Is Settling Good for Pastoralists?

The Effects of Pastoral Sedentarization on Children’s Health, Nutrition, and Growth in Northern Kenya

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Abstract

• Three-year study compares levels of malnutrition and illness between five different Rendille communities ranging from pastoral to settled in Marsabit District Kenya. In particular compared drought to normal year

• Settled children showed significantly higher levels of stunting than children in nomadic pastoral community

• Settled children and women showed higher rates of respiratory and diarrheal diseases than nomads

• Malaria rates were uniformly higher in lowland communities than in the highlands

• Policies should be directed at improving livestock and protein crops in settled communities, and delivering health and veterinary care to nomads.
Pastoralism

Economic dependency (>50%) on domestic livestock (cattle, camels, goats, sheep, horses, etc.) for food, transport, and trade, where households often move with their animals in search of pasture and water.
Adaptation to Arid Lands

- Allows humans to survive in environments where agriculture is marginal or not possible

- Uses livestock to convert patchy and scarce vegetative resources into food and products for human population – milk, meat, hides, wool, etc. blood

- Provides surplus for trade and social obligations
Pastoralism requires mobility

- Animals must be provided pasture, water, salt
- Animals must be protected from insect vectors, predators, disease and theft
- Movements must adjust to seasonal, climatic, or social/political changes
Location of Rendille, Ariaal, and Samburu Pastoralists
Northern Kenya
Pastoral Nutrition

- Diet based on livestock products - milk, meat products, and cereals acquired by trading animals

- Milk accounts for 30-66% of diet, but highly seasonal

- Diets are protein rich, high in vitamins A and C, but calorie poor, ranging from 1080-1350 kcal per person per day

- Undernutrition highest in adolescents and women due to high work loads and poorer nutrition compared to adult men (Sellen 1996)
Milk provides 30-66% daily pastoral diet
Daily milk consumption per person among settled and nomadic Rendille, bi-monthly 1994-1997
Health and Disease
Kenya Health Statistics - Children

Infant Mortality Rate 78.0/1000 (2004)


Deaths among children under five years of age due to neonatal causes 24.2% (2000)

- Pneumonia 19.9%
- Diarrhea 16.5%
- HIV/AIDS 14.6%
- Malaria 13.6%
- Measles 3.2%
- Injuries 2.7%

World Health Organization 2006
Statistical Information System (WHOSIS)
Health and disease among pastoralists

- High rates of malaria, STDs, accidents
- Contagion from livestock contact including anthrax, trachoma, brucellosis, tuberculosis
- Reduced risks of ‘settled’ diseases – measles, cholera, worm loads
- Poor access to health clinics, medicines, and vaccinations

(Sheik-Mohamed and Velema 1999)
CURRENT PROBLEMS FACING EAST AFRICAN PASTORALISTS

- Population Growth
- Drought and Famine
- Loss of Grazing Lands
- Privatization of Land and Water
- Political Insecurity
- Sedentarization
- Urban Migration
The pulls of and pushes towards sedentarization

**Pushes:**
- Drought, loss of animals
- Impoverishment
- Political insecurity
- Theft and war

**Pulls:**
- Access to social services, medical care, schools
- Access to wage jobs
- Access to famine relief foods
- Access to agricultural resettlement schemes
- Police and physical security
Sedentarization is neither absolute nor a one-way process

- Social and economic ties maintained between settled and nomadic communities
- Agricultural farms and towns viewed as additional resources and new opportunities for diversification
- Sedentary communities absorb poorer and richer members of nomadic community
### Pastoral Kenya - North versus South

#### North and Northwest
- Low rainfall (< 250mm)
- Low pop density
- Camels, small stock
- Low agricultural potential
- Poor proximity towns, roads
- Little subdivision
- Few or no game parks

**Turkana, Rendille, Somali, Boran, Gabra**

#### Central and South
- Higher rainfall (> 500 mm)
- Higher pop density
- Cattle pastoralism
- Higher agr. potential
- Better access roads, towns
- Group ranches, privatization
- Proximity to large game parks

**Maasai, Samburu, LChamus, Uasin Gishu, Pokot**
Marsabit District
138,000 people occupying 75,078 sq. km (1993)

- Until 1970s made up predominately of pastoralists including Rendille,
- Gabra, and Boran
By 1990s, 50% Marsabit's pastoralists settled

- Songa scheme - highlands
- Korr town - lowlands
- Karare town - highlands
- Laisamis town - lowlands
Benefits of Settling

Education, wage jobs, commerce

Access to health care

Food security

Physical security
Development of new roles: Women’s self-help organization in Korr
Costs of settling

- Idle youth
- Poor housing
- Decline in moral economy
- Disease risks
- Changes in belief and customs
Research Question

What are costs and benefits in health and nutrition to women and children from pastoralist families - those most at risk - from settling?

As measured by
- Nutritional indices
- Morbidity change
- Economic indices
Study Sample

205 Women and their 488 children under 6 (< 9) years in five Rendille communities
Study design:

Bimonthly surveys over three years (1994-1997)

- Dietary recalls
- Anthropometric measurements
- Morbidity reports
- Height and weight measurements
- Demographic change (fertility, mortality, migration)
- Economic activities
Study Sites in Northern Kenya

- **Lewogoso** – nomadic herding community
- **Karare** – settled w/ cattle near capital
- **Songa** – agricultural scheme
- **Korr** – famine relief town
- **Ngrunit** – isolated town
1. Lewogoso - Nomadic pastoral community
2. Korr – A Famine Relief Town
3. Songa - Agricultural Scheme on Marsabit Mountain
4. Karare- Agro-pastoral community on major road 17 km south of Marsabit town
5. Ngrunit – isolated agro-pastoral community in the Ndoto Mountains
Morbidity and nutrition data
Collected bimonthly interviews and survey data from each mother in five communities between Jun 1994 - Sept 1997

- How many days in past 30 did her child experience diarrhea, fever and/or respiratory illness
- Dietary recalls of each mother and child in last 24 hours
- Anthropometric measurements of women and children for height, weight, head circumference, upper mid arm circ., triceps skin fold
- Examined outpatient records at Marsabit had Laisamis Hospitals for clinics at Korr, Ngrunit, Songa, and Karare
- Rainfall data from KARI in Marsabit town 1994-1997
Measuring, heights, weights, triceps skin folds, upper mid-arm circumferences
Bimonthly surveys of social, economic, and health information for each household in study
Results

Growth and Nutrition -
Children’s anthropometric data
Result

Pastoral children were uniformly taller and heavier in all age groups than children from the sedentary villages.
Measures of malnutrition weight-for-age, pastoral versus sedentary, wasting defined as below -2 Z scores.
ANALYSIS AND RESULTS

WEIGHT-FOR-AGE Z-SCORES, ALL FIVE COMMUNITIES

AGE INTERVALS MONTHS

0-11 12-23 24-35 36-47 48-59 60-71

Z-SCORES

LEWOGOSO NGURNIT SONGA KARARE KORR
Result

Nomadic children in all age groups were far less likely to suffer wasting and/or stunting than sedentary same-aged counterparts. In fact settled children showed three times the level of malnutrition and stunting.
Measures of malnutrition for height-by-age, pastoral versus sedentary samples, stunting defined as below –2 Z-scores.
Result

- Illness and poverty negatively affected weight-for-age throughout the study period.
- But most prominently access to milk positively influenced weight for children throughout the study period.
ANALYSIS AND RESULTS

GEE RESULTS WEIGHT-FOR-AGE, ALL CHILDREN, TOTAL STUDY PERIOD

Z-VALUES

ILLNESS***
WEALTH-POOR***
MILK***
SEX-MALE
Consumption of milk over study period, Pastoral versus Sedentary
Access to milk is principle defense against malnutrition
Health and Illness

Health Clinic at Ngrunit
Result

Nomadic children have less respiratory, fever, or diarrhea overall than any of 4 settled communities.

Average days ill for children in the nomadic pastoralist communities only twice in 17 periods exceeded that in the sedentary communities.
Morbidity
Days ill over study period, pastoral versus sedentary samples, means and standard errors of the means

![Graph showing average days ill over study period for pastoral versus sedentary samples, with error bars for each month (January to January)].
Compare ‘normal’ year 1995 to ‘dry’ year 1996
Monthly Rainfall in Marsabit District, 1995-97
Morbidity Days/Child

Normal year 1995, by location

Morbidity Days/Child 1995 by Village

Mean Morbidity Days/Child

Village

Korr
Lewogoso
Ngurunit
Songa
Karare

Diarrhea Days
Fever Days
Cold Days
Morbidity Days/Child
Drought Year 1996, by location
Analysis of GEE Parameter Estimates, Analysis of GEE Parameter Estimates, Sedentary Communities versus Lewogoso, “normal year” 1995 (n=2186)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
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<th>Prob.</th>
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Analysis of GEE Parameter Estimates, Analysis of GEE Parameter Estimates, Sedentary Communities versus Lewogoso, “dry year” 1996 (n=1850)

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Clinic Data: Diarrhea, Respiratory Diseases and Malaria by Clinic, “Normal Year” 1995

Diarrhea, Respiratory Diseases and Malaria by Clinic 1995

- Karare
- Marsabit
- Njurunit
- Korr
- Laisamis

% Total Clinic Visits

- Diarrhea
- Malaria
- Respiratory

Clinic Site
Clinic Data: Diarrhea, Respiratory, and Malaria by Clinic, “Dry Year” 1996

Diarrhea, Malaria and Respiratory Diseases by Clinic 1996

<table>
<thead>
<tr>
<th>Clinic Site</th>
<th>1996 Diarrhea</th>
<th>1996 Malaria</th>
<th>1996 Respiratory</th>
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<td>Karare</td>
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<td>30.00%</td>
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<tr>
<td>Marsabit</td>
<td>20.00%</td>
<td>50.00%</td>
<td>10.00%</td>
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<tr>
<td>Ngurunit</td>
<td>30.00%</td>
<td>40.00%</td>
<td>10.00%</td>
</tr>
<tr>
<td>Korr</td>
<td>40.00%</td>
<td>30.00%</td>
<td>10.00%</td>
</tr>
<tr>
<td>Laisamis</td>
<td>50.00%</td>
<td>20.00%</td>
<td>10.00%</td>
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Malaria - Health Clinic Records

- Records of five health clinics show ‘fever’ (includes malaria) higher in all lowland than highland locations, higher in normal versus drought year

<table>
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<tr>
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<th>1995</th>
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<td>Ngrunit</td>
<td>3530</td>
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<td>5604</td>
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Malaria: Highland, Dry Lowland, Ngurunit by Year

Clinic Locations

Highland
Low land
Ngurunit

% Total Visits per Year

1995
1996
Pastoralists had fewer illnesses than settled children (fevers, respiratory, diarrhea) despite lack of access to health care interventions and vaccinations

Marty Nathan administers Polio vaccine in Lewogoso
Conclusions

• Rendille pastoralist children are heavier and taller than settled children. The main factor in the difference seems to be lack of access to milk in settled communities.

• There is an increase risk of disease -- particularly diarrhea and colds -- among all settled children. This may reflect synergy with malnutrition.

• Climatic and geographic aspects of settlements – altitude and rainfall -- affect respiratory and malarial morbidity.
Children from settled community of Karare
Is Settling Good for Pastoralists?

• Pastoralism is an adaptation to arid lands. With sufficient herd size, it provides regular and adequate food and income to human population

• But not everyone can make it as a pastoralist - sufficient numbers of animals are needed

• Farms and towns are important options for poor pastoralists, but improvements must be made in children’s nutrition
We encourage development agencies to

- Reinforce pastoral livestock economy and access to health care

- Ensure that settled women and children have improved access to protein, secure food supply, and access to health care
For a safe and healthy life, both nomads and settled alike