

## MARKET POWER AND EFFICIENCY IN INDIGENOUS SMALL RUMINANT MARKETING CHANNELS IN MARSABIT, KENYA

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### **Abstract**

*Eighty percent of Kenya's land is arid and semi arid (ASAL). The ASALs are best suited for indigenous livestock production, particularly small ruminants. They offer employment to a majority of people in the areas, and thus contribute to general livelihoods. The "livestock revolution" is projected to double meat consumptions in the developing countries, by the year 2020 compared to 1993. The rural poor are expected to benefit from this growing market, yet pastoral population in arid districts of Kenya lack reliable marketing outlet which would provide increased benefits from indigenous small ruminant resource to both pastoralists and consumers in the ASAL region and beyond. One contributing limitation is lack of data and information on the marketing of indigenous small ruminants, subsequently leading to gaps in the existing knowledge; and a failure to appreciate the importance of indigenous animals. The need for data and information on marketing associated with the development of small ruminant's resources creates a demand for research to provide such information. This paper aims at contributing to filling this information gap by collecting and analyzing data on the marketing of indigenous small ruminants. The paper in particular examines the existing market channels, quantifies market costs and margins, and assesses opportunities for producers to access markets. A cross-sectional survey of 148 traders involved in the selling and/or buying of indigenous small ruminants was conducted in Marsabit district and the city of Nairobi. In Marsabit the survey was carried out in local markets which act as collection points close to the producer, while Nairobi serves as the terminal market and the last collection point. A simple random selection was done in the markets to select traders. The structure, conduct and performance approach was used in analyse of market channels. Results reveal two market channels through which indigenous small ruminants flow from the producer to the terminal market. A Lorenz curve and Gini coefficient (G) results of both primary traders and secondary traders showed highly concentrated markets.*

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*The paper concludes by recommending improving market and transport infrastructure from the very interior areas of the district to the terminal market in Nairobi as an important strategy.*

## **1. Introduction**

Eighty percent of Kenya's land is arid and semi arid (ASAL), best suited for livestock production (Barret et al., 2003). ASALs are well endowed with indigenous livestock (AIS, 2003), particularly small ruminants, which are a major component of the pastoral population's household economy (Njanja et al., 2003). This is because they are relatively easy to keep, they reproduce quickly, spread the risk inherent in agricultural production (Ehui et al., 2003), and can be used as a first step on the ladder out of poverty (Peacock, 1995). They also utilize the low potential areas of the country where environmental conditions prohibit to keeping other domesticated animals (EPZ, 2005). They thus offer employment to a majority of people in these regions (Muriuki, 2001). In addition to natural capital, and financial capital, small ruminant livestock contribute to social capital as well as to the sustainable livelihoods and security of the rural poor (Perin Saint Ange 2002).

However, production without access to market is a problem for many livestock producers in Kenya (Lightfoot et al., 2005). Delgado et al.'s (1999) "livestock revolution" can be expected to allow the rural poor in developing countries to contribute to this growing market yet pastoral populations in arid districts of Kenya lack reliable marketing outlets that could provide the full benefits of indigenous small ruminant resources, to be captured by both pastoralists and consumers in the region (AIS, 2003) and beyond. To achieve these benefits it is necessary to address the constraints within the pastoral production system. Thus, recommendations on supportive ways to small scale and pastoral production, to policy makers (Conroy, 2004) are important. One outstanding aspect of the livestock revolution is the implied change of production from traditional subsistence to a market-oriented industry (Delgado et al., 1999), making livestock marketing a significant factor in the development of ASALs in Kenya (McPeak, 2003). Faced with several demand-led factors such as population and income growth, urbanization and changing consumer preferences (Devendra, 2005), policy makers need to consider those policies that will encourage the expansion of food production and improve the quality of life at urban and household levels (Lanyasunya et al., 2001). This study examines the existing market channels for indigenous small ruminants, quantifies market costs and margins, and assesses opportunities for livestock keepers to access markets, with a view to contributing to market information and

assisting in the formulation of appropriate policies that might address marketing constraints faced by indigenous small ruminant livestock pastoral producers.

## **2. Materials and methods**

### **2.1. Study area**

Marsabit district is one of the ASAL districts in Kenya and lies to the north of eastern province. It covers an area of 66,000 square kilometres (GoK, 2002). It has a bimodal rainfall pattern with short rains falling between October and December and long rains between March and May. On average, it receives between 200mm to 1,000mm of rainfall per annum. Most of the district is an extensive plain lying between 300m to 900m above sea level, and is characterised by hills and mountain ranges, inselbergs, volcanoes cones and calderas. The land spans agro-ecological zones III, IV, V and VI and is mostly suitable for camels and sheep and goats (GoK, 2002). About 80% of the district's residents are pastoralists deriving their livelihoods from livestock and livestock based industries.

### **2.2. Survey methodology**

A cross-sectional census survey of 148 traders involved in the selling and/or buying of indigenous small ruminants was conducted in Marsabit and Nairobi. Traders were characterised within two categories; primary traders (buying from producers to sell in local markets or markets within their areas), and secondary traders (buying from both producers and primary traders, then transporting to sell in Nairobi market also referred to as terminal market). Markets within the communities of Gabra and Rendille were selected for the study on the basis of the communities keeping large populations of indigenous sheep and goats and being representative of the potential target communities for a community based management (CBM) project. The survey was conducted between the months of June and September, 2006 in a total of seven markets.

### **2.3. Data collection**

Personal interviews were conducted using a pre-tested structured questionnaire. Information from market agents was obtained with regard to period in business, initial capital, number purchased, market prices, mode and cost of transport, opinion with regard to what attracts buyers and what determines prices and problems faced in trade. A total of 63 primary traders, and 85 secondary traders were surveyed.

### **2.4. Statistical analyses**

The structure, conduct and performance approach was used to analyse operating market channels. Market structure was analysed based on market concentration exercised by traders and

barriers to market entry for potential traders. To analyse concentration, the market shares of individual traders, in terms of volume of trade, were analysed using a Lorenz curve. A Gini coefficient, according to Brown (1994) was used to measure the level of inequality in market shares among traders. The study assessed market entry, by looking at the capital requirements for potential traders. These capital requirements were considered in the context of operating costs.

Market conduct was analysed based on pricing strategies. Traders were asked if they looked for market information and how they used such information in their trade.

Market performance was assessed using market costs and margins. To determine the level of profits, the study used individual traders' stated opportunity cost in terms of average net monthly income. By analyzing the level of market margins, net returns and their cost components, it was possible to evaluate the impact of structure and conduct characteristics on market performance. Marketing costs involved operating costs which were related to the volume and level of business transacted. Costs included; buying costs (purchase price multiplied by number of animals, local government marketing fee, brokers' payment), transportation costs and selling costs. Gross margins were calculated as the difference between buying and selling prices for individual traders. Net margins were calculated by subtracting operating costs from total revenues.

### **3. Results**

#### **3.1. Description of marketing channels**

The study findings reveal two market channels through which indigenous small ruminants move from the producer to the terminal (Nairobi) market. These are:

1. First point of sale (producer) \_\_\_\_ local market (primary trader)\_\_\_\_terminal market (secondary trader)
2. First point of sale (producer) \_\_\_\_\_terminal market (secondary trader)

Marketing channels include primary traders and secondary traders. Both primary and secondary traders deal with the producer to buy animals. Primary traders buy in small numbers daily and sell to secondary traders in the local markets. Secondary traders buy from both producers and primary traders and transport to the terminal market to sell. Secondary traders play an important role in transporting animals from the producer to the consumers.

#### **3.2. Description of market flows**

Market flows from the producer gate to the terminal market in figure 1 were analysed in terms of marketed numbers of animals recorded by market agents and species. The basis for

recording animals by market agents and species stems from the fact that during the survey, primary traders considered trades over a time period of the one month, while secondary traders considered trades over a time period of three months. The difference in considered trades over time periods required the study to harmonize the periods by extrapolating the period for primary traders. Therefore marketed animals for primary traders were extrapolated to cover three months, a period similar to secondary traders.

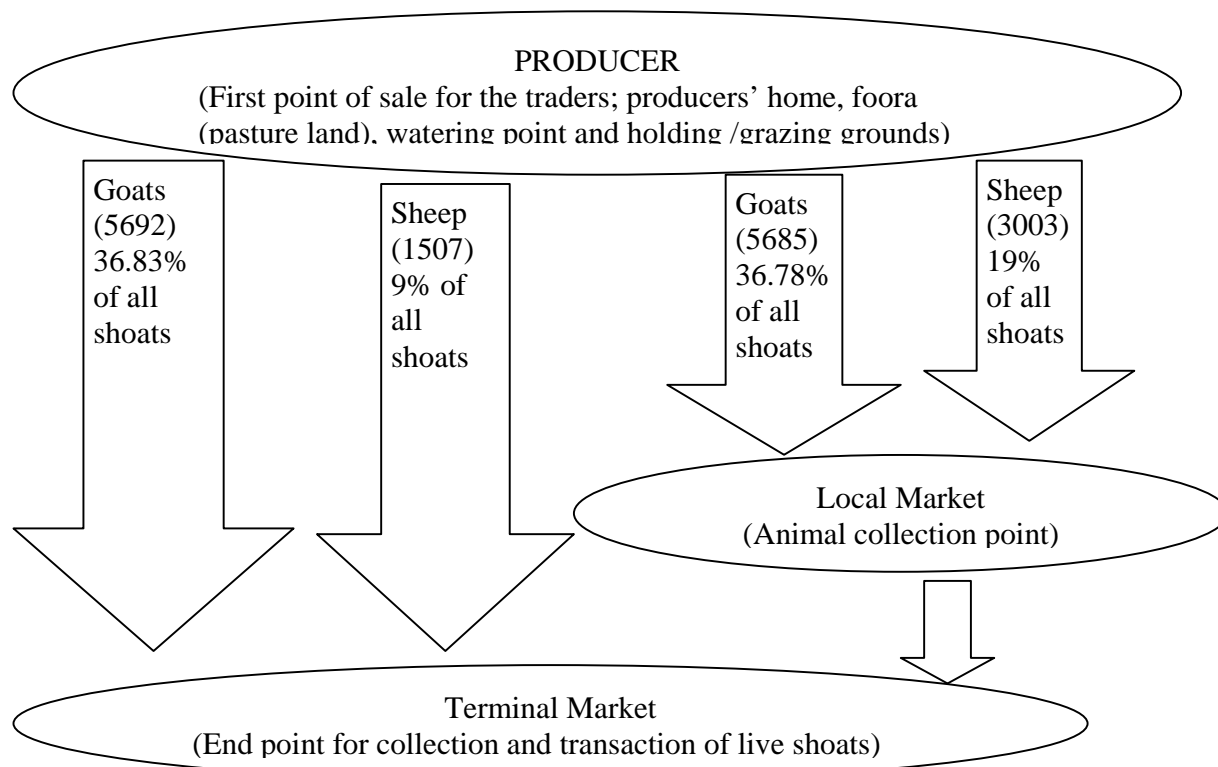


Figure 1: Market flows of sheep and goats from the producer to the terminal market - end of market chain for live animals

From figure 1, a total of 11,377 goats and 4,510 sheep were transported to the terminal market for sale by secondary traders. On the basis of extrapolation, goats traded by primary traders increased from 1895 to 5685 and sheep increased from 1001 to 3003. These animals were included in the numbers transacted by secondary traders, since most primary traders sell to secondary traders. Looking at both primary and secondary channels the difference in the number of traded goats was small giving a percentage that is almost same. This means both groups buy almost the same percentage of goats from producers. Sheep seem to be less traded as compared to goats.

Due to the post-drought situation when the survey took place, there was no market per se (i.e. no busy market operation), making physical market structures non-functional as is usually the case under such circumstances. Few animals would be brought for sale by producers, compelling both primary and secondary traders to find producers and their animals at watering points or holding/grazing areas, a situation that showed excess demand for animals. Primary traders would then bring purchased animals to town and sell them to secondary traders. Most of the secondary traders do business in partnership, basically to share market costs, particularly transport cost.

### 3.3. Market structure

Analysis of market structure was done for primary traders and secondary traders.

#### 3.3.1. Market share distribution by primary traders

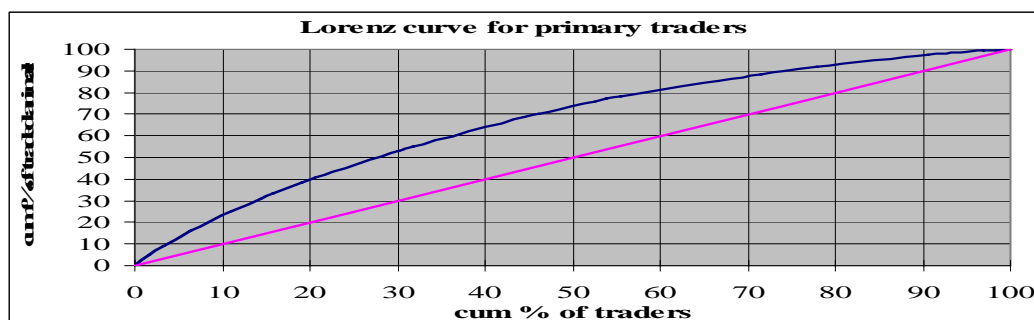


Figure 2: Results of degree of inequality in market shares of primary traders.

The Lorenz curve shows the cumulative percentage of market share (traded animals) versus cumulative percentage of primary traders. The curve shows that the largest 10% of total primary traders controlled about 23% of total market trade and the largest 20% of traders accounted for about 40% of total market trade. Similarly the largest 50% controlled about 75%. This implies that the marketing of indigenous sheep and goats is dominated by relatively many primary traders and is relatively equitably shared. Empirical results of the level of inequality in market shares by Gini coefficient (G) is  $1 - 0.68 = 0.32$ . The study results of coefficient (G) of 0.32 shows a moderately concentrated market of primary traders.

### 3.3.2. Market share distribution by secondary traders

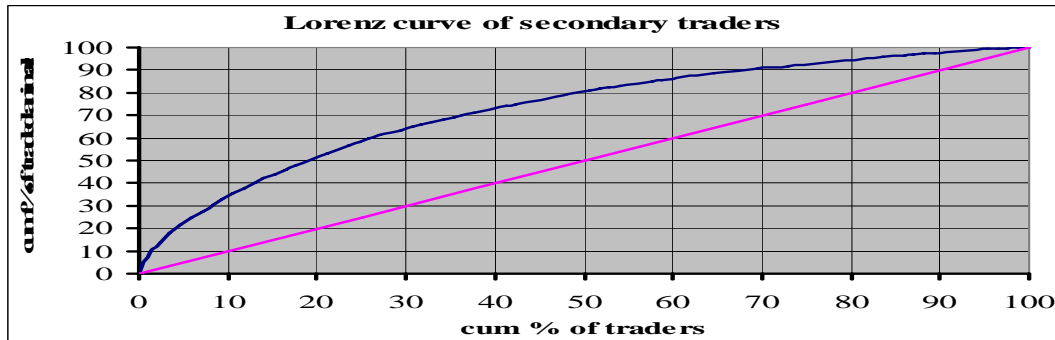


Figure 3: Results of degree of inequality in market share of secondary traders

The Lorenz curve shows the cumulative percentage of market shares versus cumulative percentage of secondary traders. The curve shows that the largest 10% of total secondary traders handled about 35% of total market trade and the largest 20% of traders held about 50% of total market transactions. Similarly the largest 50% handled about 80%. This implies that the marketing of indigenous sheep and goats is dominated by moderately few secondary traders and is rather inequitably shared. Empirically, the result of level of inequality in market shares by Gini coefficient (G) is  $1 - 0.54 = 0.46$ . Comparing to Gini coefficient that ranges between zero and one, the results of coefficient (G) of 0.46 implies that secondary traders operate in a highly concentrated market.

### 3.4. Conditions to market entry conditions

Capital requirements serve as an entry barrier since only those who have such capital (to cover market costs) can enter the market. The study used operating costs as a measure of the initial capital needed for potential entrants. The study further classified the two market agents (based on section 2.2 descriptions) by size into small scale, medium scale and large scale. This was done by rearranging volumes of traded animals (by market agents) in ascending order, then divided into 3 groups. Considering change in monetary interest rates over time, the study examined recent market operating cost versus initial capital (as bench mark) within a period of 5 years and below to measure the capital required for potential entrants.

Table1: Market costs and initial capital (Kshs per month) of market agents classified by size

<i>Primary traders</i>	Mean operating cost in 5 years of business	Mode initial capital
Small scale traders	28,976.10	< 10,000
Medium scale traders	69,657.30	10,000 – 20,000
Large scale traders	140,909.30	10,000 – 20,000
<i>Secondary traders</i>		
Small scale traders	29,876.60	< 10,000

Medium scale traders	57,662.00	20,000 – 40,000
Large scale traders	192,891.30	20,000 – 40,000
<i>Butchers</i>		
Small scale traders	12,932.10	< 10,000
Medium scale traders	57,265.00	10,000 – 20,000
Large scale traders	227,317.50	10,000 – 20,000

Results in table 1 show mean marketing costs per month for small scale primary traders was Kshs 28,976.10 (equivalent of US\$ 426.2) medium scale primary traders was Kshs 69,657.30 (US\$ 1,024.4), and large scale primary traders was Kshs 140,909.30 (US\$ 2,072.2). Compared to the bench mark of initial capital of less than Kshs 10,000 (US\$ 147.1) for small scale traders, and between Kshs 10,000 – 20,000 (US\$ 147.1 - 294.1) for both medium and large scale, results indicate that the marketing costs for the three classes of primary traders are high.

Mean marketing costs per month for small scale secondary traders was Kshs 29,876.60 (US\$ 439.4), medium scale secondary traders was Kshs 57,662.00 (US\$ 848), and large scale secondary traders was Kshs 192,891.30 (US\$ 2836.6). Compared to the bench mark of initial capital of less than Kshs 10,000 (US\$ 147.1) for small scale traders, and between Kshs 20,000 – 40,000 (US\$ 294.1 – 588.2) for both medium and large scale, the results indicate that the marketing costs for the three classes of secondary traders are high.

### **3.5. Market conduct**

The determination of prices by traders was assessed based on the availability of market information. Lack of market information was seen as a way by which secondary traders could exploit primary traders in the interior villages. Thus, market participants were asked if in their opinion, market information on the level of prices and volumes was available, and if they were satisfied with the available information. Results show 63% of primary traders and 82% of secondary traders said market information was available, sourced from fellow traders, showing trust among the traders. Further, 35% of primary traders and 32% of secondary traders were satisfied with the available information. The reason for those not satisfied was unstable market prices that changed with market supply and demand. The study generally noted that market information was available. In addition regression analysis was done on selling price as the dependent variable. Results in table 1 show that the selling price of animals of both market agents was influenced by the buying price of animals, the particular market where sale takes place and the type of animal.

Table 1: Regression parameter estimates for factors influencing small ruminant's selling price.

Variables	Coefficient (OLS)	Std. Error
<i>Primary traders</i>		
Buying price of animals	0.77 <sup>*</sup>	0.10
Information availability (1= if available, 0= if not)	- 185.76 <sup>*</sup>	68.55
Market location ( 1= Marsabit, 0= Nairobi)	245.94 <sup>*</sup>	73.58
Preference of animal type (1= if preferred, 0= if not)	203.27 <sup>*</sup>	79.15
Business period over 10 yrs	-182.72 <sup>**</sup>	97.87
<b>R-squared = 0.76</b>		
<i>Secondary traders</i>		
Buying price of animals	0.40 <sup>*</sup>	0.08
Number of animals purchased	0.28 <sup>***</sup>	0.17
Preference of animal type (1= if preferred, 0= if not)	208.38 <sup>**</sup>	101.32
Preference of animal traits (1= if preferred, 0= if not)	-456.63 <sup>**</sup>	209.99
Market location (1= Nairobi, 0= Marsabit)	303.50 <sup>*</sup>	92.36
<b>R-squared = 0.57</b>		

<sup>\*</sup>, <sup>\*\*</sup> and <sup>\*\*\*</sup> = significance at 1%, 5% and 10% respectively

### 3.6. Market performance

Results of the analysis on market performance are based on the two market channels. Analysis of gross margins aimed to assess the ability of traders to cover the market costs and analysis of net margins was intended to assess the profitability of marketing trade, and whether net returns constitute economic rent or normal profits.

Results in table 2 shows primary traders have a mean gross margin of Kshs 358.30 (equivalent of US\$ 5.3) per month, while secondary traders revealed a mean gross margin of Kshs 159.70 (US\$ 2.4) per month. Using opportunity cost as a benchmark, the study showed that primary traders receive a lower mean net margin of Kshs 15,071.40 (US\$ 221.6) per month compared to the opportunity costs of Kshs 61,285.70 (US\$ 901.3). Similarly secondary traders receive lower mean net margin of Kshs 27,264.60 (US\$ 400.95) compared to the opportunity costs of Kshs 38,791.20 (US\$ 570.5) per month. This could imply that the net returns received by traders in both primary and secondary channels are normal. On the other hand, higher nominal opportunity cost could mean that the trade returns are below normal. Considering returns per animal, primary traders receive a net margin of Kshs 288.90 (US\$ 4.2) per animal per month; secondary traders receive a net margin of Kshs 415.2 (US\$ 6.1) per animal. Considering returns to labour, primary traders' labour was presumed to equal a month's days since they operated on daily basis, thus mean net margin per man day was Kshs 502.40 (US\$ 7.4). Secondary traders' labour was calculated in terms of transported lorries. Assuming a trader takes

8 days to transport a lorry to the terminal market sell and travel back then the mean net margin per man day was Kshs 21,989.40 (US\$ 323.4).

The market situation of high concentration with low profits especially for secondary traders (who constitutes sellers) would indicate that the market is controlled by the buyers at the terminal market. This could explain the relatively small number of traders in the market. High costs involved in the market coupled with traders being price takers leads to less profit. This could indicate a non-attractive market for secondary traders, thereby reducing market entry. Accordingly existing traders could choose to leave the industry, but findings of the survey indicate that traders are limited by the capital requirements to enter into other industries. Traders also claim that they are not literate enough to venture into other businesses.

Table 2: Market costs and margins (in Kshs) by market agents.

Market agents/ Variables viewed	Mean	Std. Dev	Min	Max
<i>Primary traders</i>				
Gross margins	358.3	269.4	0	1,175
Trader's total costs per month	64,361.5	50,583.6	11,180	246,000
Net margins per month	15,071.3	19,366.3	-1,500	89,400
Net margins/animal	288.9	265.1	-30	1,131
Net margin/ man day (labour)	502.4	645.5	-50	2,980
Alternative business profits/ month	61,285.7	106,955.7	2,000	500,000
<i>Secondary traders</i>				
Gross margins	159.7	130.2	-625	491.7
Trader's total costs	104,353	127,699.4	10,451.67	919,833.3
Net margins per month	27,264.6	39,216.3	-63,558.3	234,666.7
Net margin/ animal	415.2	394.6	-2,007.1	1,420
Net margin/ man day (labour)	21,989.4	11,925.6	2,830.6	58,470.8
Alternative business profits/ month	38,791.2	70,105.1	0	333,333.3

#### 4. Conclusions and recommendations

Compared to small ruminants, the population of large ruminants in the study area can be said to be very small. Thus the small ruminants are a major component of the pastoral population's household economy.

Results show that both primary and secondary traders operate in an imperfect market, controlled by buyers. Buyers exercise market control influencing pricing decisions, especially at the terminal market, meaning that sellers (traders) are absolute price takers. Based on the benchmark opportunity cost of traders the results show an absence of economic rent since in both channels net margins are lower than the opportunity cost. Yet in an imperfect market situation of sellers, we would expect to find that profits are above normal.

The study was part of a larger study that aims to improve the livelihoods of poor livestock keepers who depend highly on indigenous small stock. The proposed improvement was to be achieved through the community-based management of indigenous breeds. The findings of this study suggest that part of such interventions should focus on marketing issues and, in particular, improving the market infrastructure from the very interior areas of the district to the terminal market in Nairobi is important. One such means of improving market infrastructure would be to elevate the market at the district head quarters to a secondary market to serve as a second collection point for animals. This would call for an enabling environment to increase the market size in terms of both volume transacted and/ or number of traders. Increase in market size can be encouraged through providing facilities such as water, roads, grazing ground around the market. Provision of such facilities could be done by the government which would help support value addition to these animals through change of ownership along the market channel and raise prices for both producers and primary traders who would be walking the animals to this market. In addition improving transport infrastructure, would reduce lorry transport costs (among others), consequently reducing entry barrier. This would encourage entry of potential traders to become more competitive leading to increases in incomes for pastoral communities, since the majority of traders are pastoralists themselves. In order to achieve such transport cost reductions the government needs to invest in better road networks, especially since the district does not have a single tarmacked road.

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