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

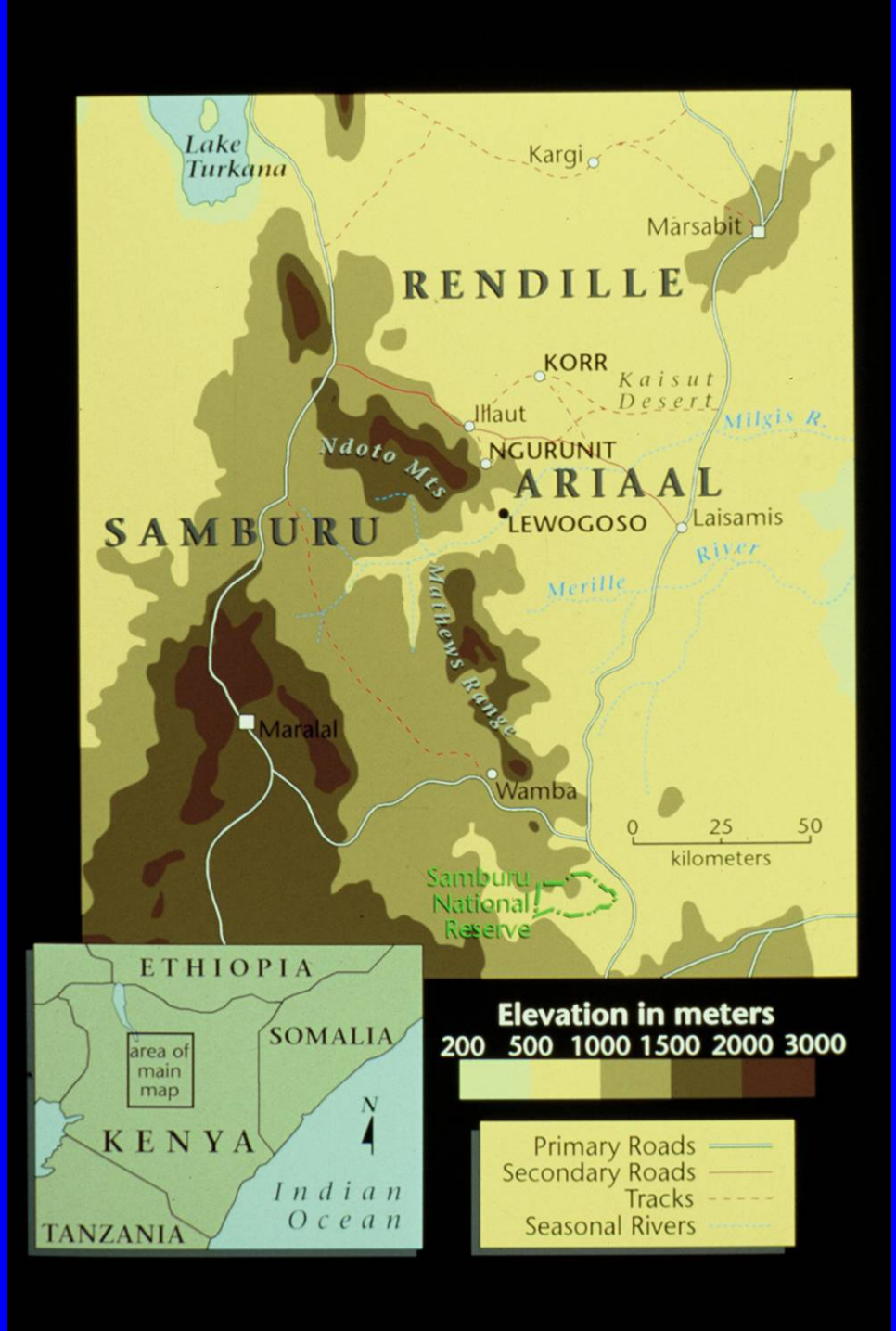
Pastoralism requires mobility

- **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**

PASTORALISTS OF AFRICA

EAST-AFRICAN PASTORALISTS

Deasy GeoGraphics
Penn State

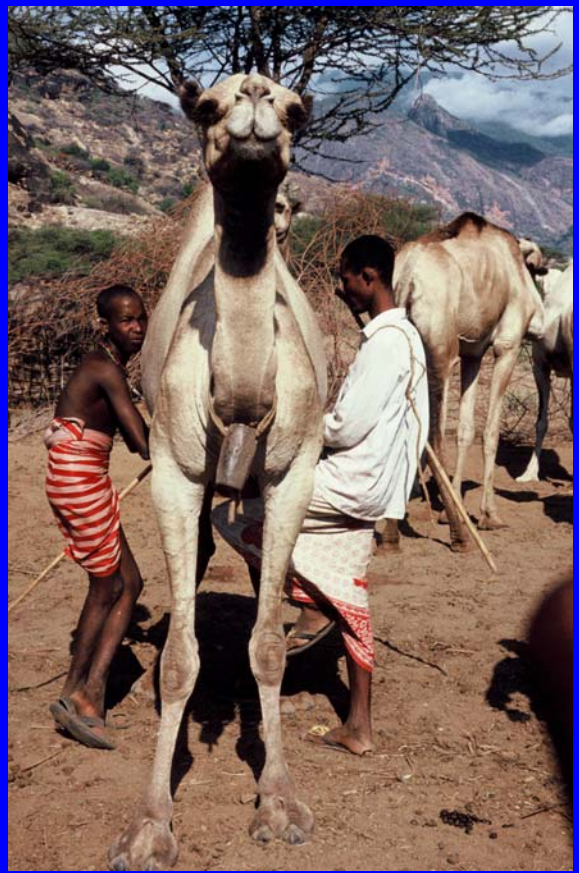


Location of Rendille, Ariaal, and Samburu Pastoralists Northern Kenya

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

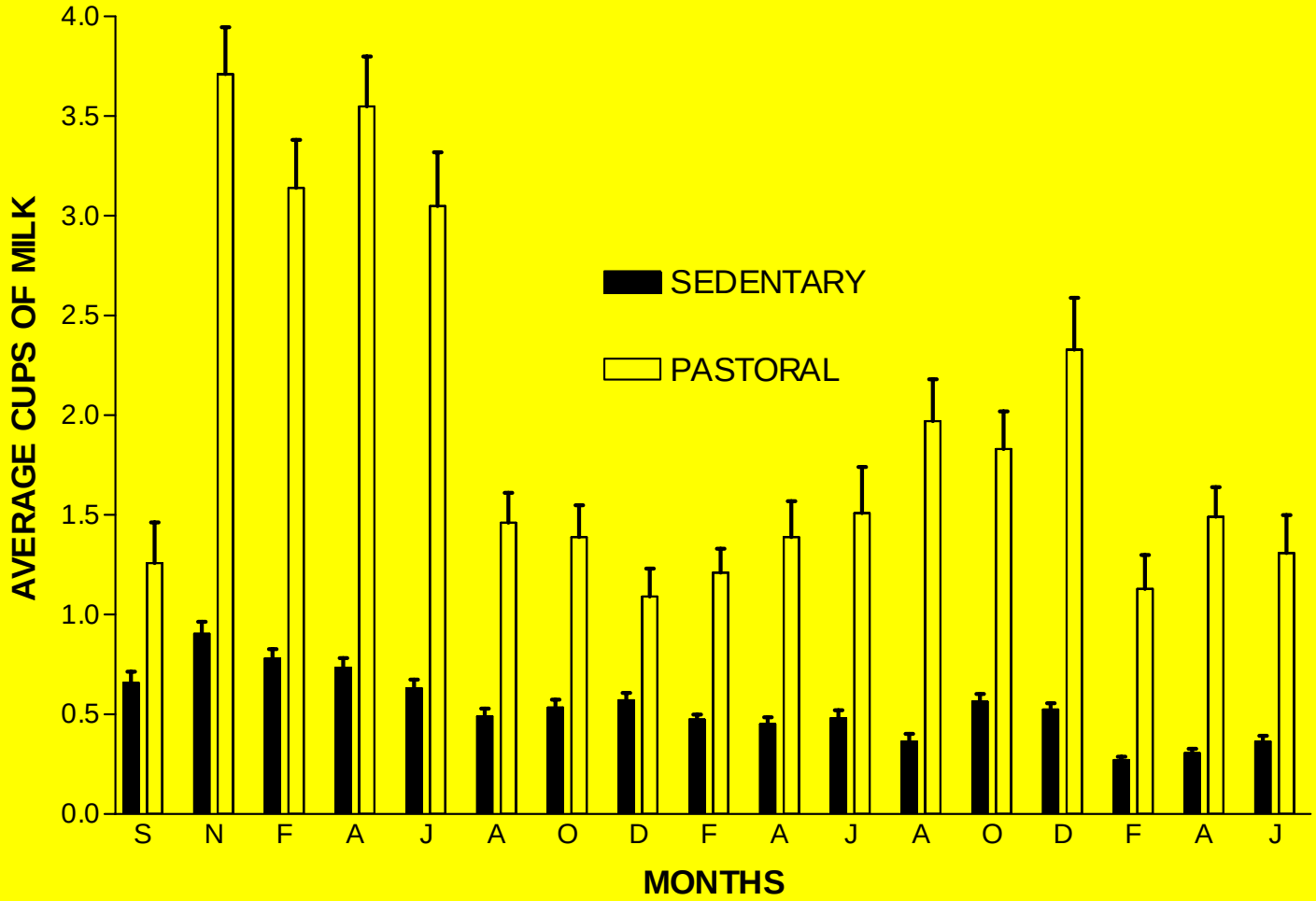


Ariaal Rendille

Maasai

Turkana

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)

Under-5 mortality rate **urban 117, rural 94** (2003)

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

Drought and famine (1971-73, 1982-1984, 1992, 1996) led to increased settlement

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

Disease risks

Decline in moral economy

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

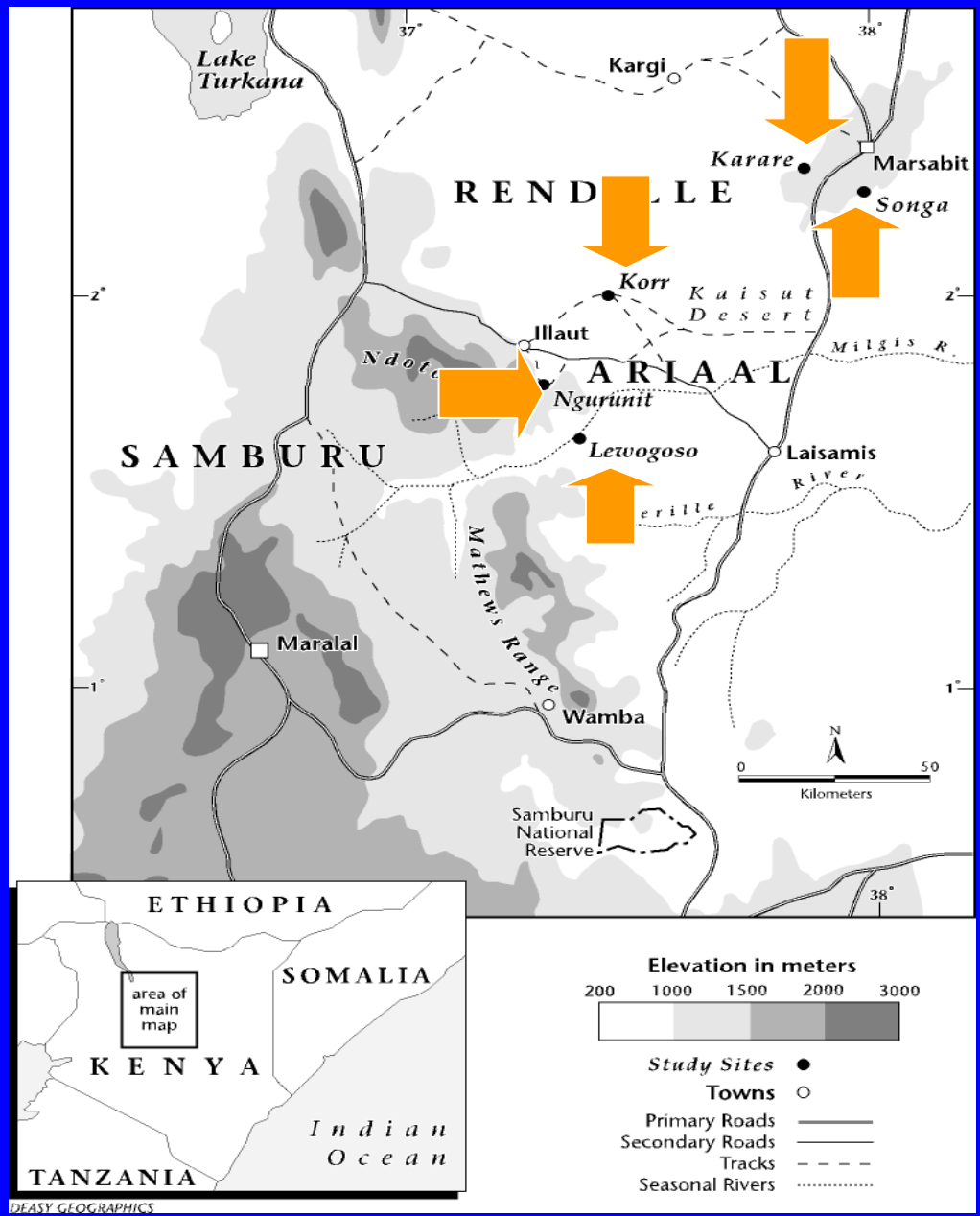
Study design:

Bimonthly surveys over three years (1994-1997)

- **Dietary recalls**
- **Anthropometric measurements**
- **Morbidity reports**
- **Height and weight measurements**
- **Demographic change (fertility, mortality, migation)**
- **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

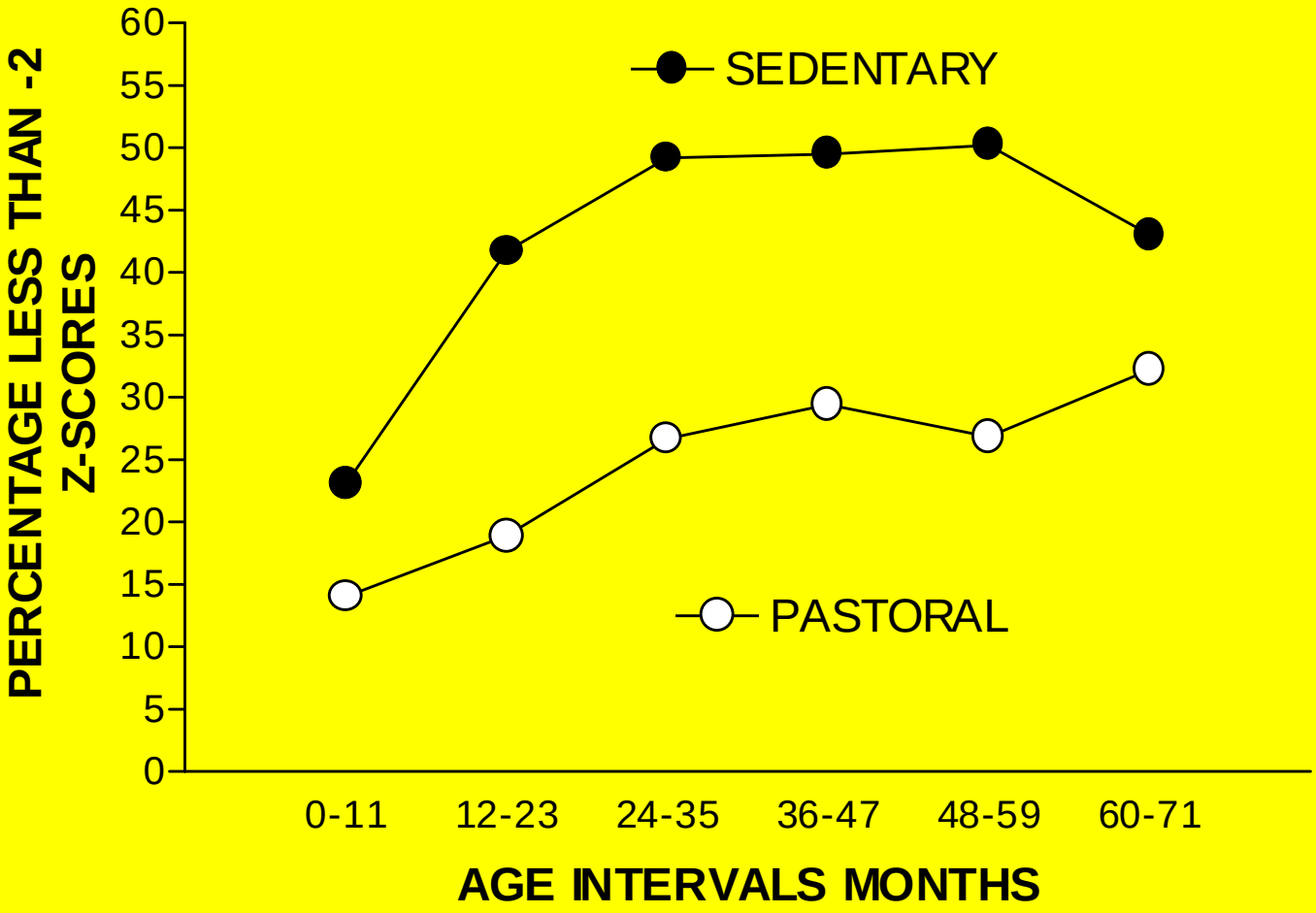
Bimonthly surveys of social, economic, and health information for each household in study

Results
Growth and Nutrition - Children's anthropometric data

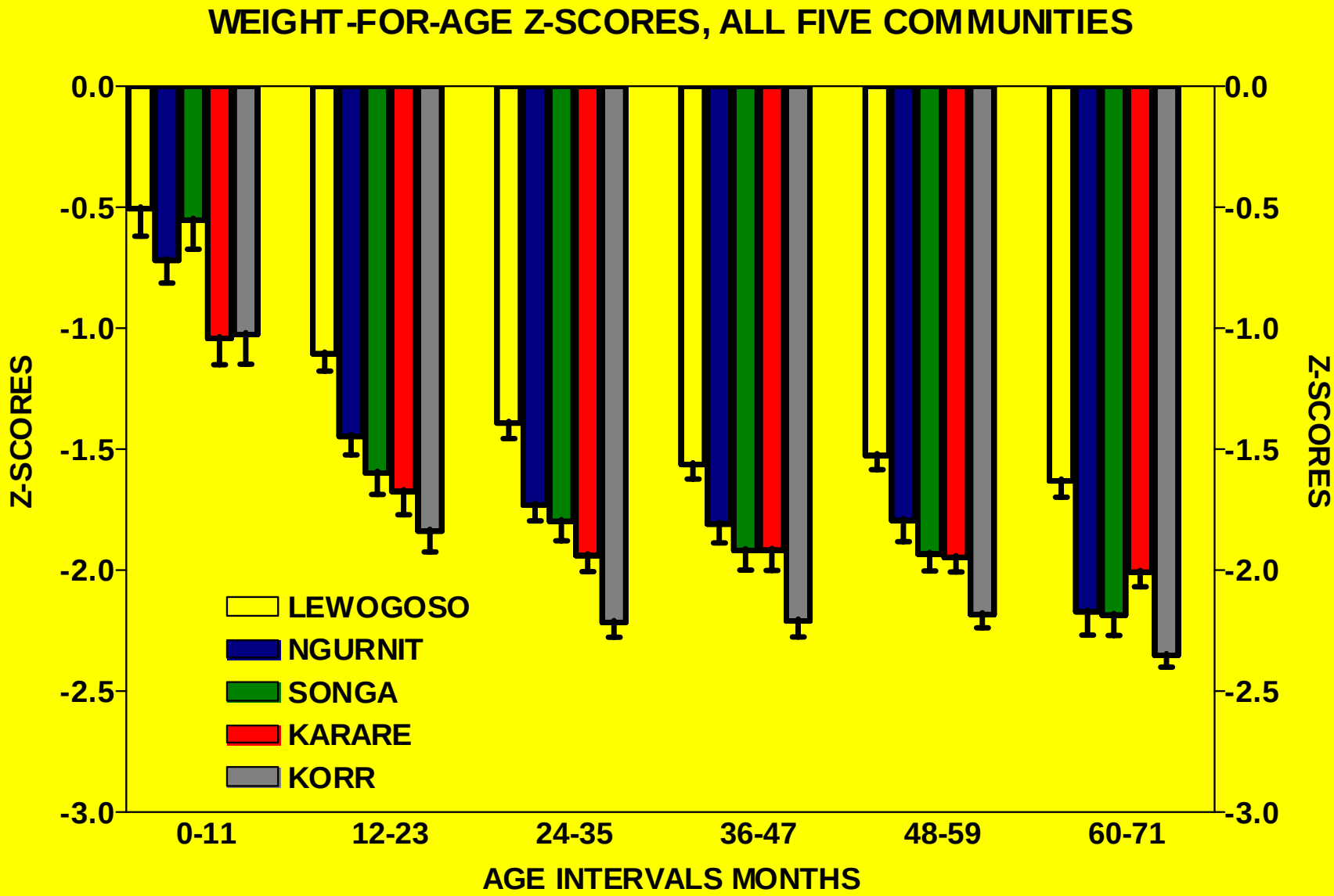
Result

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

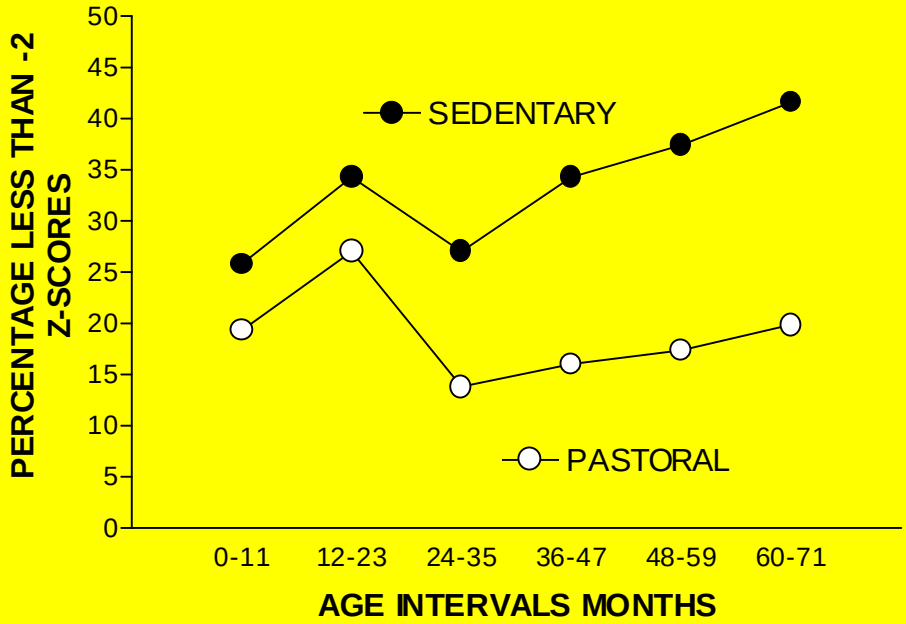


Result

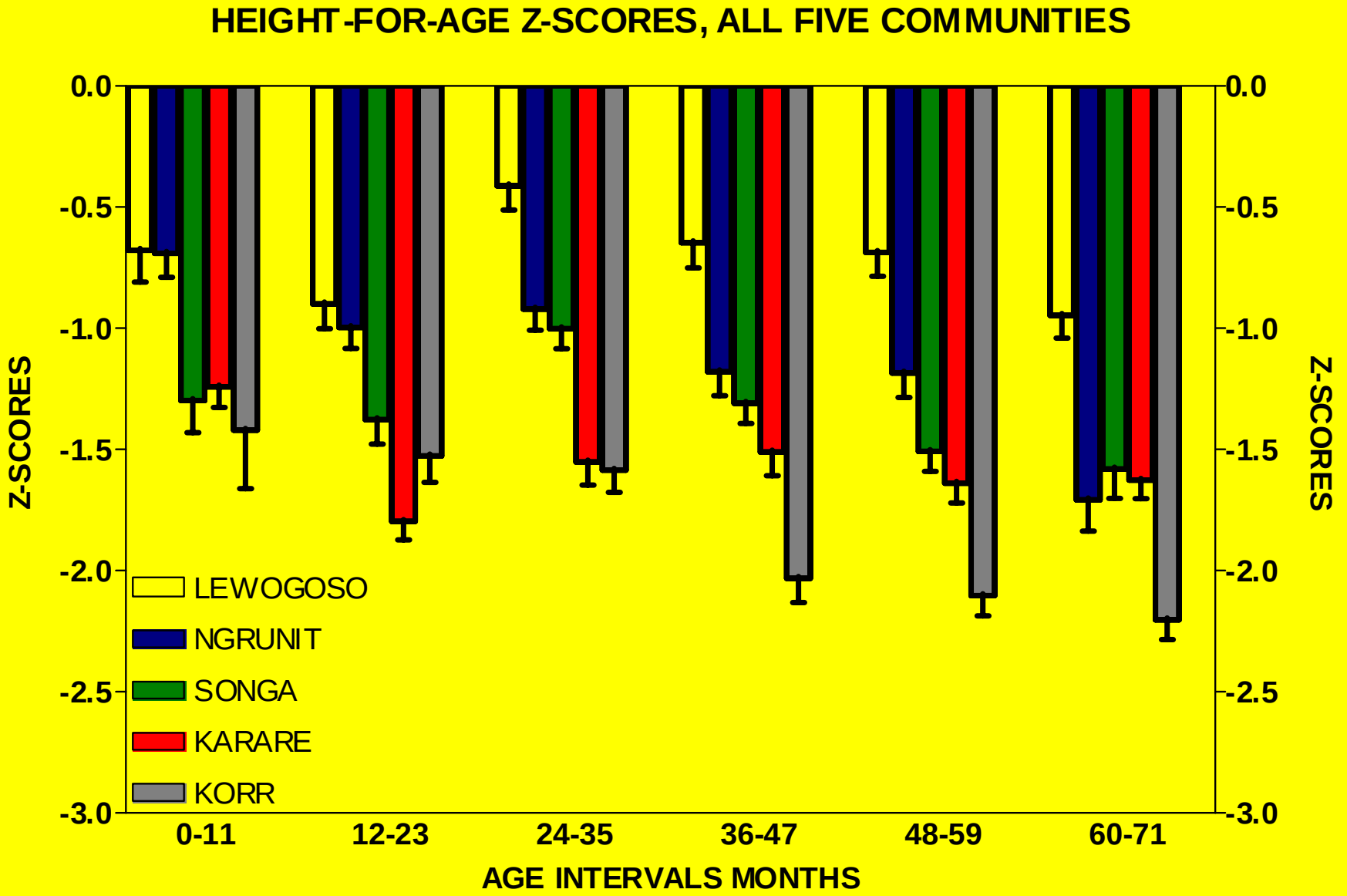
Nomadic children in all age groups were far less likely to suffer wasting and/or stunting than sedentary same-aged counterparts.

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



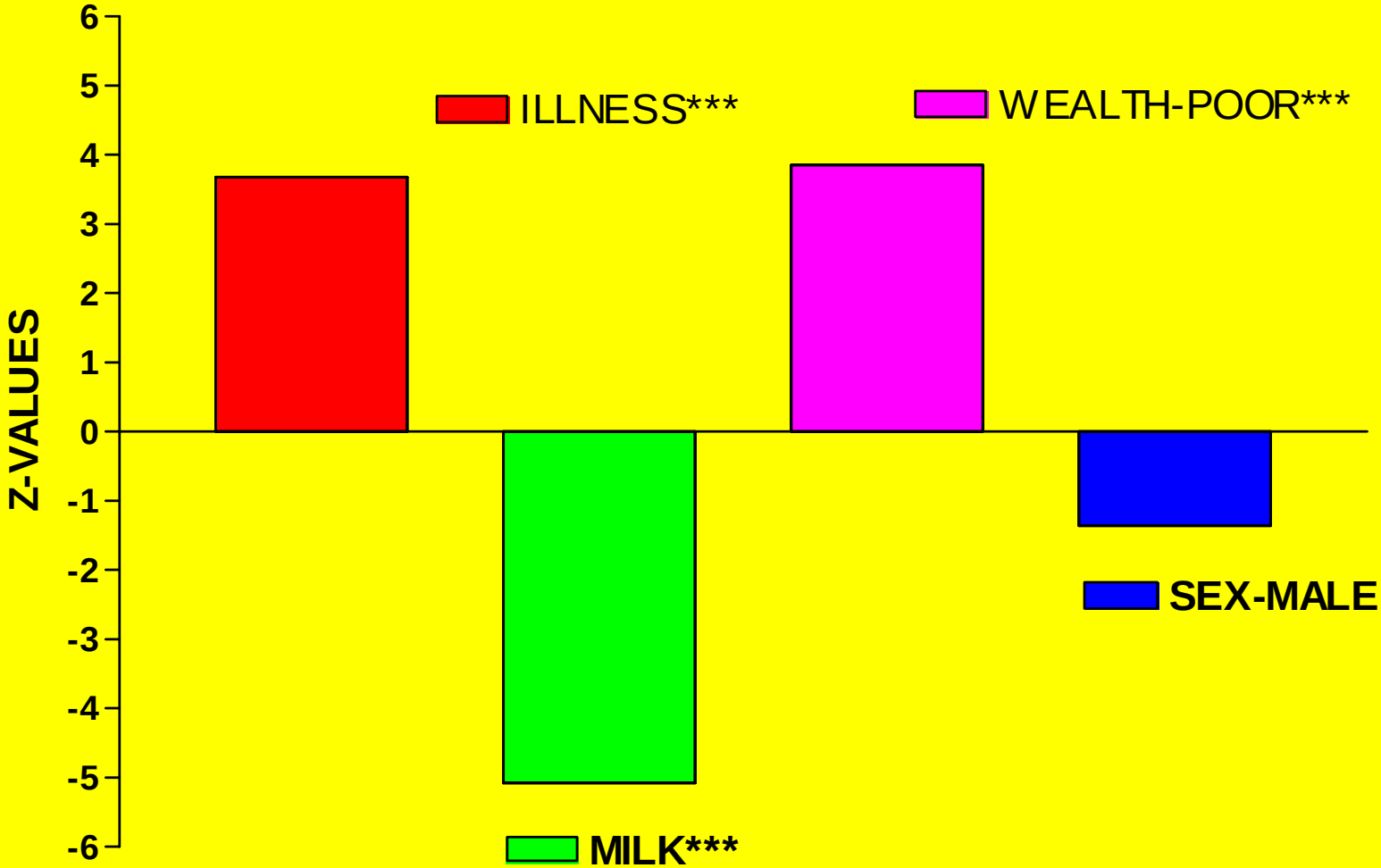
ANALYSIS AND RESULTS



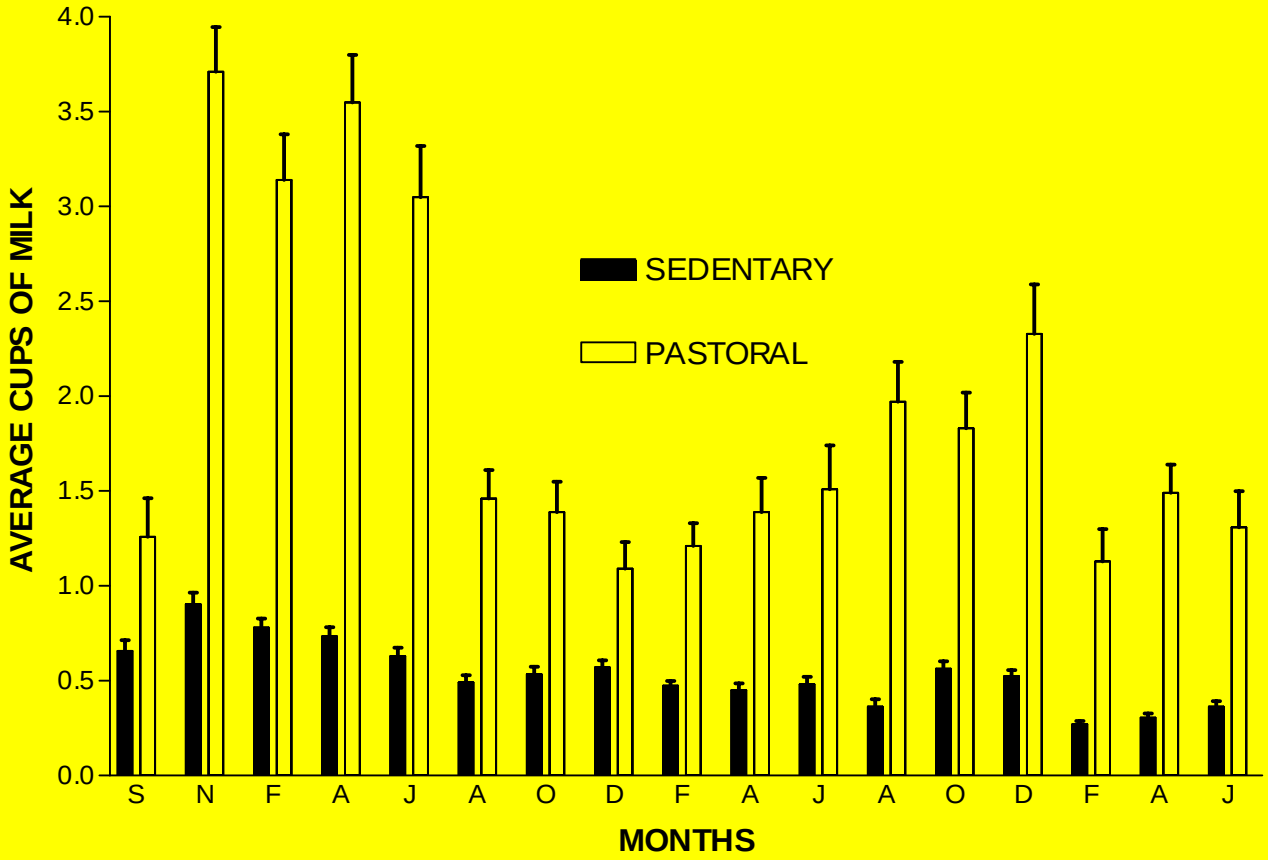
Result

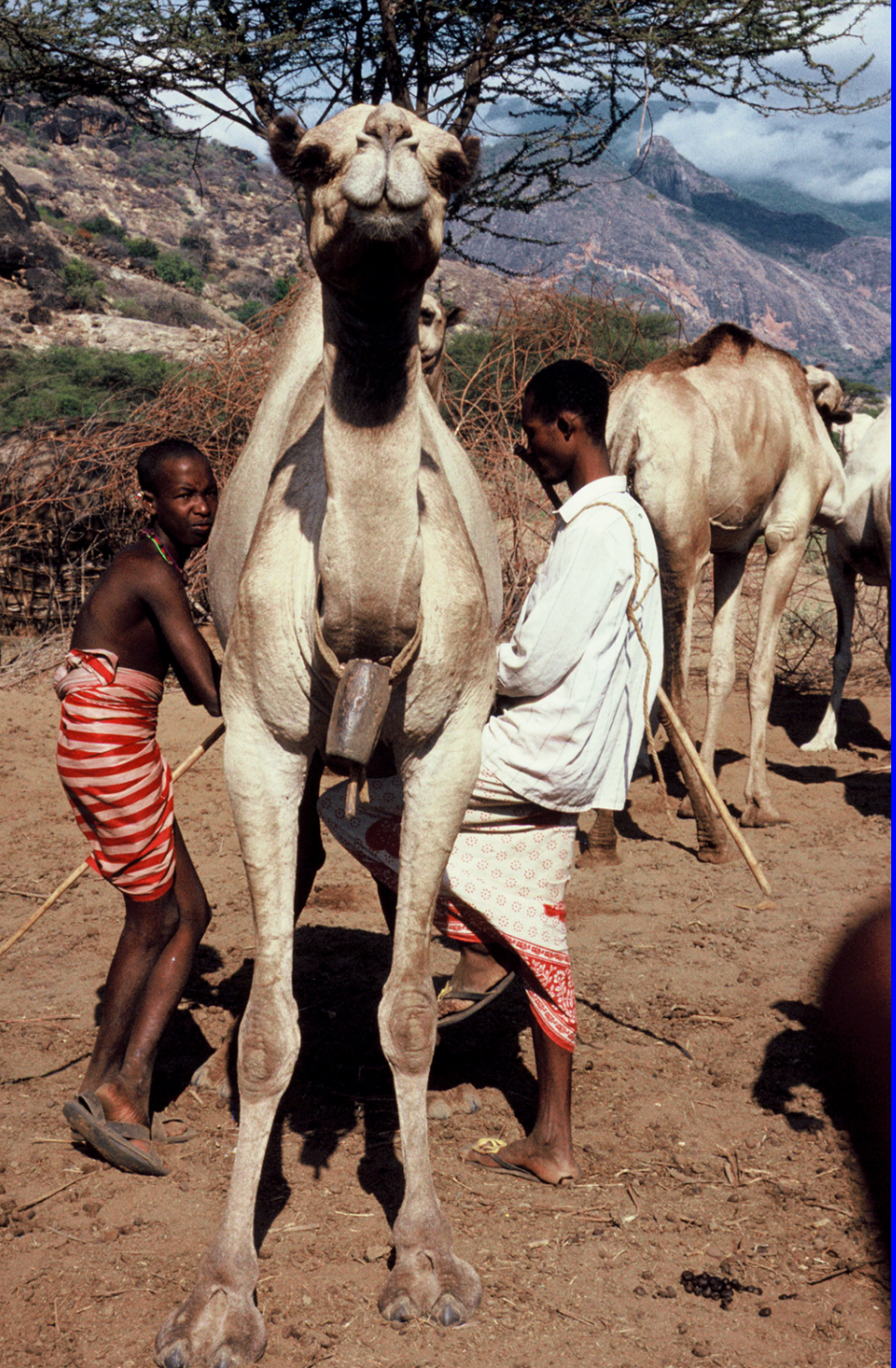
- **Illness and poverty negatively affected weight-for age throughout the study period**
- **But most prominently access to milk positively influenced weight for children throughout the study period**

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



Consumption of milk over study period, Pastoral versus Sedentary





Access to milk is principle defense against malnutrition

Health and Illness

Health Clinic at Ngrunit

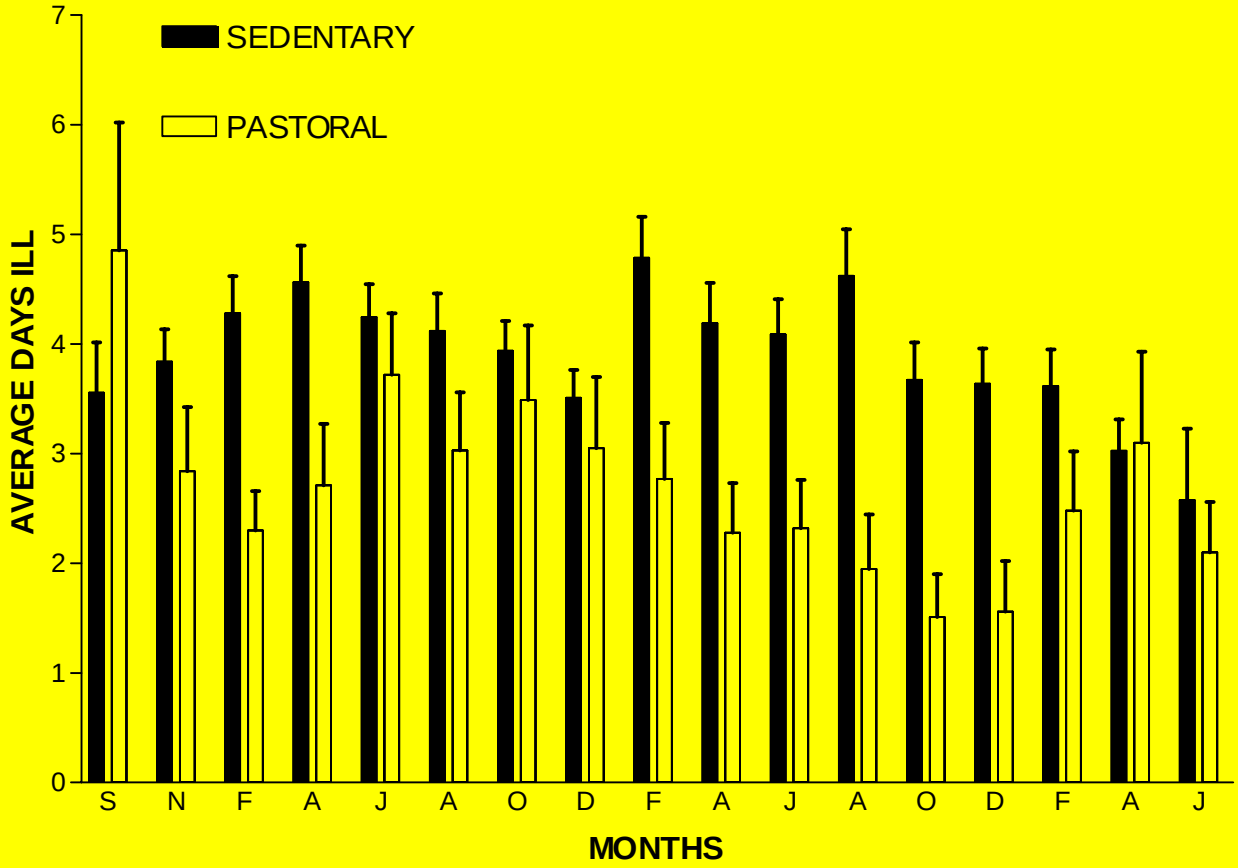
Result

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

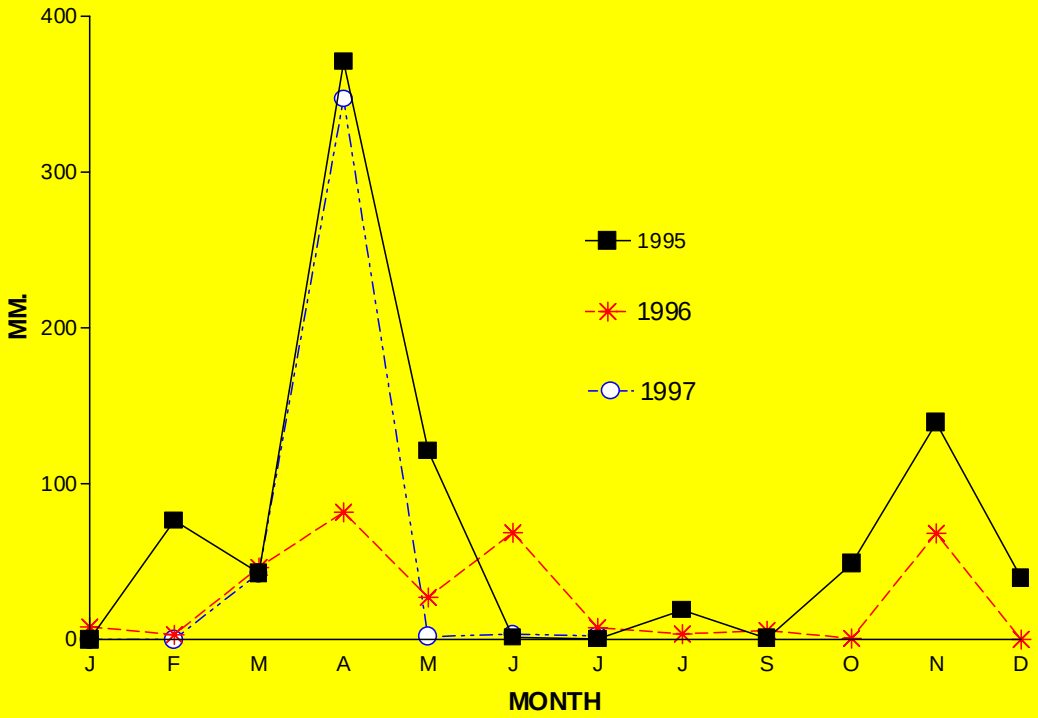
Morbidity

Days ill over study period, pastoral versus sedentary samples, means and standard errors of the means



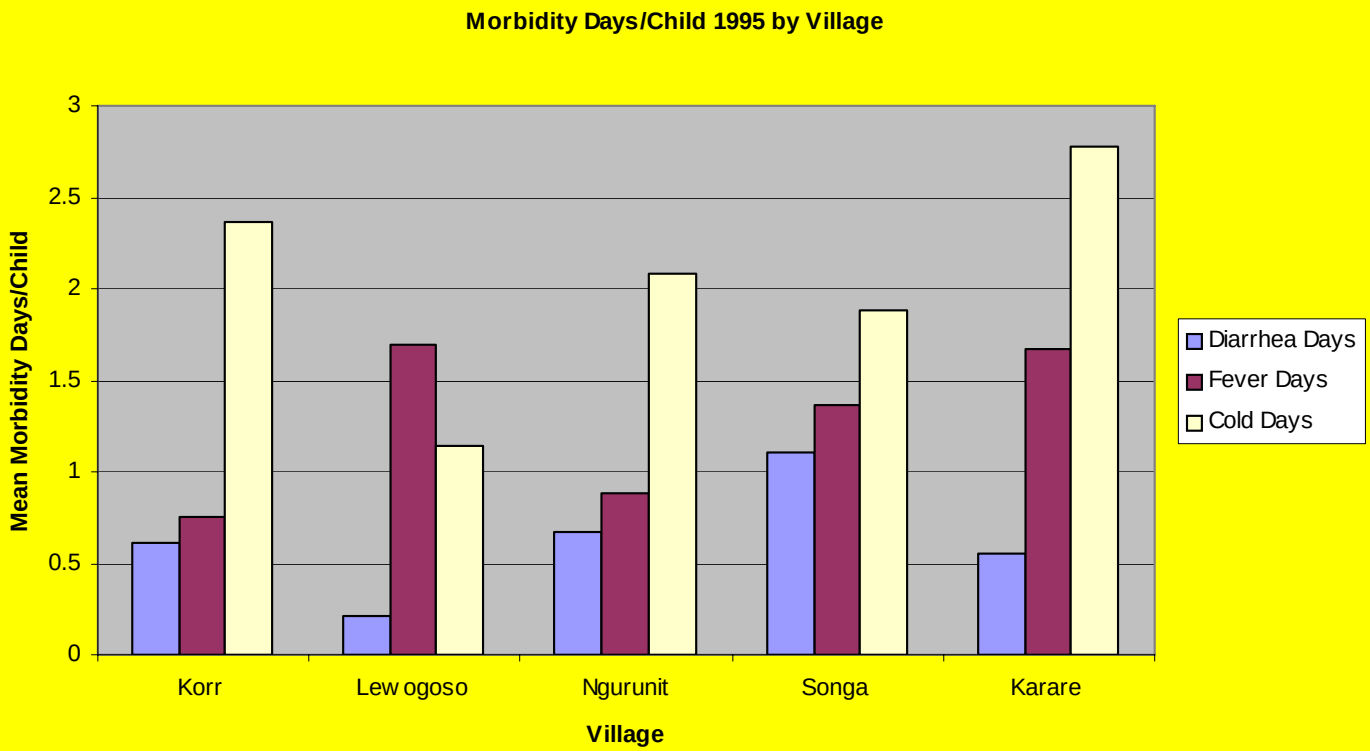
Compare ‘normal’ year 1995 to ‘dry’ year 1996

Monthly Rainfall in Marsabit District, 1995-97

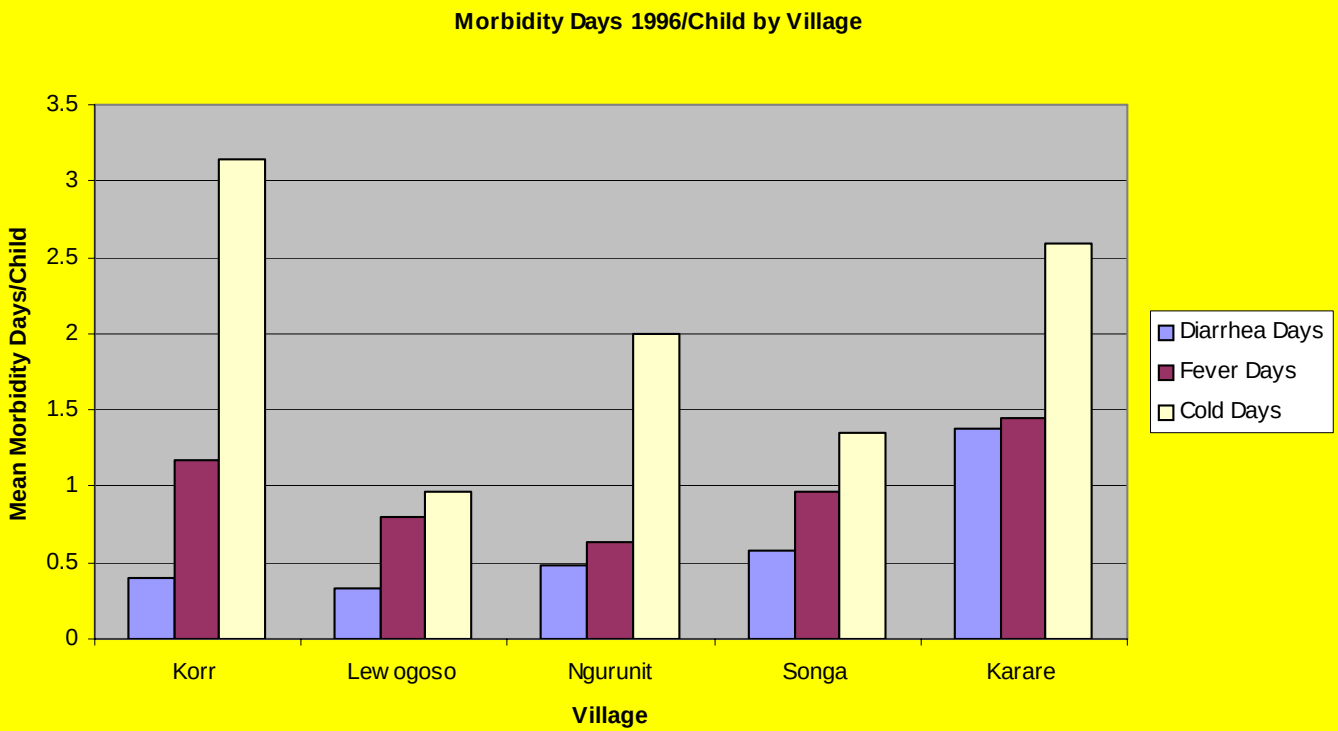


Morbidity Days/Child

Normal year 1995, by location



Morbidity Days/Child
Drought Year 1996, by location



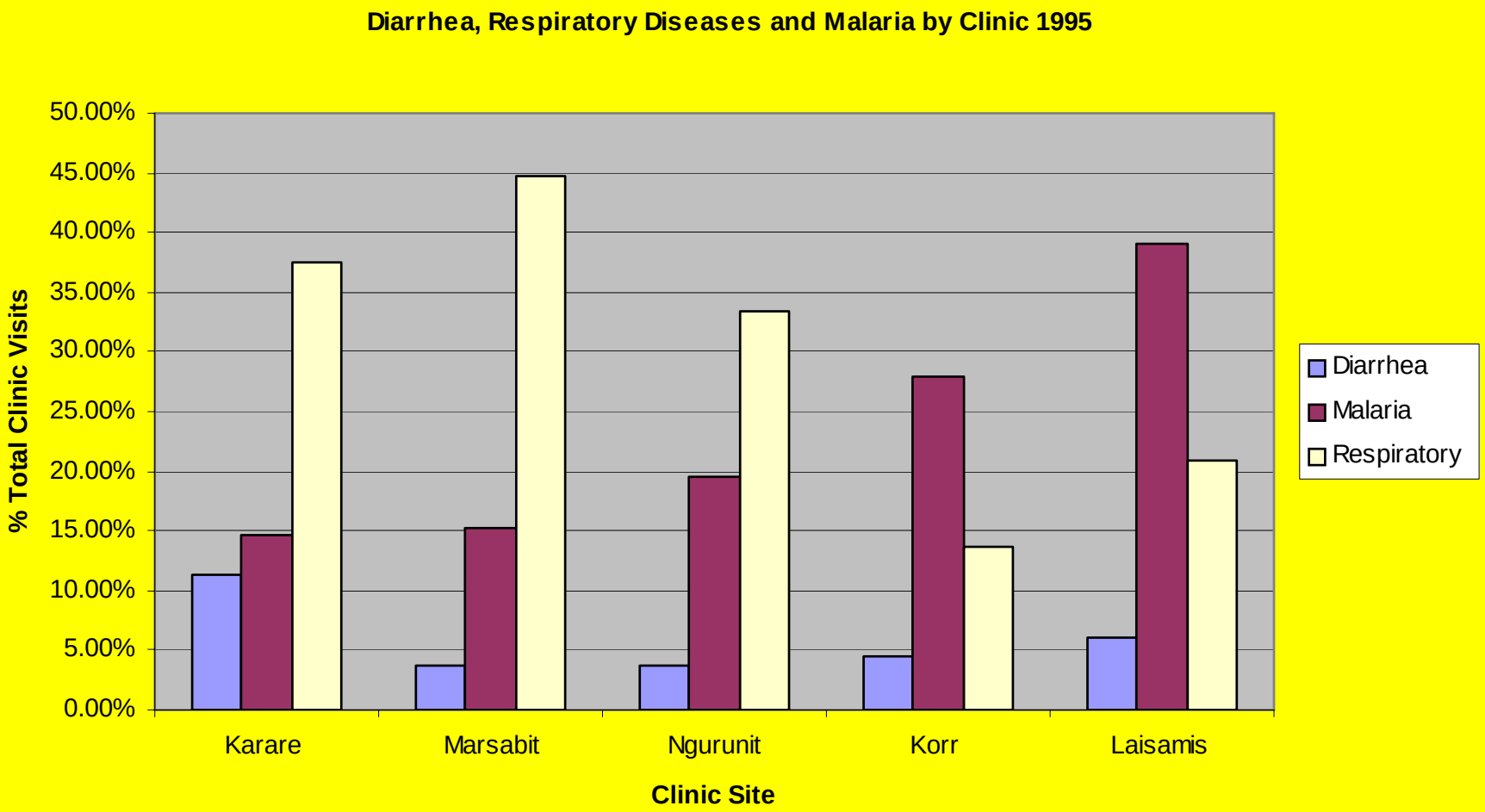
Analysis of GEE Parameter Estimates, Analysis of GEE Parameter Estimates, Sedentary Communities versus Lewogoso, “normal year” 1995 (n=2186)

Parameter	Estimate	Std Err	Z	Prob.
INTERCEPT	1.1550	0.1397	8.27	<0.0001
DIARRHEA *	0.2839	0.0777	3.65	0.0003
COLDS *	0.1739	0.0412	4.22	<0.0001
FEVER *	-0.1046	0.0248	-4.23	<0.0001

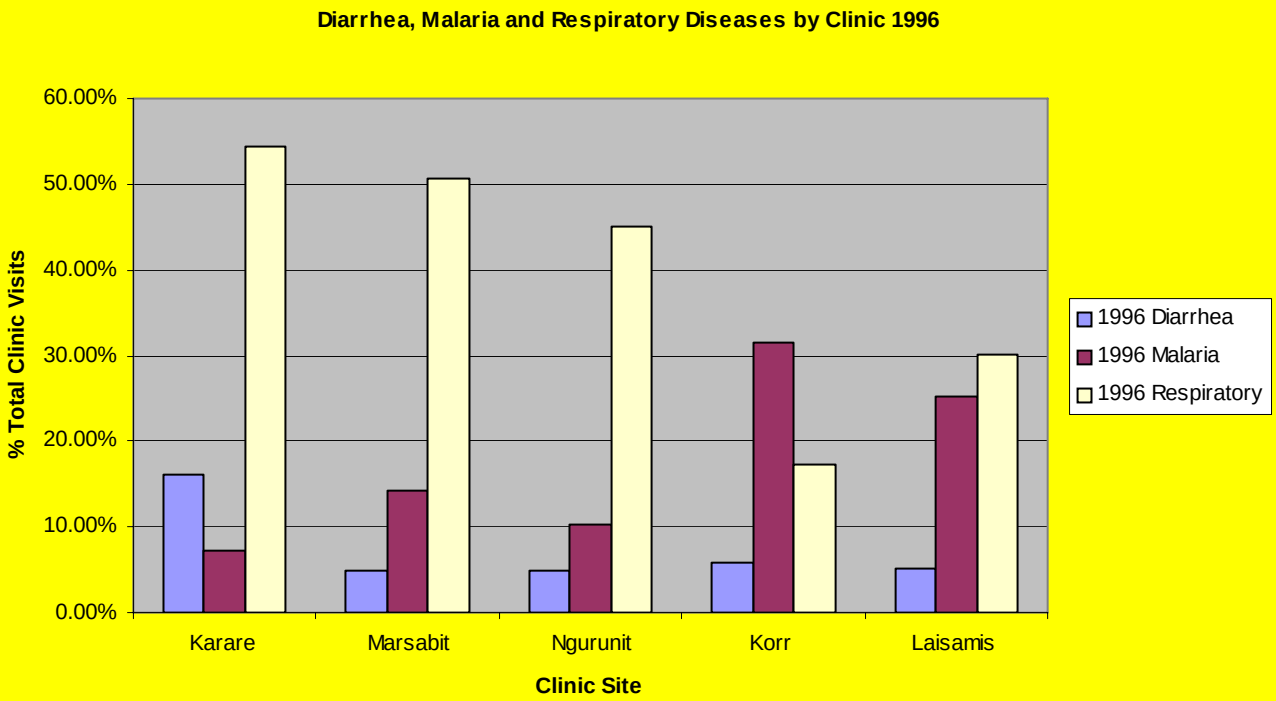
Analysis of GEE Parameter Estimates, Analysis of GEE Parameter Estimates, Sedentary Communities versus Lewogoso, “dry year” 1996 (n=1850

Parameter	Estimate	Std Err	Z	Prob.
INTERCEPT	1.1100	0.1490	7.45	<0.0001
DIARRHEA	0.1263	0.0554	2.28	0.0228
COLDS *	0.1816	0.0362	5.01	<0.0001
FEVER	-0.0182	0.0382	-0.48	0.6340

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



Clinic Data: Diarrhea, Respiratory, and Malaria by Clinic, "Dry Year" 1996

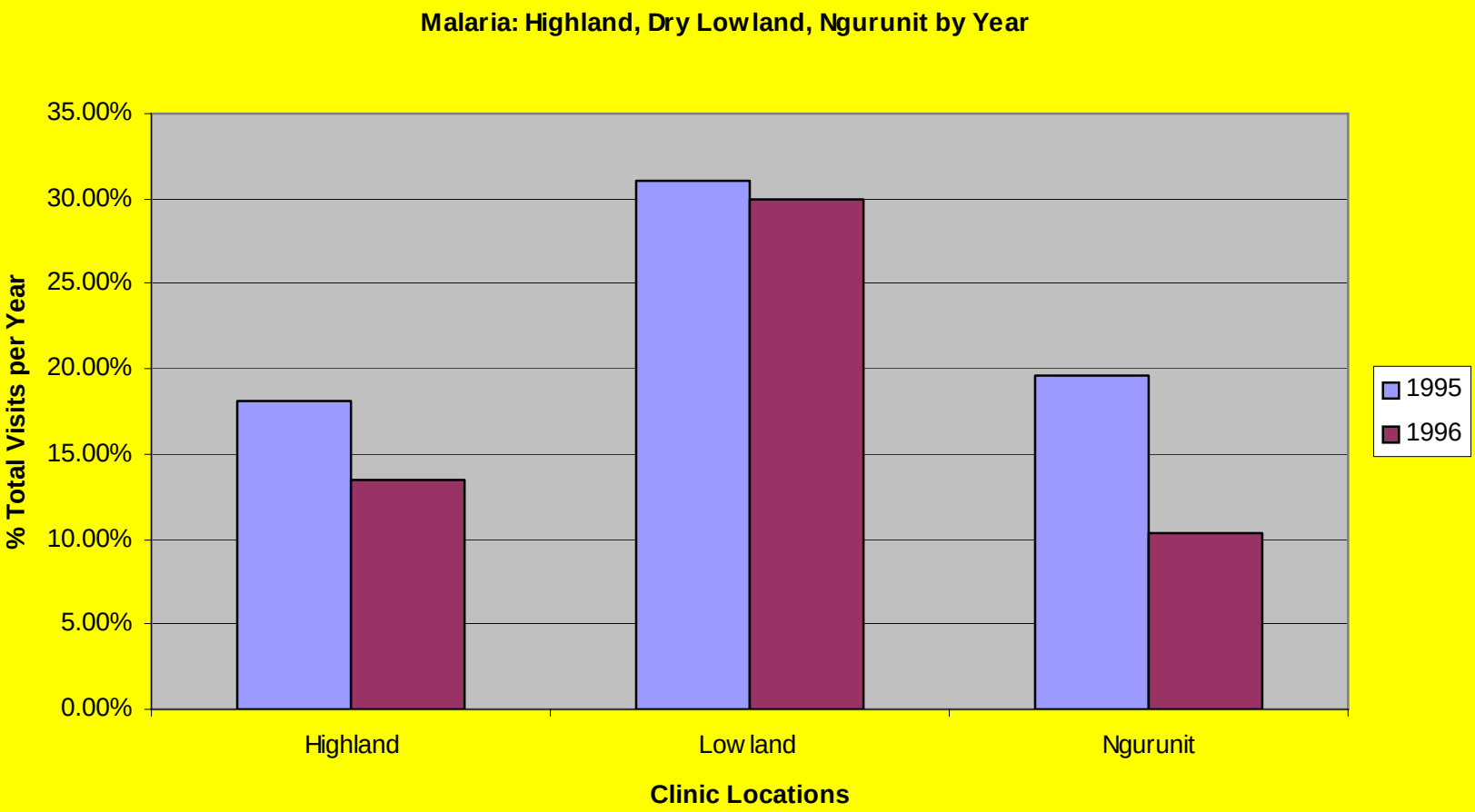


Malaria - Health Clinic Records

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

Clinic	1995	1996	Total
Karare	1554	1437	2991
Korr	6714	5776	12490
Laisamis	2718	2025	4743
Marsabit	13474	13655	27129
Ngrunit	3530	2074	5604

Malaria: Highland, Dry Lowland, Ngrunit by Year



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

end