diversifying out of livestock and into buildings to operate as a shop or to rent out is more popular among Samburu, since they have been more exposed to ‘western’ influence. Owning a butchery is possible for individuals of at least middle wealth who live in small pastoral towns, as indicated in the lower left quadrant of Figure 6. Small retail shops, whether in towns or out of one’s home in the pastoral settlements, are also controlled by members of rich and middle-level strata. Members of poor groups cannot afford to operate shops, nor can they rent out buildings or start butcheries. These types of activities should decrease risk by adding to the pastoralist’s income and assets rather than replacing them.

Only members of poor classes discuss an activity other than livestock that registers in the lower right quadrant of Figure 6: selling charcoal (coal). No wealthy herders sell charcoal, while middle members rarely mention and always rank charcoal sales as generating the least income

(upper left quadrant of Figure 6). As with charcoal, firewood (wood) is sold more often and is a more important income generator for poor pastoralists. Charcoal and firewood sales are income diversification activities done only out of necessity and are considered to be very low status activities. They are extremely laborious and generate little income, not always enough to buy food for the family. Despite the risk of being fined by the government because these are illegal activities, poor women have few alternatives to feed their families. The preferred cash generators of milk or produce sales are not available to them.

Gender: Gender plays a key role in the types of responses individuals may pursue. Selling animals is an activity well understood to be the domain of men in the pastoral economy (Coppock 1994; Fratkin 1987; Holtzman 1997; Kelly 1990). By contrast, all income-earning activities in which women can engage are forms of diversification, including the previously mentioned milk sales. In addition to selling livestock, men diversify through selling poles, renting building space (rent), operating butcheries (butcher), and working for wages (wage). Their continued preference to not diversify out of the livestock economy is revealed by how few of them engage in these other male activities, all of which occupy the left quadrants of Figures 3 to 6.

The difference in the gendered activities of selling livestock versus milk also becomes more pronounced as the distance to market town increases. Men can sell animals regardless of how close they live to a market. They in fact rely more on livestock sales, the further they live from markets as their options to diversify decrease. But it becomes more difficult for women to sell milk the further they live from towns. In large part this stems from the nature of the commodities involved. Livestock can move on their own without the need to carry or otherwise transport them, whereas milk must be moved to market by some means of transport. In addition,

milk is a perishable commodity and consequently must be shipped to market soon after milking in order to avoid spoilage. Because of these constraints, women often turn to operating shops out of their homes or brewing alcohol.

Wealth and gender combine with proximity to town to determine women's opportunities. Despite the obvious advantage of being rich in livestock, women from wealthy families actually have fewer options to diversify because they tend to live further from towns. Figure 6 shows rich herd families selling milk less than middle or poor groups, both of which tend to be closer to towns. Still, middle members more frequently mention milk as an income generator than do poor community members, because middle-level women have more animals from which to obtain milk.

The extent to which women convert grains into alcoholic beverages is difficult to know. This activity can be profitable because of its high demand by (mostly) male customers. Women are hesitant to conduct this business, however, because it is illegal. Therefore, not surprisingly, selling locally made alcohol is consistently mentioned little and ranked low, occupying the upper reaches of the upper left quadrant of Figures 3-6.

CONCLUSION: WHAT CAN WE SAY ABOUT PASTORAL DIVERSIFICATION

The case study, as well as the review of the literature, shows that diversification strategies have multiple causes and patterns. The figures on how herders earn cash incomes show the relative importance of diversification, although pastoralism remains the primary activity. Dercon and Krishna's (1996) conclusion about the popularity of livestock as a productive investment appears to hold true throughout our study area. Although there are many alternatives to pastoralism, most tend to generate low incomes and thus may actually increase risk during periods of stress. Especially for poor individuals, diversification is not a risk-averse strategy

because they do not necessarily diversify into several different sources, nor do they do so out of choice. They, instead, replace pastoral activities with other activities in order to survive. Wealth again enters the picture because middle and rich families can and do diversify to minimize risk, being as aware as poorer families are that specialized pastoralism no longer takes care of all their needs. For the relatively rich, holding all of their assets in livestock invite losses, losses that appear to be increasing in frequency and severity on East Africa's rangelands (Desta 1999).

As noted earlier, the goal of this article was not to carry out rigorous statistical analyses to determine the ultimate causes of diversification. The data to do so are simply unavailable at this point. We have shown, however, that there are important trends in the region that can be observed from existing studies and from the case study. For example, there is little question that across the study region (and generally throughout pastoral areas of East Africa) per capita livestock holdings have declined considerably since 1980 (see Table 1). In these areas there is now a substantial population of stockless or near-stockless herders who often reside near towns. We would venture to say that very few groups in the region currently have average per capita holdings of more than 6 TLU per person, a figure considered to be about the threshold for pastoral self-sufficiency, and most groups own less than 2 or 3 TLU per person. For example, data for Ariaal of Marsabit, Kenya, show a decline in per capita holdings from 8.2 TLU in 1976 to 4.0 TLU in 1995 (Nathan et al. 1996). Il Chamus have also seen a reduction in per capita livestock holdings of about 40 percent during the 1978-1990 period (Little 1992).

With declining per capita stock holdings, there is little question that many herders, both male and female, have had to diversify their income-earning activities. What is surprising is how rapid and how much of this has occurred since the 1970s. For areas where agriculture is feasible, there continues to be an expansion of agriculture into former range areas, including dry-season

grazing reserves. These include areas on the Borana Plateau, southern Ethiopia; around irrigated perimeters in Baringo, Kenya; on Marsabit Mountain in northern Kenya; and on the Leroghi Plateau, Samburu District, Kenya. Much of the expansion has been carried out by herders themselves, or by non-pastoralists who have encroached on rangelands. For areas where agriculture is not feasible, diversification mainly has entailed wage labor and trading or business activities. Wage employment usually requires migration out of the study region (e.g., to Nairobi), but this varies by locational factors.

Our discussion also shows that not only has diversification among herders increased since 1980 but that different categories of herders--rich/poor and male/female--have responded differently. For the poorest herders unskilled waged labor and petty trade seem to be the most common non-pastoral option, while for the wealthiest it tends to be trading, business, and skilled (higher income) waged labor. The process of diversification affects the richest and poorest herders, leaving 'middle' wealth herders relatively out of the pattern. This bifurcated pattern of pastoral divestment first was observed by Fredrik Barth (1964) more than 30 years ago and still holds true today.

Sedentarization or settlement often is associated with diversification and provides some increased income-earning opportunities for low-income women. This is especially true in petty trade (milk and vegetable trading), handicrafts, informal alcohol brewing, and local waged employment, where women assume prominent roles (see Coppock 1994; Fratkin and Smith 1995; Little 1992). Wealthier women herders are likely to rely more on income from livestock and milk and ghee sales, than on other revenue sources. Shop ownership, retail business, and labor migration remain predominantly male activities.

In terms of risk, some data show that cultivation allows herders to better manage risk in zones of adequate climate. They seem to respond better to drought-induced shocks than do other pastoralists, and in these higher rainfall areas pastoralism requires less mobility and thus generally requires less labor than in drier rangelands. Little (1992), for example, describes how herders who had partially diversified into irrigated agriculture more quickly rebuilt their herds after the 1979-1980 and 1984 droughts than did others; while Hogg (1980) shows how the Boran of Isiolo who have diversified into agriculture and trading withstand bust years than others. The extent to which cultivation allows Boran of southern Ethiopia to better manage risk is currently being addressed by the Pastoral Risk Management Project, an interdisciplinary applied research program in the region (see footnote 2).

What about the links between diversification and improved risk management in drier pastoral zones? In these areas the issues are more complex and some diversification strategies may directly compete with labor for herding and reduce herder mobility, an occurrence that can have negative social and ecological impacts. The studies from Marsabit District, Kenya, show the potentially negative ecological and social affects of pastoral sedentarization and diversification (Fratkin 1991; Nathan et al. 1996). Yet most studies have not paid sufficient attention to differences in non-pastoral income activities and what these mean for the herder, the environment, and the production system. Nor have they acknowledged that certain diversification strategies do not always lead to sedentarization. Indeed, a herder family with a member(s) engaged in a lucrative non-farm job can help the family maintain a pastoral livelihood through remittances, as well as provide capital to rebuild herds after a disaster.

To conclude, we have attempted to examine comparatively the issue of income diversification among herders in northern Kenya and southern Ethiopia. Additional research is

needed to identify the ways in which gender intersects with diversification, and the effects of spatial variables (e.g., proximity to towns) and rangeland availability on pastoral diversification. The model and the case study presented here are suggestive of the kinds of data that need to be gathered to understand the complexity of pastoral diversification. Yet, until there is recognition of the differences in what we have termed ‘conditional’, ‘opportunity’, and ‘local response’ variables, analyses of one of the most important processes in the rangelands of East Africa--pastoral diversification--will remain highly localized and under-theorized.

Endnotes:

¹ A limitation of the non-farm literature in contributing to understandings of pastoral income diversification is the fact that unlike ‘crops’, livestock is a source of subsistence and income, as well as a form of capital and savings that can yield substantial annual returns. For example, in their comparative analysis of rural Tanzanian and Ethiopian economies, Dercon and Krishnan demonstrate that “investment in livestock is by far the most popular productive investment identified by the households. . . .livestock provides an attractive form of investment, particularly in view of the few alternatives available in the local economy” (1996:860). The issue is even more complicated in cases where herder diversification can actually enhance the capital and savings functions of livestock. Indeed, there is considerable empirical evidence that income from non-pastoral activities frequently is invested in livestock; while keeping animals off devalued markets by earning income from non-pastoral pursuits also is a means of preserving herd capital (Little 1992). In short, income diversification among pastoralists does not necessarily equate to a diminished interest in livestock investments and production.

² The study region corresponds to the area where the Global Livestock-Collaborative Research Support Program (GL-CRSP) on ‘Improving Pastoral Risk Management on East African Rangelands’ is working (see acknowledgments above). The GL-CRSP project is a collaborative effort of Utah State University, the University of Kentucky, Cornell University, Egerton University (Kenya), and the International Livestock Research Institute (ILRI). It addresses the causes and consequences of different types of risk among pastoralists; the means by which herders manage--economically, environmentally, and culturally--endemic and periodic risks; and the grassroots initiatives by herders to address the difficulties associated with high levels of risk.

³ As with any rural group in Africa, wealth categories are relative. When the paper uses the terms rich, middle, poor, or very poor they are not meant to imply absolute levels of wealth or poverty. On a regional scale pastoralists are considered among the most impoverished groups in East Africa.

⁴ In a review of existing literature on diversification for our study region (southern Ethiopia and northern Kenya) and in the selection of relevant variables, we used studies of the Ariaal (Fratkin 1991; Fratkin and Roth 1990); Ethiopian (Coppock 1994) and Kenyan Boran (Hogg 1980, 1986, 1987); Il Chamus (Little 1992); Gabbra (O’Leary 1985, 1990); Rendille (O’Leary 1985, 1990; Fratkin et al. 1996; Fratkin and Smith 1995); Samburu (Holtzman 1996, 1997; Perlov 1987; Sperling 1987, 1989; Straight 1997); and Tugen (Vedeld 1990; Vedeld and Lusenaka 1991). Because of the richness of their data, some case studies outside of the study region were also reviewed and included in the analyses (for additional details, see Little et al. 1999). These are the Kenyan Maasai, who are located about 250 km south of the study region (Bekure et al. 1991; Campbell 1978, 1984; Kituyi 1990); the Boran-related Orma of northeastern Kenya (Ensminger 1992); and the Mukogodo, who are located on the southern boundary of our project’s study region (Herren 1991).

⁵ A TLU is an animal unit equivalent to about 250 kg liveweight. For the purposes of this paper, it is equivalent to 1 head of cattle, 6 goats or sheep, or 0.8 camels.

⁶ In Kenya the ‘district’ is the key administrative unit for data; in Ethiopia it is the *woreda*.

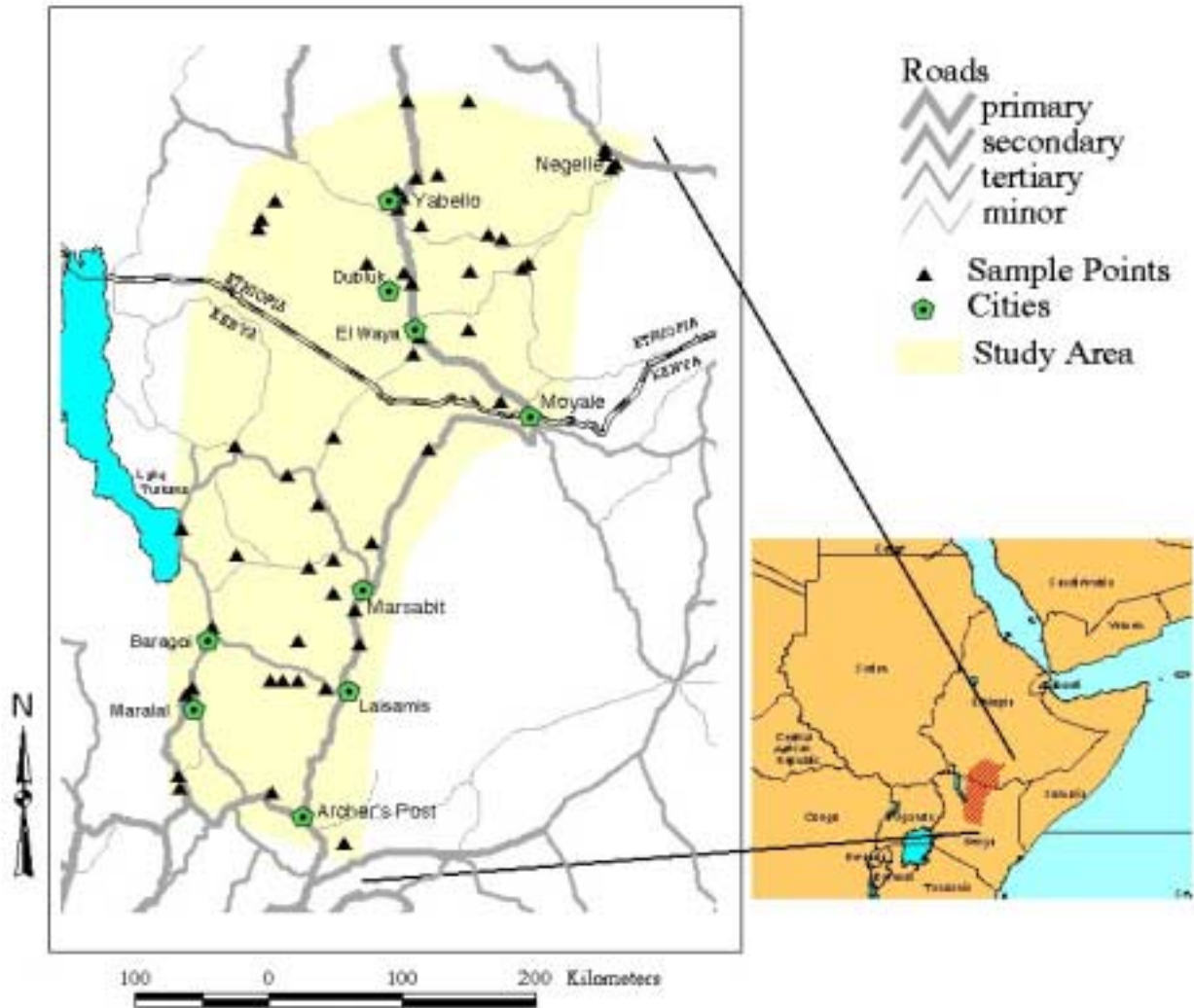
⁷ Diriba notes that “due to restrictive state policies affecting the rural labour market, rural households are not permitted to employ or to be employed even when it is desirable” (1995:117). He goes on to say that off-farm employment in southern Ethiopia remains limited, even with less restrictive policies.

⁸ For ease of between-country comparison, junior secondary schools (classes 7 and 8) were lumped together with primary schools (classes 1-6) on the Ethiopian side. Kenya does not distinguish primary and junior secondary classes, instead putting classes 1-8 in the same school. Secondary school on both sides of the border consists of classes 9-12.

⁹ Wealth is a difficult variable to measure and is a highly relativistic term. In the focus group interviews herders were asked to identify income-earning activities by their own classifications of wealth: poor, middle, and rich herders. No attempt was made to actually elicit a specific definition of what these wealth categories were equivalent to in livestock units. It should be noted that while we use the term ‘rich’, it means rich relative to other local herders and is not meant to be an absolute measure of wealth. Herders in the study region are among the poorest segments of society in both countries.

Figure 1

Study Area



Note: Map was developed by Paul Box of Utah State University and is based on Smith et al. (1999)

Figure 2: Model of Pastoral Livelihood Diversification

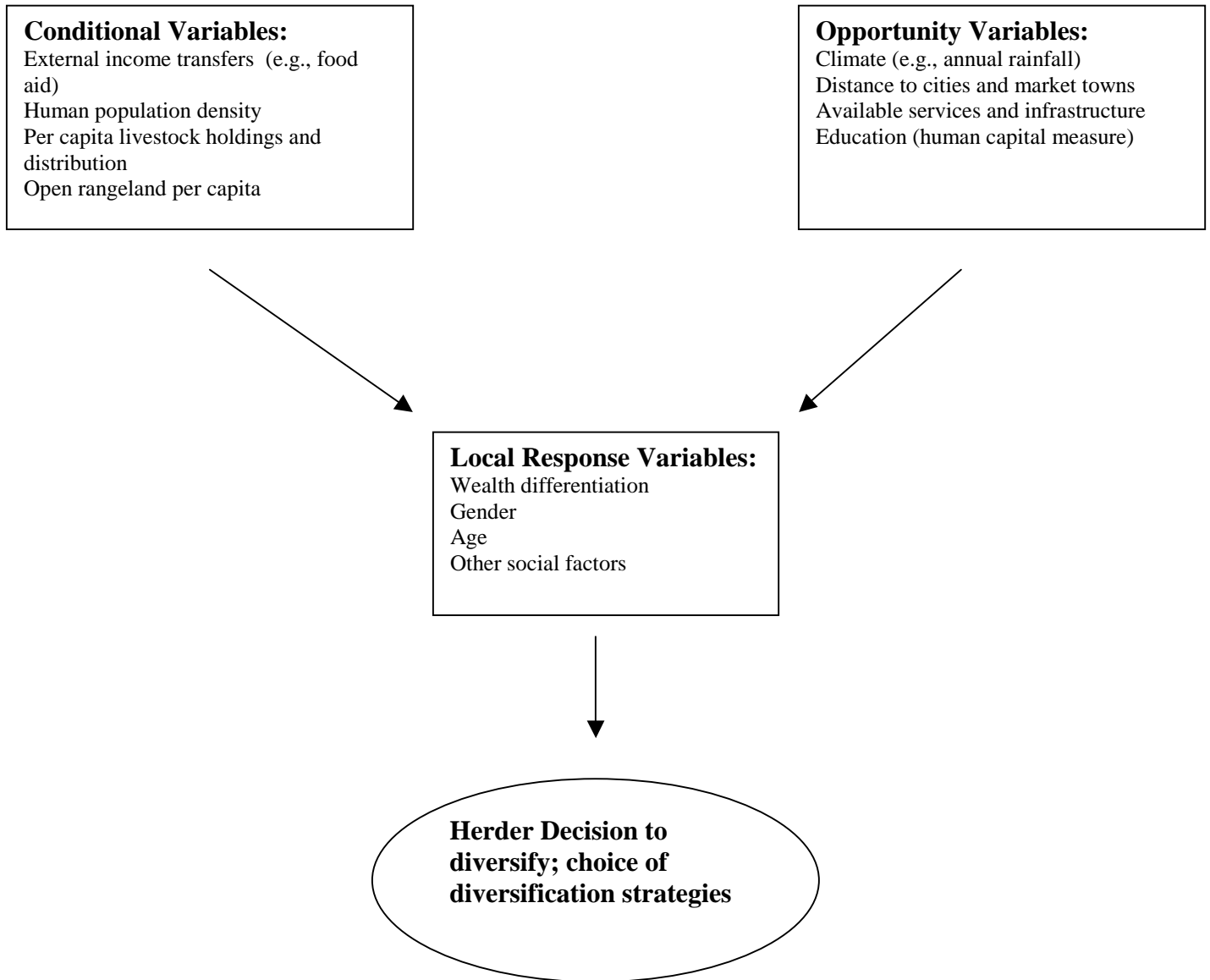


Figure 3: Money making options by frequency and importance

Figure 3: Money making options by frequency and importance

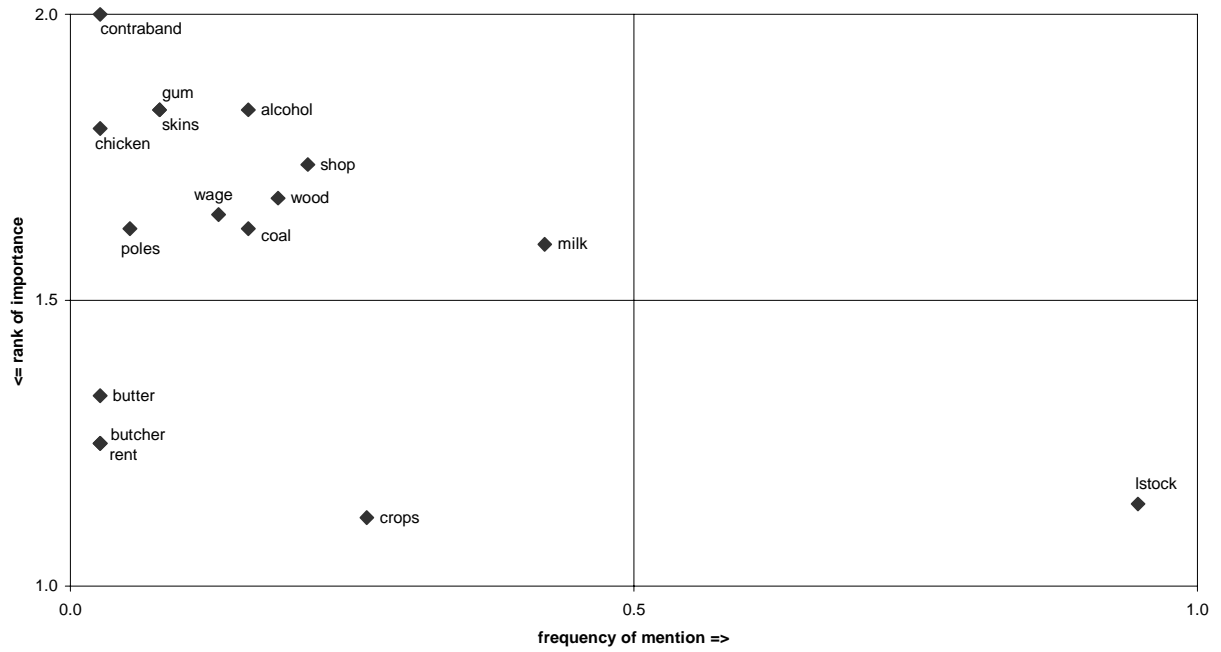


Figure 4: Money making options by proximity to nearest town

Figure 4: Money-making options by proximity to nearest town

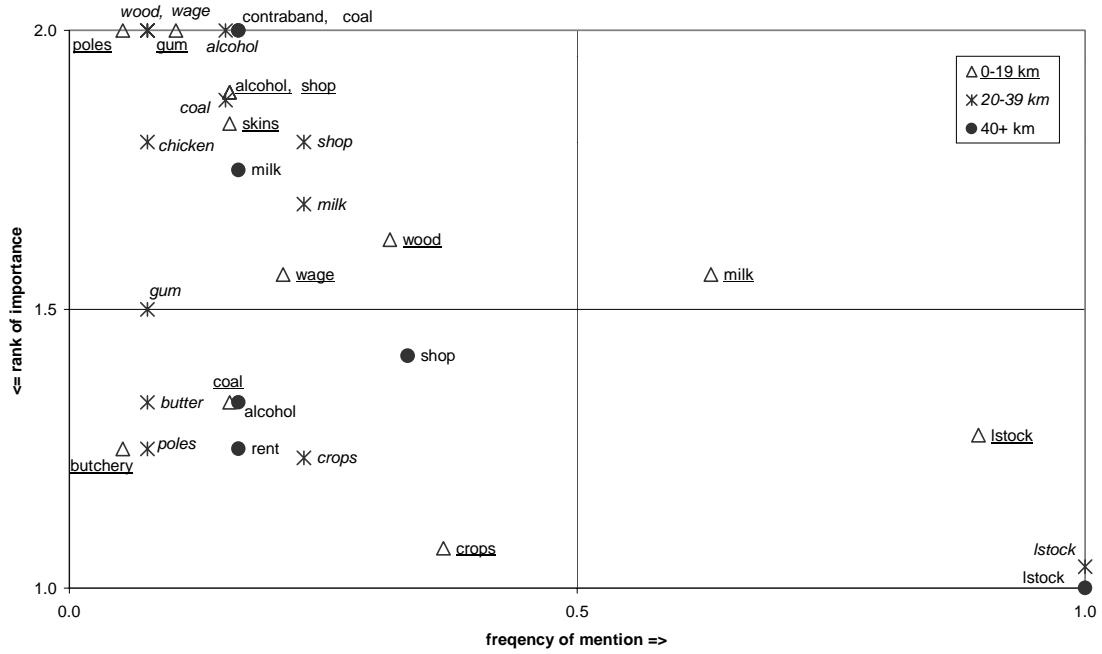


Figure 5: Money making options by differences in altitude

Figure 5: Money-making options by differences in altitude

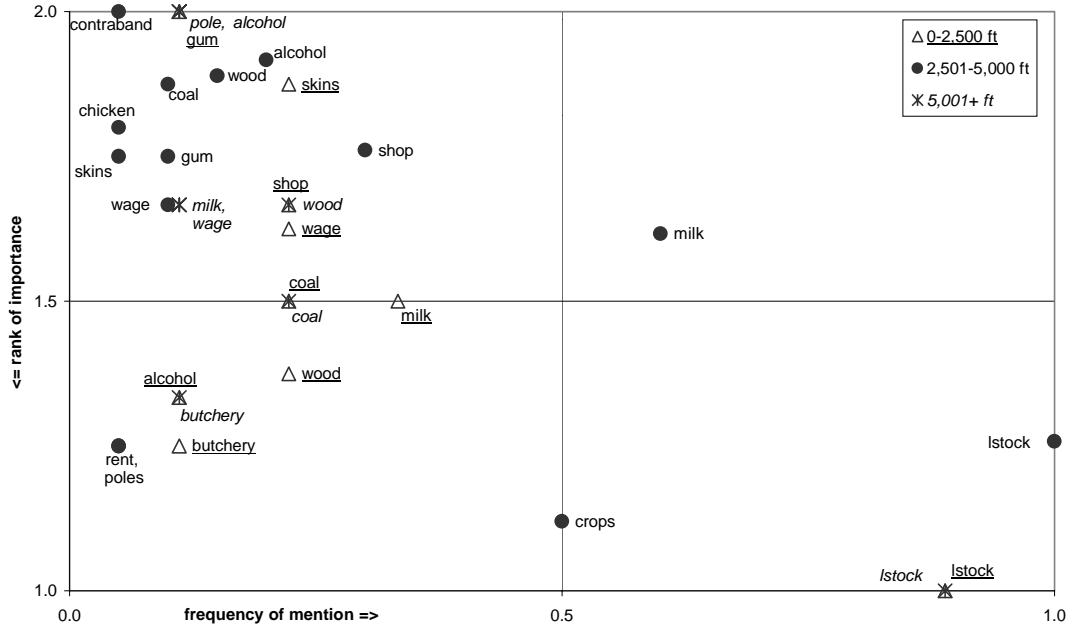


Figure 6: Money making options by wealth category

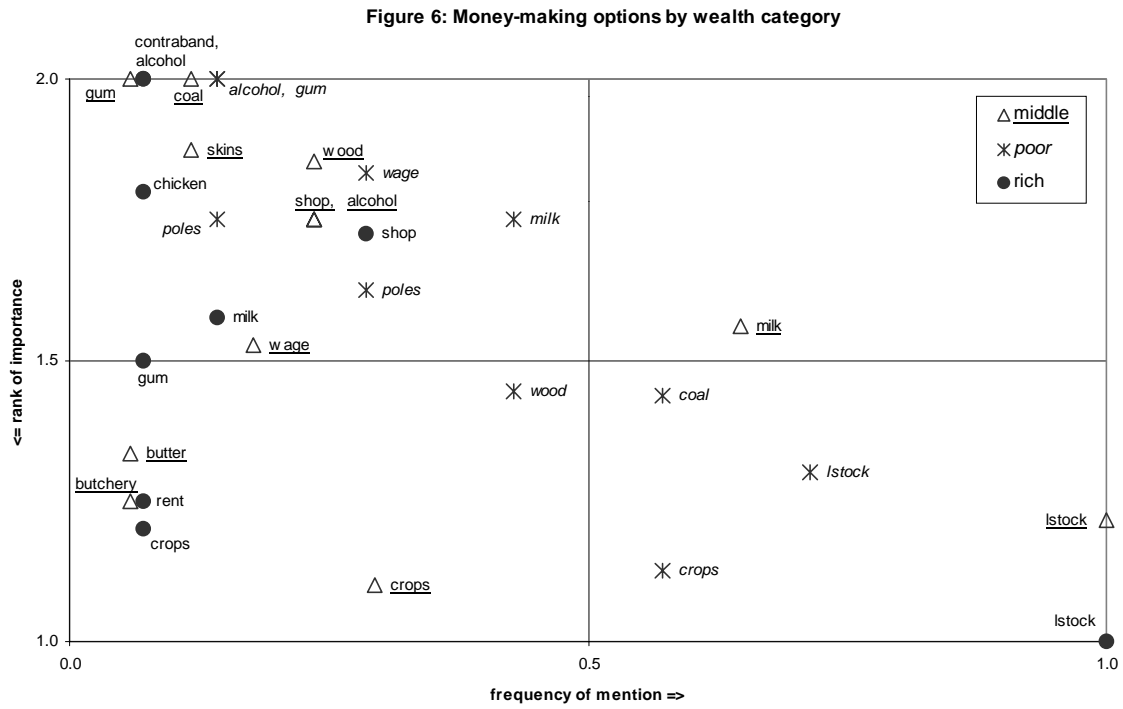


Table 1. Comparative analysis of pastoral diversification¹

Ethnic Group	Sources of income²	Data by wealth category (in % terms)	Data by gender	External income flows (e.g., food aid)	Avg. annual rainfall	Pop. density³ per /km²	Livestock per capita⁴	Date of data
Ariaal	% of HHs with wage workers: 1976 pastoral 10%, 1976 town 36%; 1985 pastoral 19%, 1985 town 43%. In 1976, 0.13 HH members employed. In 1985, 0.25 HH members employed.	ND	ND	Food aid programs in 1970s and 1980s.	500mm	1.2	1976: 8.2 TLU/person 1995: 4.0 TLU/person	1974-75, 1985, 1990
Boran/Ethiopia	LS> 95% of total income (90% of income cattle related); Ag involvement 33% to 88% of families during 1980s.	ND	ND	Food aid present in some years.	700mm	7.3	2.3 TLU/person	1980-1989
Boran/Kenya	Some received cash from farming.	ND	17% males (M) involved in wage labor.	Food aid programs present.	305mm	1	ND	1979
Orma (Borana related), Kenya	1980: LS 74.8%, WL 18.6%, T 6.5% 1987: LS 51.3%, WL 33.2%, T 15.4%	<u>Poor</u> : 1980: LS 61.9%, WL 33.2%, T 4.8%; 1987: LS 42.1%, WL 52.3%, T 5.5%. <u>Middle</u> : 1980: LS 77.0%, WL 16.7%, T 6.3%; 1987: LS 49.0%, WL 32.7%, T 18.2% <u>Rich</u> : 1980: LS 84.9%, WL 6.8%, T 8.4%; 1987: LS 62.9%, WL 14.8%, T 22.4%	ND	Government famine relief in some years.	ND	Est. 2	1980: 5.0 TLU/person; 1987: 3.5 TLU/person	1978-81, 1987
Il Chamus	LS 65.2%, Ag 0.8%, Pk 2.6%, Fi 2.8%, NF 28.6%.	<u>Richest</u> : LS 85.5%, Ag 4.0%, NF 10.5% <u>Rich</u> : LS 30.9%, Ag 2.8%, NF 66.3% <u>Middle</u> : LS 44.2-64.2%, Ag 3.3-10.8%, Pk 0.0-10.9%, Fi 1.9-7.1%, NF 23.2-34.4% <u>Poor-Poorest</u> : LS 47.3-59.5%, Ag 1.9-10.5%, Fi 1.8-11.7%, NF 30.5-40.7%	ND	Food aid program present.	640mm	14	5.36 TLU/person	1980-81
Gabbara	LS 80.2%, RM 7.9%, G 4.9%, O 5.0%, H 2.0%	ND	ND	Food aid program present since 1971.	<300mm	Est. 1-2	8.9 TLU/person	1981-1984

Ethnic Group	Sources of income ²	Data by wealth category (in % terms)	Data by gender	External income flows (e.g., food aid)	Avg. annual rainfall	Pop. density ³ per /km ²	Livestock per capita ⁴	Date of data
Maasai (1977)	“Pastoralists”: LS 93.4%, G 1.3%, B 2.4%, WL 1.4%, O 1.5% “Maasai Farmers”: LS 35.4%, Ag 9.9%, ES 1.3%, RS 6.5%, WL 8.0%, R 4.1%, B 34.9%	ND	ND	Famine relief received by 41% Maasai farmers, 67% Maasai pastoralists	794mm	Est. 6 but considerable local variation	ND	1977
Maasai (1981-1983)⁵	LS 67.2-87.2%, WL 0.8-12.4%, MT 7.4-19.4%, BB 0.0-1.9%, O 0.0-1.4%	<u>Poor</u> : LS 71.9%, WL 8.9%, MT 13.9%, BB 2.3%, O 3.0% <u>Medium</u> : LS 80.6%, WL 11.8%, MT 7.0%, BB 0.5%, O 0.0% <u>Rich</u> : LS 88.6%, WL 8.4%, MT 2.6%, BB 0.2%, O 0.2%	ND	Not present	463-584mm	6	est. 4.4 TLU/person	1981-83
Mukogodo Kenya	LS 58%, RM 31%, O 11%	<u>V Poor</u> : LS 63%, RM 22%, O 15% <u>Poor</u> : LS 31%, RM 60%, O 9% <u>Medium</u> : LS 59%, RM 31%, O 10% <u>Rich</u> : LS 96%, RM 1%, O 3%	ND	Food aid present	Est. 500-600 mm	31	Est. 1.8 TLU/person	1987-88
Rendille (1981-1984)	LS 77.8%, NP 22.2%	<u>Poor</u> : LS 77.8%, RM 13.4%, G 8.9% <u>Better-Off</u> : LS 80.5%, RM 11.9%, G 7.6%	ND	Food aid program present since 1971.	167-800mm	Est. 1	Est. 11 TLU/person	1981-1984
Rendille (1976, 1989, 1995)	1976 0.0 HH members in WL; 1989 0.37 HH members in WL. Increased settlement in towns, and WL and T. In 1995, 34.9-40.5% of HHs had someone in WL; 36.5% of HHs sold milk, 16.2% of HHs of sold crops.	ND	ND	Food aid programs present.	500mm	1.2	1.9 TLU/person (1995)	1976, 1989, 1995
Samburu (highland) (1981-82)	Ag began in late 1970s, 1981: 13% at Ilkilorili in Ag; 91% at Baawa in Ag; 100% at Lorian in Ag; some migration for WL.	ND	ND	ND	500-700mm	Est. 10 (Leroghi Plateau)	3.25 TLU/person ⁶	1981-82
Samburu (lowland) (1983-84)	Increasing involvement in WL, esp. since droughts of 1980 and 1984.	ND	Increasing WL experience among males over time.	Food aid program present.	250-500mm	Est. 4	1.7 TLU/person ⁶	1983-84

Ethnic Group	Sources of income ²	Data by wealth category (in % terms)	Data by gender	External income flows (e.g., food aid)	Avg. annual rainfall	Pop. density ³ per /km ²	Livestock per capita ⁴	Date of data
Samburu (highland) (1992-1994)	42.6% of households in BB, 15.8% in Ag, and 42.8% in WL	Richest 25.0% of herders in WL; 'well off' 28.6% in WL, average 35.3% in WL, stock poor 35.5% in WL, stockless 46.9% in WL.	36.6% of males in WL; 64.8% of males at some time in WL. Women work locally (no data).	ND	Highland 500-900mm	ND	ND	1992-1994
Samburu (lowland) (1992-1994)	Widespread WL	ND	> 40% of young men involved in WL. Mainly young men travel for jobs.	Food-for-work (food aid) program; 51% of women in program.	400 mm in lowland	ND	Est. 2 TLU/person	1992-1994
Tugen (1987-1988)	LS 60.0%, Ag 7.4%, WL 5.3%, NF 27.3%	<u>Poor</u> : LS 55%, Ag 24%, NF 21% <u>Medium</u> : LS 59%, Ag 18%, NF 24% <u>Richer</u> : LS 29%, Ag 7%, NF 64%	ND	Food aid present	940mm	Range from 23 to 41.	1.4 TLU/person	1987-1988

Notes:

1. Data for this table are based on Ariaal (Fratkin 1991; Fratkin and Roth 1990; Fratkin et al. 1996); Borana/Ethiopia (Coppock 1994), Borana/Kenya (Hogg 1981); Orma (Ensminger 1992); Il Chamus (Little 1992); Gabbra (O'Leary 1985, 1990); Maasai 1977 (Campbell 1978); Maasai 1981-1983 (Bekure et al. 1991); Mukugodo Kenya (Herren 1991); Rendille 1981-1984 (O'Leary 1985, 1990); Rendille 1976, 1989, 1995 (Fratkin 1991; Fratkin et al. 1996; Roth, personal communication); Samburu-highland 1981-82 (Perlov 1987); Samburu-lowland 1983-84 (Sperling 1987, 1989); Samburu-highland 1992-1994 (Holtzman 1996); Samburu-lowland 1992-1994 (Straight 1997; GFA 1993); Tugen 1987-1988 (Vendeld 1990; Vendeld and Lusenaka 1991); and Kenya 1994 (some population density figures, see note 3).
2. The codes used for income activities are as follows: (LS) livestock; (G) gifts; (WL) wage labor; (T) trade; (Fi) fishing; (ES) egg sales; (H) handicrafts; (Ag) agriculture; (NF) non-farm; (Pk) Pekerra Irrigation Scheme (government irrigation scheme, Baringo, Kenya); (RM) remittances; (MT) money transactions; (RS) retail shop; (R) rental; (BB) beer brewing; (NP) non-pastoral; (B) business; and (Ot) other. ND implies that data were unavailable or insufficient to include in the table. The authors take full responsibility for any misinterpretations and oversights to data that are included in that table.
3. If population density figures were not provided in the cited text, figures listed are for the district and are drawn from the 1989 Population Census of Kenya (1994).
4. A TLU is equivalent to 250 kg of liveweight animal. The approximate animal ratios are 1 TLU= 1 cattle, 0.8 camels, or 6 small stock (goats and sheep).
5. Based on three Maasai areas: OIkarkar, Merusihi, Mbirikani—each with different income emphases—and the work of Bekure et al. (1991).
6. This figure only includes cattle and, therefore, it is probably an underestimate.
7. This figure only includes those individuals who owned livestock. Based on Little's work (1992) in Baringo at least 20 percent of Tugen have little or no livestock, which would considerably reduce the TLU figure in the table.

Table 2: Average town population and number of facilities to buy and sell goods

Country	Population	Retail	Wholesale	Butcheries	Livestock	Produce
		shops	suppliers		market	market
Ethiopia	5,312	92	4.81	2.25	0.75	0.38
Ethiopia ¹	3,933	26	0.20	1.87	0.73	0.33
Kenya	4,242	45	1.35	4.35	0.15	0.15

N=43 towns

Notes: (1) Excluding Negelle, Ethiopia.

Table 3: Average number of services and facilities per town by country

Country	Primary	Secon.	Hospitals	Clinics	NGOs	Churches	Mosques
	Schools	Schools					
Ethiopia	1.25	0.19	0.25	1.25	0.69	1.88	0.88
Ethiopia ¹	1.13	0.13	0.20	1.00	0.47	1.67	0.80
Kenya	1.85	0.50	0.23	1.08	1.12	2.96	0.92

N=43 towns

Notes: (1) Excluding Negelle, Ethiopia

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