Analysis of the Household Economy and Expenditure Patterns of a Traditional Pastoralist Society in Southern Ethiopia.

Wassie Berhanu[a] and Bichaka Fayissa[b]

Abstract: Some key features of the Borana household economy are explored in the changing context of growing pastoralist exposure to the exchange system. Despite past commercialization efforts, the pastoral economy has largely remained unmonetized. The average cattle off-take rate is found to be well below 10% for the sample Borana households of which only 11% of the household off-take decisions were made for the primary purpose of financing non-pastoral business. Such decisions are largely made by the actual conditions of life principally associated with the need to procure cereal grains and meeting other basic needs. The analysis of household expenditure patterns reveals income diversity as a key determinant of the growing importance of "imported" items in pastoral household budgets. The apparent elastic demand for stimulants in this connection is a critical matter for local actions in the context of eroding traditional values.

Key words: Pastoralism, Household expenditure, Borana, Ethiopia

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[a] Wassie Berhanu is at the Department of Economics, Addis Ababa University, Ethiopia.
[b] Bichaka Fayissa is at Middle Tennessee State University, USA. Please address all correspondence to Professor Bichaka Fayissa, Middle Tennessee State University, and P.O. Box 189, MTSU, USA. E-mail: bfayissa@mtsu.edu

Borana Pastoralism: Analysis of the Household Economy and Expenditure Patterns of a Traditional Pastoralist Society in Southern Ethiopia.

Abstract: Some key features of the Borana household economy are explored in the changing context of growing pastoralist exposure to the exchange system. Despite past commercialization efforts, the pastoral economy has largely remained unmonetized. The average cattle off-take rate is found to be well below 10% for the sample Borana households of which only 11% of the household off-take decisions were made for the primary purpose of financing non-pastoral business. Livestock off-take decisions are largely determined by the actual conditions of life principally associated with the need to procure cereal grains and meeting other needs. The analysis of household expenditure patterns reveals income diversity as a key determinant of the growing importance of "imported" items in pastoral household budgets. The apparent elastic demand for stimulants in this connection is a critical matter for local actions in the context of eroding traditional values.

I. Introduction

Traditional pastoralism is a livelihood system predominantly characterized by raising livestock on extensive communal rangelands in dryland areas. African pastoralists are traditional producers who have developed the ability to sustain livelihoods in ecologically harsh and fragile environments that are unsuitable for sustainable crop agriculture due to poor top soils and erratic climatic conditions. Therefore, involving the management of complex interactions between humans and their natural habitats, pastoral adaptations represent a creative human response uniquely adjusted for sustainable and effective utilization of the meagre natural resource base of dryland ecosystems (SANFORD, 1983; PRATT, et al., 1997; MORTON AND MEADOWS, 2000; HOMEWOOD, 2009).

Ethiopia is among the top 5 countries in the world where traditional pastoralism is practiced as a system of production (MARKAKIS, 1993). Pastoralism is a direct source of livelihood to more than 7 million people who inhabit the vast lowland territories of the country. The pastoral sector is an important source of high quality indigenous livestock for export markets and urban beef consumption. However, despite their significant economic potential, Ethiopia's pastoralist territories are subject to humanitarian crisis due

to their extreme vulnerability to recurrent droughts and periodic conflicts partly fuelled by bad governance (DEVEREUX, 2006). The people are victims of prolonged marginalization and exclusion by the centre. Pastoralist territories were either given little attention or inappropriately managed due to the limited knowledge and misconceptions about the pastoralist societies, their habitat, and way of life (GEDAMU, 1990). The Ethiopian policy making elites have, in particular, been strongly influenced by the old deeply entrenched values of the highland farming tradition that considers pastoralism as a backward practice.

Government resource commitments to pastoral development in Ethiopia properly began after the mid 1970s with the implementation of rangeland projects supported by international donors (see, COPPOCK, 1994). These were generally characterized by inappropriate approaches, technical packages and dissonant institutional structures that were incongruent with the system upon which they were imposed. Government interventions disproportionately focused on misconceived livestock commercialization aimed at resource extraction for national economic development with no significant direct attention to the improvement of the pastoralists' conditions and their habitats through proper investment on human capital and natural resource management. The central aim of the increased cattle off-take for export markets and urban meat consumption was the principal motivation for government resource commitment to Borana pastoralism (BERHANU, 2000). All the same, above all, these program interventions still remain to be part of the positive and adverse trends that have profoundly shaped the dynamics of change experienced by the Borana pastoral economy in the last three decades.

The Borana are traditional pastoralists. Principally driven by dynamic socio-economic trends and natural and human made shocks, however, Borana pastoralism has been profoundly affected by intense internal and external pressures of change (see, COPPOCK, 1994; DESTA and COPPOCK, 2004). This paper examines some important features of the Borana pastoral economy in this changing context with a particular focus on the analysis of the household economy and pastoralist expenditure patterns. Changes in the level of income and shifts in its composition will have considerable influence on the nature of pastoralist demand for goods and services as a result of more encroachment into the exchange economy through involvement in non-traditional income generating activities,. The monetization of the pastoral economy is strongly associated with the prevailing trend of the increasing household livelihood diversification which is fundamentally driven by crisis survival and accumulation motives. Income diversity, in turn, brings about consumption diversity and, thus, a higher demand for "non-traditional," or "imported" items. We empirically assess this testable proposition in view of the implied potential linkage

effects that signify the importance of the pastoral economy as a dynamic engine for growth in other sectors.

The paper is organized as follows. The next section is devoted to a brief description of the study area and data source. Some important features of the Borana household economy are explored in section III. Section IV is devoted to an empirical analysis of pastoral household expenditure patterns for exploring the pastoralist current consumption behaviour. Concluding remarks are given at the end.

II. The Setting and Data Source

The Borana plateau, predominantly inhabited by the Borana Oromo pastoralists, is a vast territory in southern Ethiopia topographically characterized by altitudinal variations ranging from 1000m to 1500m in the main, but with a few exceptional peaks of up to 2000m. The area is less endowed with moisture retaining vertisols for reliable crop-based livelihoods, except for some areas in the valley bottoms (COPPOCK, 1994). The rainfall pattern is very erratic with a long-term annual average of less than 500mm. The arid and semi-arid agro-climatic characteristics of the region rather signify the importance of pastoralism as the single most important source of livelihood to the growing human population in the area.

The household is the lowest unit in the Borana dual organisation of social-territorial division. A Borana family unit in an encampment usually consists of a man, his wife or wives, and children. Other members may include a widowed elderly parent, young brothers and sisters, other relatives or borrowed young herders. A great proportion (62%) of the Borana households were nuclear family households, and the average household size was 6.6. The proportion of polygamous households in the sample was found to be 12%.

A Borana household is a single resource-management unit that raises privately owned livestock on commonly managed rangeland resources. A common family livestock herd is held under the central control of the household head. The wife normally has some animals in the herd that are exclusively acquired from her father-in-law, parents and relatives which she can freely decide upon after the death of her husband (LEGESSE, 1973; TACHE, 2000). All the family livestock herds, however, always remain in the same pool except for the break away of younger sons with their entitlements in the immediate aftermath of their marriage ceremonies. The core family herd is inherited by the first-born son.

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Daughters are not entitled to family herd inheritance because of their marriage implications of shifts of wealth to the opposite branch (moiety) of the Borana society (interview with Borbor Bule).

The household, as the lowest unit of the Borana social organization, may be conceived as being *vertically* integrated into *milo* (sub-clan), *gosa* (clan), and moiety. The Borana society is divided into two main branches (moiety) of *Sabo* and *Gona* groups. These are in turn sub-divided into the largest secondary units called *gosa* (clans). The moiety division is purely social and is not territorially observed; the Sabo and Gona members of the Borana society are inseparably mixed in their geographic settlements and pastoral movements. Nonetheless, Borana marriage arrangements are restricted to be only between these opposite moieties.

The moiety and clan divisions are often blurred by the complex mediating forces of integration such as *sera* (law), *adaa* (custom, rules, norms), and the Borana philosophy of *Nagenya Borana* (peace and harmony) under the general framework of the *Gada* institution (TACHE, 2000; TAYE, 2002). The Borana clans are not simple tribal corporate units characterised by feud and frictions as may be observed elsewhere. They are essentially social organisational units with complex socio-political, economic, and resource management functional routines under the umbrella of a single traditional political leadership.

Horizontally, Borana households are grouped into *olla* (see, HOGG, 1993). A Borana *olla* is a residential encampment of a group of households. The size of a typical Borana *olla* is not static due to the mobile nature of the population. The number of households in an *olla* ranges from 5 to 40. The next territorial unit above *olla* is *arda*. *Arda* is a locality in which are found 4-10 Borana encampments (olla). The Borana intermediate territorial grazing management unit is *madda which* literally refers to a water source. The *madda* territorial organization is connected with a regulated access and settlement patterns around the clusters of the Borana traditional permanent wells system. *Dheda*, meaning grazing, is the largest traditional territorial management unit in Borana pastoralism. Territorially, at the highest level, Boranaland has two main regions, namely, Liban and Dirre. The Liban region has two large traditional territorial grazing areas (*dheda*) of Dida and Golbe. The Dirre region has five *dheda*, namely, Wayyama, Garacha-tula (wells heartland), Malbe, Gomole, and Golbo.

The data used in this study were generated by a pastoral household survey supported by the Borana Lowland Pastoral Development Program of the German GTZ. Bi-weekly data were collected using repeated-visit interviews of 150 randomly selected Borana households from October 2002 to July 2003. The survey was conducted in the Dire region of the Borana pastoral area. The interviewed households

were chosen from villages in four selected sites (Dhas, Dhoqolle, Dubluq, and Romiso) of varied locations ranging from peri-urban to remote areas.

III. The household economy

a) Livestock production and the nature of wealth distribution

Borana pastoralism is traditionally a milk dependent production system (see, PRATT, et al., 1997 for distinctions in pastoral typologies).   Boranaland is ecologically best suitable to cattle production. A recent sampled assessment shows that nearly 60% of Borana landscapes are suited for cattle production as compared to the estimated 12% for mixed species (cattle, small stock, and camel), or 10% for small stock only (OBA, 1998).   Therefore, the Borana are basically milk dependent cattle herders though they have been under a critical pressure of diversifying into other livestock species (small stock and camel) consequent upon changing climatic and ecological conditions.

The Borana pastoralist grazing strategy is flexibly based on accumulated experience of conditions of rangeland resources, current assessment of rain distribution, and availability of forage within and across *dheda* grazing territories (OBA, 1998). Besides the conventional seasonal cyclical patterns of movement between dry and wet season grazing territories, the Borana traditional range management practice is also uniquely characterised by its semi-settled versus mobile herd management systems. These refer to the *warra* and *fora* herd management divisions. The *warra* herds normally include milking cows, calves, and weak animals that are maintained at the encampments (*olla*) along with women, children, and the elderly. The *warra* herd forms the core subsistence herd of the family. It is normally of limited circular movement within the surroundings of the semi-sedentary encampments, though not less than a daily minimum round trip travel of 20-30km for water (see, COSSINS and UPTON, 1987). The *fora* split, on the other hand, is a mobile herd unit of mature animals and dry cows that migrate with young male household members to remote grazing territories.

The traditional permanent wells (*ela*) are the most important sources of water supply to the Borana pastoral economy. Without environmental modification of prior investment on these wells, Boranaland could have only supported hunting and gathering. They were dug as clusters of 10 or more wells in different locations of the vast Garacha-tula grazing heartland of the Dirre region (HELLAND, 1980; 1994; OBA, 1998). The operation of Borana traditional wells is labor intensive. It requires a chain of people for a relay system of water lifting function and support activities of dung removal and animal watering

supervision. However, the intensity of labor contribution in the water lifting operation is not necessarily equal to the size of individual livestock numbers. There is a common responsibility to water Borana livestock; so also is a corresponding obligation for the well-off to feed and restock the needy.

The Borana are generally poor as a group. However, intra-community wealth inequality is remarkably impressive. The top 20% in our sample owned 66% of the livestock assets. The role of institutional forces in shaping the state of wealth distribution is often non-trivial. Nonetheless, Borana pastoralism is a system characterized by common resource management institutions. The role of institutional factors in defining the state of wealth inequality, if not absent, is less pronounced there as compared with other systems. Therefore, inter-household differences in wealth status at a particular point in time are, perhaps, significantly defined by stochastic factors or some peculiarity and innate characteristics of individual agents rather than significantly driven by institutional forces. An important exception is, however, the existing profound gender inequality in livestock wealth distribution. Female-headed households are generally found to be very poor as compared with the male-headed counterparts.

b) Household asset holding strategies

The traditional pastoral mode of asset accumulation is not well cushioned against the devastating effects of recurrent droughts. The pastoralist conventional strategy is to make efforts of sufficient herd build-up to a level that enables them to survive drought periods (CAMPBELL, 1984). The most sensible strategy for the traditional pastoralist is to hold more livestock. The sample Borana household heads were interviewed with regard to their most preferred way of asset holding. The majority indicated that they would prefer to hold their asset only in livestock form. Only 28% of the respondents were found to be positive about the idea of bank saving. Therefore, the Borana pastoralists almost entirely hold their assets in terms of livestock, except for those who invest on fixed assets in towns and market centres. Only 3.4% of the respondents were found to have ever saved their money in banks; and about 8% of them have never even heard of the existence of commercial banks.

However, the risk of wealth loss is often thought to be minimized through innovative diversified asset holding strategies. Coppock (1994) discusses the importance of "banking livestock" as a principal risk management intervention in Borana pastoralism. This simply refers to the conversion of male cattle stock into cash for saving in local commercial banks. Strictly, "banking livestock" as a strategy of intervention is an inducement for precautionary savings. The pastoralist response to such an innovation may be significantly influenced by their strong perception of livestock as a special property compared to the more

apparently liquid low return bank savings. The use of modern banking facilities is centrally associated with the level of monetization of the pastoral economy, the degree of commercial orientation of its agents, and their confidence in modern banking.

c) Livestock supply to markets

The average off-take rates for the sample Borana households were found to be 5.2% for cattle and 7.8% for small stock. A large proportion (41.5%) of the sample households' marketed cattle off-take was supplied by the top 5% in the cattle holding category. Pastoralist market off-take decisions are usually linked to their strategic culling calculations in livestock management. Thus, the largest proportion of household marketed livestock is made up of mature and young males followed by old cows; 74% of the sample households' cattle sales were male stock (40% mature and 34% young male). The Borana make little open market supply of female breeding stock which is one of the difficulties faced by some post-drought NGOs' restocking programs.

The Borana pastoralists sell livestock more frequently for the *mixed* purposes of clothing, grain purchases, replacement stock, and tax payment, etc. The *mixed* purpose decision was most frequently (55.6%) mentioned as the primary reason for livestock off-take. In the second place were social and medical reasons that together initiated 26% of household off-take decisions. Cereal grain purchases as a *primary* reason for livestock off-take accounted for 10.2% of household livestock sales decisions. The highest frequency of livestock off-take for the purpose of grain procurement is found among poor households clearly because of their insufficient milk production. Livestock off-takes for a primary reason of breeding herd build-up were more frequently observed among the poor than the rich. It is also found that about 11% of livestock off-take decisions were made by the rich for a *primary* purpose of financing non-pastoral business, indicating the potentially significant positive association between high return non-pastoral investment opportunities and livestock off-take rates.

Perverse supply response is a phenomenon often thought of as having one of its best examples in pastoralism (DORAN et al., 1979; KHALIFA and SIMPSON, 1972). The argument simply is that pastoralists perversely respond to increased livestock market prices by reducing off-take since they are assumed to sell livestock only for basic cash needs. These requirements, other things being equal, are normally and easily satisfied in the face of increasing livestock prices, thus, leading to an overall reduction in pastoral livestock off-take. The perverse supply response hypothesis with respect to pastoralism is centrally based on the argument that strongly attributes pastoralist livestock accumulation to non-economic

motives. Livestock, however, are investment assets. Pastoralists are reluctant to sell these assets, not due to lack of the fundamental instinct of responding to market opportunities, but rather because of a) limited alternative investment options for asset diversification and b) due particularly to the complementary human capital, especially skill requirements of these alternative ventures.

To broadly gain some impressions on pastoralists' perception, respondents were probed for an answer to a simple hypothetical question in our cross-section survey: "How would you respond to increased livestock prices?" For a significant proportion (56%) of the respondents, their off-take decisions were determined by the actual conditions of life, not market prices. Only a minority (4.3%) of sample respondents directly indicated that a price increase will help them to reduce off-take and save on livestock. Favourable livestock prices were considered to present a good market opportunity for reinvestment of incremental revenues in younger breeding stock for a quick capital gain for about 14% of the interviewed households, while 6% of them expressed it as a potential gain to invest proceeds in non-pastoral business. These commercially-oriented positive responses do, in fact, reflect the prevailing actual trend of the adoption of these strategies among the new generation of Borana pastoralists. It was observed that some pastoralists did actually respond to favorable livestock market prices by selling mature stock for automatic replacement restocking and investment in non-pastoral activities. The pastoralist replacement-investment accumulation strategy might hence increase the supply of mature livestock but with an implied increased demand for young stock.

d) Household income sources and women's control over cash

Pastoralism is the principal source of livelihood for Borana households. The income from pastoralism consists of the cash component (generated from live animal sales, earnings from milk off-take, miscellaneous income from other animal by-product sales such as hides and skins), and the in-kind source. The in-kind component of pastoral household income consists of unmarketed pastoral and farm outputs, inter-household in-kind transfers, and food aid. The cash component of pastoralist household income is similarly generated from pastoral and non-pastoral activities. The latter have become a growing source of pastoralist livelihoods in recent years. The Borana household non-pastoral cash income is generated from grain sales (in peri-urban areas), various non-farm non-pastoral (NFNP) activities, and some cash gifts and transfers from friends and relatives.

The *cash* component of the total income of the interviewed Borana households was found to be only 40.5% which differs across wealth ranks with 46% for the very poor, 35.1% for the middle wealth rank,

and 45.4% for the rich. This apparently follows the pattern of Borana livelihood diversification (see, Berhanu et al. 2007); more diversified households are naturally found to generate more cash revenues than the less diversified ones. Nearly 70% of household *cash* revenues were found to come from pastoral sources and the largest proportion of this is from livestock sales; only 4.6% of the total household *cash* incomes are accounted for by dairy and other by-products sales. The second and growing pastoralist cash revenue source is the non-farm non-pastoral (NFNP) activities category which contributed 27.6% of Borana household total *cash* income. The cash revenue from dryland farming was found to be below 3% of total household *cash* earnings (see, Table 1). Pastoralists practice farming primarily to supplement their subsistence diet, though it has gained some importance as a source of *cash* income in the relatively livestock-poor peri-urban areas.

Table 1: Pastoral cash revenue sources by wealth ranking categories[‡] (in '000 Eth. Birr) (December-June 2002/2003)   (N=146)

Items	Very poor		Poor		Middle		Rich		Total	
	'000b	Col %	'000b	Col %	'000b	Col %	'000b	Col %	'000b	Col %
1. CASH REVENUES	17.2	100	36.8	100	53.2	100	144.5	100	251.7	100
a) Pastoral Revenue	4.4	25.6	26.8	72.8	42.1	79.1	102.2	70.7	175.5	69.7
Live animal sales	4.2	24.4	25.1	68.2	36.3	68.2	98.3	68.0	163.9	65.1
Dairy & other products sales	0.2	1.2	1.7	4.6	5.8	10.9	3.9	2.7	11.6	4.6
b) Non-pastoral Revenue	12.8	74.4	10.0	27.2	11.1	20.9	42.3	29.3	76.2	30.3
Grain sales	0.7	4.1	0.9	2.4	1.3	2.5	3.9	2.7	6.8	2.7
NFNP income	12.1	70.3	9.1	24.8	9.8	18.4	38.4	26.6	69.4	27.6

[‡] These categories were established based on participatory wealth ranking exercise guided by the traditional Borana criteria.
Source: Survey data

Borana women have an indisputable control over dairy income. Livestock and grain sales revenues are, however, entirely controlled by men, though by tradition, any unspent cash income is kept with women. On the average, however, women had direct control over only 10% of the cash income generated by the interviewed Borana households because of the insignificant contribution of dairy sales as a source of cash earnings; women control less than 5% of the cash income from pastoral sources. The non-farm non-pastoral (NFNP) income source is a growing area of women's control over cash, especially in poor households. Nearly 20% of cash income from NFNP activities was found to be controlled by women. A great proportion of women's earnings apparently go to finance household basic needs though they also substantially save on livestock by minimizing distressed sales.

e) Household time allocation and the role of women

Women have key roles both in decision making and as suppliers of household labour in the Borana pastoral production system. There is no strict cultural rigidity that limits Borana women from involvement in any aspect of livestock production activity. They get involved in herding, watering animals, calf-feeding, livestock management, and other livestock production activities. The activity involvement of Borana women is more widely spread and intensive than that of men. The prominent areas of Borana male household members' time use is in livestock production followed by the recently growing dryland farming activity. Female household members are more stretched with significant levels of involvement across all activity categories. Areas of higher women involvement than men are domestic work, gathering and related activities such as water fetching and fuel wood collection, going to market place to sell products and to buy basics, and participation in petty trading and other non-farm non-pastoral (NFNP) activities. Domestic and house construction activities take the largest share (37.6%) of female members' labour time, followed by livestock production activities (26.6%), gathering and related (16.2%), going to market (5.5%) and dryland farming (3.7%).

The labour intensive animal watering activity of the Borana pastoral system is relatively an area of low involvement by women. The Borana normally commit their young male labor force largely to this duty of watering animals from deep wells and recently to dryland farming. On the other hand, however, construction is virtually an exclusive burden of women in addition to their traditional household maintenance role. The larger share of Borana household increasing time allocation to non-farm non-pastoral cash income generating activities is also contributed by female members. Women thus generally work far longer hours than men. The largest share (69%) of social activity participation (visiting friends and relatives, social ceremonies, and meetings) with high leisure content is enjoyed by men.

In total, livestock production absorbed about 47% of household time use. Domestic activities and house construction with 19.3% share take the second place. The rest was accounted for by social engagements (8.7%), gathering and related activities (8.5%), dryland farming (8.7%), and marketing and non-pastoral productive activities (7.9%). Time use by poor Borana households was generally found to be of higher leisure content than that of the rich ones. Productive time use per capita was lower for the poorer households. Poor households, for a variety of reasons, appear to have limited options for optimal labour allocation decisions in multiple productive engagements. Herding labour market is virtually absent as a source of demand and extra earning for the poor in Borana pastoralism. The livestock economy as the most important area of engagement almost entirely benefits from unpaid family labour and cooperative

labor arrangements. There are few non-pastoral opportunities that gainfully occupy the poor. Also, the existence of some level of indigenous welfare system means that the poor might somehow survive at a sub-optimal state of their labour use.

IV. Analysis of Household Expenditure Patterns

a) The analytical method

The demand for a commodity, in the theoretical economic model, is determined by income, prices, and consumer tastes and preferences. The consumer makes a utility maximization choice subject to a budget constraint, where the sum of expenditures on individual commodities is constrained to be equal to the total income of the consumer. An important step in the empirical analysis of household consumption behavior is, however, to establish the functional relationship between the level of consumption of a commodity and household income. The relationship between household consumption (expressed either in quantity or, for practical reasons, in purchase expenditure) and income gives the well known Engel function (PRAIS HOUTHAKKER, 1955; CURRIE, 1972).

A point of specification concern is related to the definition of the dependent and explanatory variables. The dependent variable, though ideally a *quantity* demanded (purchased), is usually defined in terms of expenditure on a particular commodity; this is mainly because of the composite nature of commodities (such as food and clothing) considered in the analysis of household budgets. This is expressed either in terms of total expenditure on the commodity in question or, more frequently, in expenditure share form. Household budget studies, in accordance with consumer theory consider income as a key explanatory variable in empirical model specification. There is, however, a practical question as to which one of either income received or total expenditure as its proxy is used in actual estimations (CURRIE, 1972; HAZELL and ROELL, 1983). The use of total expenditure as a proxy is often forced by the lack of reliable data on income.

A household may be assumed to make a budget allocation decision among different expenditure *categories* such as food, beverages, clothing, etc. The demand for a particular composite commodity i may then be simply represented by:

$$D_i = f(E, \mathbf{X}) + \varepsilon \qquad [1],$$

where D_i is expenditure on i, E total expenditure, $\mathbf{X}$ a vector of economic and non-economic factors that influence the household's demand for commodity i, and ε stands for stochastic factors. The proportion

of total household budget committed to commodity i is referred to as the average budget share (ABSi), which can be presented as:

$$ABS_i = S_i = \frac{E_{ij}}{E_j} \qquad [2],$$

where S_i is average budget share of commodity i, E_j total budget allocation of household j, and E_{ij} for the amount of expenditure allocation to commodity i by the j the household.

One of the primary concerns in the estimation of the demand relationship is the choice of the functional form. A well known empirical specification is the Working-Leser model (see, LESER, 1963; CHESHER and REES, 1987; HAZEL and ROELl, 1983; CLEMENTS and SELVANTHAN, 1994; DELGADO, et al., 1998):

$$S_i = \alpha_i + \beta_i \log E_j \qquad [3],$$

where α_i and β_i are parameters to be estimated and the variables are as defined above. A notable point is that the model is specified in expenditure share form which is thought to be important in mitigating the problem of heteroscedasticity that is typically unavoidable in cross-section analysis (DELGADO, et al., 1998).

Based on equation [2], equation [3] may be reorganized to obtain the marginal budget share (MBS$_i$) of commodity i:

$$E_{ij} = \alpha_i E_j + \beta_i E_j \log E_j \qquad [4]$$

$$MBS_i = \frac{\partial E_{ij}}{\partial E_j} = \alpha_i + \beta_i + \beta_i \log E_j$$

$$\Rightarrow \beta_i + S_i = \delta \qquad [5]$$

The marginal budget share of commodity i, denoted by δ in [5], measures the rate of change of household expenditure allocated to i resulting from a unit addition to income (total expenditure). It varies with the change in the average expenditure share S_i and the marginal budget share (δ) is less than the average budget share (S_i) for necessities such as food. The expenditure elasticity for commodity i is given by:

$$\eta = \frac{MBS_i}{ABS_i} = \frac{\delta}{S_i} = 1 + \frac{\beta_i}{S_i} \qquad [6],$$

and η decreases with increasing level of income. The average budget shares are required to add up[1] to 1.

b) Estimation

The following empirical model is specified for the analysis of Borana household budgets:

$$S_i = \alpha_i + \beta_i \log E_j + \gamma_{i1} H_j + \gamma_{i2} D_j + \gamma_{i3} L_j + \gamma_{i4} A_j \qquad [7],$$

where i may stand either for expenditure groups such as food or for individual item like sugar.

The equivalent Engel function for [7], based on [4], is:

$$E_{ij} = \alpha_i E_j + \beta_i E_j \log E_j + \gamma_{i1} E_j H_j + \gamma_{i2} E_j D_j + \gamma_{i3} E_j L_j + \gamma_{i4} E_j A_j, \qquad [8]$$

and then,

$$MBS_i = \frac{\partial E_{ij}}{\partial E_j} = \alpha_i + \beta_i + \beta_i \log E_j + \gamma_{i1} H_j + \gamma_{i2} D_j + \gamma_{i3} L_j + \gamma_{i4} A_j$$

The expenditure elasticity is given by:

$$\eta = \frac{MBS_i}{ABS_i} = \frac{\beta_i + S_i}{S_i} = 1 + \frac{\beta_i}{\alpha_i + \beta_i \log E_j + \gamma_{i1} H_j + \gamma_{i2} D_j + \gamma_{i3} L_j + \gamma_{i4} A_j} \qquad [9]$$

The expenditure share equations specified in [7] are estimated using OLS. The ABS_i and MBS_i for an average household are then computed at the mean values of the explanatory variables[2].

Table 2: Variable definition for the expenditure share equations

Variables	Description	Mean	SD
S_i	Share of expenditure on good i in the total expenditure of household j	Various commodities	Various commodities
E_{ij}	Expenditure on good i by household j	Various commodities	Various commodities
E_j	Total expenditure of household j	2682.4	3190
H_j	Household size in adult equivalent units	5.4	2.9
D_j	Diversification ratio; ratio of NFNP income	0.115	0.19
L_j	Location dummy; Romiso=0	0.75	0.44
A_j	Age of household head	53.1	16.7

The definition and descriptive statistics of the variables are given in Table 2. The explanatory variables in the specified share equation [7] are total expenditure (E_j), household size (H_j), diversification ratio (D_j),

Location (L_j), and the age of household head (A_j). The total expenditure which is a proxy for total income includes cash expenditure and consumption of own production. Household characteristics influence both its needs and in some respect its purchasing power. Household size is introduced here in terms of the average adult equivalent measure (to capture the influence of household composition) computed based on WHO scales and indicated in Dercon and Krishnan (1998). The diversification ratio (D_j) is defined as the proportion of non-farm non-pastoral (NFNP) earnings in the total household income. Diversification into NFNP activities implies increased monetization which raises the cash component of pastoral household income. Income diversity is also assumed to bring about consumption diversity through increased monetary expenditure on a variety of consumer items. Income diversification, among other things, involves a considerable amount of travel as well as frequent external contacts and transactions in cash; a case that appears to explain some observed facts of more diversified consumption spending by poor households as compared with the expenditure pattern of rich pastoralists. Location is another important factor that may influence household expenditure patterns through its effects on tastes and preferences as well as purchasing power.

b) Discussion of pastoral household expenditure patterns

The estimated share equations of major expenditure categories and some individual items are summarised in Table 3)[3]. Consistent with expectation, the total expenditure coefficient for food is negative. Perhaps, a strikingly important relationship is the apparent impact of income diversification on pastoralist expenditure pattern. The diversification ratio (D_j) is strongly significant for 10 of the 12 equations estimated. The relationship is positive for all expenditure groups, except for the food category of high milk component. This latter exception, perhaps, rather reflects the fact that the diversification ratio is mainly higher for the less milk producing poor who spend their non-farm non-pastoral (NFNP) earnings on cereal grain and other consumer items. Similarly, households with a relatively higher diversification ratio, whether poor or rich, generally tend to have more diversified cash spending than those with very low or no NFNP income components.

The significance of location on household expenditure pattern is also similarly noticeable. The explanation for the observed strongly significant relationship between location and expenditure on imported items as well as stimulants is fairly obvious in view of the impact of location on tastes and preferences; relatively less of these stated expenditure items are demanded as one goes from peri-urban to remote locations. Moreover, the observed significantly negative relationship between age and

expenditure on goods and services such as imported non-food items and travel is, perhaps, partly indicative of the dynamically changing pastoralists' tastes and preferences.

Table 3: Expenditure share equations for major expenditure categories (N= 146)

Category	Estimated Regression Coefficients						
	Intercept	LnE	Hj	Dj	Lj	Aj	F-values
1. Major categories							
Food	0.87***	-0.019*	0.006*	-0.326***	0.060***	0.001*	F(5, 140) =17.3
	(0.000)	(0.061)	(0.054)	(0.000)	(0.000)	(0.041)	(0.000)
Beverages and tobacco	0.201***	-0.017***	-0.001	0.099***	-0.019**	0.00001	F(5, 140) =18.6
	(0.000)	(0.000)	(0.324)	(0.000)	(0.013)	(0.956)	(0.000)
Clothing and footwear	-0.024	0.012***	-0.001	0.046**	-0.020***	-0.0002	F(5, 140) =3.4
	(0.483)	(0.010)	(0.556)	(0.017)	(0.010)	(0.393)	(0.006)
Non-durable consumer items	0.064***	-0.001	-0.001	0.091***	-0.010**	-0.0004***	F(5, 140) =21.2
	(0.001)	(0.655)	(0.334)	(0.000)	(0.024)	(0.004)	(0.000)
Health and education	-0.048	0.010**	-0.001	0.019	-0.012	0.00001	F(5, 140) =1.5
	(0.161)	(0.027)	(0.467)	(0.328)	(0.134)	(0.963)	(0.186)
Travel expenses	-0.038***	0.007***	-0.001**	0.023***	0.006**	-0.0001**	F(5, 140) =8.3
	(0.001)	(0.000)	(0.061)	(0.000)	(0.014)	(0.011)	(0.000)
Durable articles	-0.029*	0.008***	-0.001*	0.046***	-0.005	-0.0002**	F(5, 140) =6.5
	(0.100)	(0.002)	(0.068)	(0.000)	(0.234)	(0.031)	(0.000)
2. Individual items [a]							
Milk	-0.146	0.072***	0.001	-0.604***	0.204***	0.0008	F(5, 140) =39.9
	(0.251)	(0.000)	(0.811)	(0.000)	(0.000)	(0.281)	(0.000)
Meat	-0.139***	0.019***	-0.001	-0.005	-0.003	0.0007**	F(5, 140) =4.5
	(0.003)	(0.003)	(0.635)	(0.837)	(0.763)	(0.020)	(0.001)
Cereals	0.876***	-0.087***	0.006*	0.148***	-0.109***	-0.0003	F(5, 140) =30.3
	(0.000)	(0.000)	(0.093)	(0.002)	(0.000)	(0.557)	(0.000)
Sugar	0.212***	-0.017***	-0.001	0.080***	-0.017***	-0.0002	F(5, 140) =26.4
	(0.000)	(0.000)	(0.478)	(0.000)	(0.004)	(0.267)	(0.000)
Tea	0.106***	-0.010***	-0.001	0.048***	0.0004	0.0001	F(5, 140) =17.2
	(0.000)	(0.000)	(0.161)	(0.000)	(0.936)	(0.320)	(0.000)

Numbers in parentheses are P-values; ***Significant at 1% level; **Significant at 5% level; *Significant at 10% level.
[a] *This is only for some major individual commodities and thus the ABS does not add up to one*

Estimation results showing the nature of average Borana household expenditure behavior are presented in Table 4. As can be seen, food alone accounted for 81.3% of Borana household total expenditure, followed by beverages and tobacco (5.9%), and clothing and footwear (4.5%) on the average. Non-durable consumer items (soap, cooking oil, paraffin oil, cosmetics, battery cells, etc.) have on the average accounted for 3.2%. Travel expense is the least expenditure share item in the pastoral household budget (1.4%).

Although non-food items only account for 18.7% (or 12.8% by further excluding beverages and tobacco), their expenditure elasticities are greater than unity, thus indicating that their budget shares increase with

total income. In accordance with Engel's law, the average Borana household expenditure elasticity for food is less than unity; that is, a growth in income will lead to less than proportionate increase in pastoralist expenditure on food. However, this is not the case for pastoral outputs of milk and meat for which the expenditure elasticity is greater than unity.

Table 4: Estimated Budget shares and elasticities[a]

Expenditure Category	Average Budget Share	Marginal Budget share	Elasticity
1. Major categories			
Food	0.813	0.794	0.98
Beverages and tobacco	0.059	0.042	0.71
Clothing and footwear	0.045	0.057	1.27
Non-durable consumer items	0.032	0.032	1.00
Health and education	0.027	0.038	1.41
Travel expenses	0.014	0.021	1.50
Durable articles	0.020	0.028	1.40
2. Individual items[b]			
Milk	0.554	0.625	1.13
Meat	0.038	0.057	1.5
Cereals	0.141	0.054	0.38
Sugar	0.058	0.041	0.71
Tea	0.033	0.023	0.70
3. Locational categories			
"Home" produced food[c]	0.630	0.689	1.10
"Imported" food items	0.088	0.054	0.61
"Imported" non-food items	0.093	0.111	1.19
4. Stimulants	0.034	0.028	1.14[d]

[a] *Estimated from the budget share equations.* [b] *Some miscellaneous food items are excluded, and tea is considered in the beverages category.* [c] *Excludes cereal grain purchases in the local market.* [d] *Refers to cash expenditure elasticity*

Milk, on the average, accounts for 55.4% of the sample Borana households' total consumption expenditure. The Borana, though one of the major suppliers in Ethiopia, are not themselves major

consumers of beef. Meat, on the average, presently shares 3.8% of pastoral household consumption expenditure; but is of the highest expenditure elasticity that implies its potentially more than proportionate response to increases in pastoralist incomes. Borana pastoralism is basically a milk-dependent system though there is a prevailing tendency of a transition to cereal dependence predominantly as a result of livelihood deterioration.

It is only about four decades since the first introduction of cereal grain into an average Borana household diet. The Goba Bule period (1969-1976) was mentioned as a point of reference by the great majority of our sample household respondents for their first time exposure to cereal diet; that was the time of the 1973/74 drought. As can be seen in Table 2, the average share of cereals (including own production and purchases) in Borana household, total consumption expenditure is 14.1%; and the cereal group is the item of least expenditure elasticity in the pastoralist major consumer bundles (0.38). The rich normally consume less grain, or some may not consume at all, during high milk production periods of the year. The Borana, perhaps, except for the very poor, also do not normally prefer to feed children with cereals. The deterioration in their livelihood conditions may have thus forced pastoral households to increasingly seek the procurement of cereal grains in favorable terms of trade with pastoral products in *normal times*.

Sugar and tea are in the top list of Borana household basic consumer items and both are income inelastic. Diluted boiled milk with tea and sugar is the basic survival diet for the poor Borana households. This generally seems to particularly decrease as one goes from the relatively livestock-poor peri-urban locations to wealthy, but remote locations.

The demand for non-durable consumer goods is found to be strongly and positively related with the level of household income diversity rather than total income as such (see, Table 3). It appears to reflect the fact that consumption expenditure may be found more diversified among those with higher cash transactions than with the wealthy traditional pastoralists who spend relatively limited proportion of their income on consumer goods imported into the area.

The locational category in Table 4 is included in order to gain some impression as to the nature of pastoralists' demand for major commodities re-grouped based on their supply origin. The "imported food" category includes a large proportion of sugar which has become a necessity in pastoralist diet as mentioned above. Some other items in this category such as macaroni and rice are mainly purchased by those who have developed the taste for these items. It appears that the demand for food items like macaroni and rice is rather determined by the level of income diversity rather than wealth status or level

of income. The demand for non-food "imports", on the other hand, is apparently income elastic and is strongly influenced by the non-farm non-pastoral (NFNP) component of pastoralist income.

The demand for stimulants (*chat*[4], alcoholic drinks and coffee) is found to be elastic with respect to *cash* expenditure. The observed relationship between demand for stimulants and location (Table 3) indicates the role of rangeland towns in the determination of pastoralist *chat* and alcohol consumption. Traditionally, the Borana were low consumers of alcohol. Observing the rising threat of a new culture of alcoholism in the area, the *Gumi Gayo* assembly has banned the selling and consumption of alcohol in the area, though the major rangeland towns are exempt from this ban through the apparent pressure from the Ethiopian government with the claim to protect the rights of highland settlers in these towns. With the ban recently in full force, there appears a tendency to adopt a substitute. This is found in the recently growing transportation of *chat* into the Borana area from the highlands with the observed gradual deepening of its penetration beyond rangeland towns and their surroundings.

V. Concluding remarks

The Borana area was a center of strategic attention in Ethiopia's past rangeland development programs that were directed to modernize the pastoral economy primarily through enhanced livestock off-takes and pastoralist increased involvement in the market. Despite the observed significant changes in the system, the pastoral economy has largely remained unmonetized. Livestock off-take decisions are mainly determined by the actual conditions of life, principally dominated by the need to procure cereal grains that may rather be conceived as reflecting the negatively changing situations of pastoral livelihoods.

Borana women control an insignificant proportion of household *cash* income from pastoral sources. However, their command over household *cash* earnings has broadly been on the rise owing to their growing involvement in non-pastoral activities. This, in some respect, reflects the extra burden on women because of the increasing family pressure to cover household basic needs from other income sources rather than livestock sales.

The system's complex dynamics in the last four decades appear to have gradually shaped pastoralist tastes and preferences.   An analysis of the pastoralist expenditure behavior reveals the significance of the hypothesized influence of recently emerging livelihood strategies on household expenditure patterns. Milk was the single most important item in the Borana household diet. However, there is a significantly changing trend of more dependence on cereals, largely due to livelihood difficulties. The Borana were

massively introduced to cereal grains with the advent of external food aid around the mid 1970s. The turn for the traditionally less known, but gradually emerging habits of alcoholism arrived in the 1990s and this was confronted by an immediate response of a local ban on alcohol, albeit, the complex enforcement difficulties faced by *Gada* officials and community representatives. The massive penetration of the "*chat* culture" in this decade marks an era of Borana's unprecedented exposure to the "evils" of the Ethiopian urban culture that has enticed them to sell their most valuable tradable commodities in exchange for inferior and unhealthy products such as *chat*. This is a matter of some urgency for the present *Gada leadership* to avert the threats of social disasters driven by such petty exchange relationships with parasitic rangeland towns.

NOTES

1. The parameters of the Engle functions are constrained in accordance with the requirement that the sum of all specific commodity expenditures is equal to total income at all income levels (Prais and Houthakker, 1953). This is fulfilled with the restrictions that $\sum_i \alpha_i = 1$ and $\sum_i \beta_i = 0$ for equation [3] which is automatically satisfied for a complete expenditure group in the OLS estimation (Hazell and Roell, 1983).

2. The additive properties mentioned in footnote 8 are thus automatically satisfied for the complete expenditure groups, though with some rounding errors.

3. A total of 12 equations are estimated out of which 7 are for complete expenditure categories and 5 for some major individual items. The estimated equations are statistically significant at the 1% level except for the health and education share equations.

4. A stimulant plant grown in East Africa.

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