The Maasai People: Initial Investigations into Public Health Practices of the Loitokitok District

Master of Public Health Field Experience

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Kansas State University
April 29, 2010
Overview

- Introduction
- Purpose
- Background
- Surveys
  - Household
  - Childhood
  - Mortality
- Results
- Recommendations
Lindsey Kelly, DVM
MPH Student
Personal Goals

Focus of potential project

- Enhance quality of life
- Improve public health of underprivileged individuals
- Aspects of agriculture and sustainability
- Avoid the snakes
Field Study Purpose

Public and Environmental Health Surveys

- International community-based experience
- Five year research plan
  - Identify health concerns
  - Maintain communication with community leaders and healthcare providers
  - Present findings to community
The School for Field Studies (SFS), in partnership with the Nomadic Integrated Development Research Agency (NIDRA), conducted a baseline survey to assess health indicators in the rural nomadic areas within the Loitokitok District.
Field Experience Mentors

Monica Onyango, RN, MPH

Senewa Montet-Timayio, PhD
Diverse MPH Field Study Team
Loitokitok District
Kilimanjaro Base Camp
Kenya, East Africa
30 May – 5 July 2007
Course Work for Cultural Integration
Kenya, East Africa

- Independence 1963
- Republic under President Mwai Kibaki
- 40 million people, 42 ethnic tribes with 120 sub-tribes
- HIV/AIDS has a 7.4% adult prevalence (KAIS)
- Rainy seasons
  - March to April
  - October to December
Loitokitok District
Loitoktok District

- Rift Valley Province  
  - New district in 2007
- 6,006 km²
- 150,000 people
- Six Group Ranches
- 100+ Primary Schools
- 12 Secondary Schools

Maasai
- ¾ population
- 3 – 4% literacy rate
  - Kenyans 85%

(Seno)
Group Ranches
Stationary Agro-Pastoralist Subsistence

- Land Act 1968
- Loitokitok Ranches
  - Kimana
  - Kuku
  - Mbirikani
  - Olgulului
  - Rombo
  - Eselenkei
The Maasai

Historically nomadic pastoralists reliant on livestock in Kenya and Tanzania.

Shift towards semi-sedentary agro-pastoralist lifestyle with the advent of group ranches.

Decreased land availability has caused overgrazing, water pollution and depletion, and increased disease among the people and their livestock.
The Maasai
The Maasai

Manyattas

Several houses made of mud and manure over a wooden framework, surrounded by a brush fence.

A central corral is used to keep livestock safe.
The Maasai

Crop farming on community and individual land

Irrigation

Fertilizers

Pesticides

Wildlife conflict in Kimana

90% farmers & 60% herders

Compensation for damages

25% farmers & 19% herders

(Campbell 2003b)
Healthcare Facility Evaluations

4 Health Centers
14 Medical Dispensaries

- Private Clinics
  - Expensive equipment
  - Well stocked pharmacy
  - Few patients

- Government facilities
  - Under-staffed
  - Under-stocked
Healthcare Providers
Community Service
Health Clinics

Several stations

- Childhood immunizations
- Weight and height for growth evaluation
- Childhood deworming
- Vitamin A supplements
- Family planning for mothers
- Consultations
  - Loitokitok District Hospital
    - Doctor
    - Nutritionist
Amboseli & Tsavo West
<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>June 2007</th>
<th>March 2007</th>
<th>June 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull</td>
<td>1</td>
<td>25,000</td>
<td>25,000</td>
<td>18,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($347)</td>
<td>($347)</td>
<td>($250)</td>
</tr>
<tr>
<td>Milking Cow</td>
<td>1</td>
<td>15,000</td>
<td>8,000</td>
<td>11,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($208)</td>
<td>($111)</td>
<td>($153)</td>
</tr>
<tr>
<td>Pregnant Cow</td>
<td>1</td>
<td>18,000</td>
<td>12,000</td>
<td>12,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($250)</td>
<td>($167)</td>
<td>($167)</td>
</tr>
<tr>
<td>Calf</td>
<td>1</td>
<td>5,000</td>
<td>6,000</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>($69)</td>
<td>($83)</td>
<td>($42)</td>
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</table>
Kimana Market

<table>
<thead>
<tr>
<th>LIVESTOCK</th>
<th>Market Price Kenya Shillings (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>June 2007</td>
</tr>
<tr>
<td>Sheep</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>($42)</td>
</tr>
<tr>
<td>Lamb</td>
<td>1,300</td>
</tr>
<tr>
<td></td>
<td>($18)</td>
</tr>
<tr>
<td>Goat</td>
<td>4,000</td>
</tr>
<tr>
<td></td>
<td>($56)</td>
</tr>
<tr>
<td>Kid</td>
<td>1,400</td>
</tr>
<tr>
<td></td>
<td>($19)</td>
</tr>
</tbody>
</table>
Baseline Survey of Health Indicators

Rural Nomadic Communities
Loitokitok District
Kenya
Methodology

Design

2 stage 30x30 sampling
- No Registries
- Level 1 – 30 areas
  - Estimated population densities
  - Community health workers (CHWs)
- Level 2 – Children at the household level*
  - At least 30 childhood surveys at each area

*A household is defined as people that cook and eat from the same cooking pot.
Methodology

Survey Collection
- Started at center of area
- Direction of dropped spinning pencil
  - Manyatta on left if more than one

First survey of hut on left of boma entrance

Surveys collected on foot
- Two-way radios
- Miles between manyattas
Data Collection
Surveys

Three surveys

- Household survey – Every third household (N = 300)
- Mortality survey - Every household (N = 622)
- Childhood survey - Children 6 - 59 months & 60 - 115 cm
  - Anthropometric data
  - Immunization data
  - Concurrent with household surveys (N = 955)
Childhood Survey

6 – 50 months old
60 – 115 cm height

Mid-Upper Arm Circumference (MUAC)

Red:  < 11 cm
Orange:  11 – 12.5 cm
White:  12.5 – 13.5 cm
Green:  > 13.5 cm

(Cogill)
Weight Collection
Areas Evaluated

Nutrition
- Malnutrition
  - Acute
  - Chronic

Health Status
- Immunization History
- Healthcare Source
- Morbidity & Mortality
- Child Delivery Location

Water & Sanitation
- Source
- Treatment
- Rubbish Disposal

Food Security & Assets
- Income
- Food Supply
- Registration for Relief Food
- Environmental Conditions
- Land
  - Crops
  - Livestock
Data Analysis

A descriptive analysis was done, as the data is the baseline information that will be used for comparison in later studies.

- **Data Entry**
  - Microsoft Excel 2003
- **Weight for Height**
  - Epi Info™
- **Analysis**
  - SPSS 9.0
  - Microsoft Excel 2003
Demographics

Households

- Average of seven (6.38) people
- Average of two (1.62) children under 5 yr

Household Survey Education Levels (N=300)

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Head of Household</th>
<th></th>
<th>Primary Caretaker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>No Education</td>
<td>207</td>
<td>69.0</td>
<td>234</td>
</tr>
<tr>
<td>Primary School Dropout</td>
<td>40</td>
<td>13.3</td>
<td>31</td>
</tr>
<tr>
<td>Primary School Graduate</td>
<td>29</td>
<td>9.7</td>
<td>22</td>
</tr>
<tr>
<td>Some Secondary School</td>
<td>19</td>
<td>6.3</td>
<td>6</td>
</tr>
<tr>
<td>Some College/University</td>
<td>5</td>
<td>1.6</td>
<td>1</td>
</tr>
</tbody>
</table>
# Food Security and Assets

## Main Household Income Sources

<table>
<thead>
<tr>
<th>Main Source of Income</th>
<th>Current Year (N=295)</th>
<th>Normal Year (N=300)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Sale of own food crops/animals</td>
<td>231</td>
<td>78.31</td>
</tr>
<tr>
<td>Daily labor</td>
<td>25</td>
<td>8.47</td>
</tr>
<tr>
<td>Salary</td>
<td>14</td>
<td>4.75</td>
</tr>
<tr>
<td>Petty trading</td>
<td>8</td>
<td>2.71</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>5.77</td>
</tr>
</tbody>
</table>
Food Security and Assets

- The main food source was home grown, followed by market purchases.
- Only one household listed relief food as their primary source, but 30.7% of families were registered.
- 65.3% of households reported access to land for farming.
  - 45.7% of this land was community land
  - Average acreage was 2.45 acres
    - Ranged from ¼ to 20 acres
<table>
<thead>
<tr>
<th>Crop</th>
<th>Normal Year</th>
<th></th>
<th>Current Year</th>
<th></th>
<th>Stock in Store</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Maize</td>
<td>175</td>
<td>58.3</td>
<td>148</td>
<td>49.3</td>
<td>69</td>
<td>23.0</td>
</tr>
<tr>
<td>Beans</td>
<td>146</td>
<td>48.7</td>
<td>123</td>
<td>41.0</td>
<td>43</td>
<td>14.3</td>
</tr>
<tr>
<td>Onions</td>
<td>36</td>
<td>12.0</td>
<td>26</td>
<td>8.7</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>27</td>
<td>9.0</td>
<td>20</td>
<td>6.7</td>
<td>2</td>
<td>0.7</td>
</tr>
</tbody>
</table>
## Food Security and Assets

### Main Crops Planted for Households that Planted (N=168)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Households Who Planted Crops this Year</th>
<th>Households that Planted the Specific Crop this Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Maize</td>
<td>148</td>
<td>88.1</td>
</tr>
<tr>
<td>Beans</td>
<td>123</td>
<td>73.2</td>
</tr>
<tr>
<td>Onions</td>
<td>26</td>
<td>15.5</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>20</td>
<td>11.9</td>
</tr>
</tbody>
</table>
# Food Security and Assets

## Household Livestock Holdings (N=300)

<table>
<thead>
<tr>
<th>Animal</th>
<th>Households with Livestock</th>
<th>Average Animals Current Year</th>
<th>Average Animals Current Yr</th>
<th>Average Animals Normal Yr</th>
<th>Households that Sold Animals in the Past Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>220</td>
<td>13</td>
<td>19</td>
<td>96</td>
<td>32.0</td>
</tr>
<tr>
<td>Milking Cows</td>
<td>213</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>2.3</td>
</tr>
<tr>
<td>Goats</td>
<td>259</td>
<td>19</td>
<td>27</td>
<td>94</td>
<td>31.3</td>
</tr>
<tr>
<td>Sheep</td>
<td>216</td>
<td>15</td>
<td>19</td>
<td>38</td>
<td>12.7</td>
</tr>
<tr>
<td>Chickens</td>
<td>136</td>
<td>5</td>
<td>6</td>
<td>20</td>
<td>6.7</td>
</tr>
</tbody>
</table>
## Water and Sanitation

### Water Quality

<table>
<thead>
<tr>
<th>Primary Water Source (N=300)</th>
<th>n</th>
<th>%</th>
<th>Households with Unprotected Water Source (N=215)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unprotected stream/river</td>
<td>182</td>
<td>60.67</td>
<td>No Treatment</td>
<td>165</td>
<td>76.74</td>
</tr>
<tr>
<td>Protected source</td>
<td>85</td>
<td>28.33</td>
<td>Boiling</td>
<td>44</td>
<td>20.47</td>
</tr>
<tr>
<td>Other</td>
<td>14</td>
<td>4.67</td>
<td>Water Guard</td>
<td>4</td>
<td>1.86</td>
</tr>
<tr>
<td>Unprotected pond</td>
<td>11</td>
<td>3.67</td>
<td>Other</td>
<td>2</td>
<td>0.93</td>
</tr>
<tr>
<td>Unprotected well</td>
<td>8</td>
<td>2.67</td>
<td>Chlorination</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Filtering</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Water and Sanitation

• 75% of households use the toilet in the bush (open air). The others use latrines.

• Rubbish disposal is mainly by burning (78.7%), followed by throwing it into the streets or bush (15.7%).
Health

Childhood Survey

- 94.5% delivered at home (N=955)
- 42.5% fully immunized (9 – 59 mo)
- 31.7% up to date (6 – 9 mo)
- 4.9% received no vaccinations (6 – 59 mo)

Childhood Immunizations

- Measles - Right deltoid
- BCG (Tb) - Left forearm
- Poliomyelitis - 4 doses, oral
- DPT - 3 doses, upper thighs alternated
  (Diphtheria, Pertussis, Tetanus)
Health

• 60.3% of children (6 – 59 mo) had illness of some form in the 2 wks prior to the survey (N=955)

• 53.3% of morbidity incidence occurred in children from households using unprotected and untreated water (N=576)

• 25.7% in households with protected but untreated water (N=576)

• The majority of these illnesses were defined as fever/malaria, respiratory tract infection, vomiting, and diarrhea.
Mortality

Included deaths in the 3 months prior to the survey for individuals < 5 yrs & ≥ 5 yrs of age.

• 33 deaths (N=3,854)
  ▪ < 5 yrs
    • 1.2% mortality rate
    • Main causes: fever/malaria & delivery complications
  ▪ ≥ 5 yrs
    • 0.7% mortality rate
    • Main causes: fever/malaria & tuberculosis
Nutrition

- **MUAC Measurement**
  - Acute malnutrition
  - 90.8% healthy
- **Wasting**
  - Acute malnutrition
  - 94.9% healthy
- **Stunting**
  - Chronic malnutrition
  - 67.5% healthy
  - 10.6% severe maln.
Presentations

- Ministry of Health & local healthcare providers
  - Data indicated areas of necessary change in local healthcare to be more specialized to the needs of the people.

- Stakeholders & community leaders
  - Data highlighted the positive and negative areas observed, with negative areas focused on issues that can be improved by more practical methods.
Summary of Main Recommendations

- More data needed to see why children are not attending school, and the average age at which girls and boys each stop attending school.
  - Sensitize community to the importance of education before marriage and family responsibilities
Food Security and Assets

• Focus: availability, accessibility, adequacy, & acceptability
• Reasons for purchasing food from the market.
• Farming practices utilized.
• Evaluate quality of livestock health and need for improving body condition, production, and disease prevention in order to benefit the health of the Maasai community.
  ▫ Maasai heavily rely on their livestock as their livelihood and measure of wealth.
• Availability of local grazing areas.
Water and Sanitation

- Identification of waterborne diseases that are a problem in the area, followed by deciding if the current water treatment practices utilized are beneficial in preventing diseases.
- Utilization of the livestock as the primary interest of the Maasai to encourage compliance in better water management.
Health and Nutrition

- Education for expectant mothers at antenatal and postnatal counseling on immunization completion and utilization of staple foods for maximal nutrition for mothers and children.
- Since 94.5% of children are born at home, train traditional birth attendants (TBAs) to educate mothers about immunizations and nutrition.
Conclusions

• Water and food security will have the greatest impact on the overall health of the people and their livestock.
• Using the cultural and financial reliance on the livestock as a means for preventative education is an important component in the success of this endeavor.
• It is imperative to understand the education level of the people to best formulate means of incorporating preventative medicine education into the lives of the people that the project intends to improve.
References


Campbell DJ, et al; 2003a; Root causes of land use change in the Loitokitok Area, Kajiado District, Kenya; Land Use Change Impacts and Dynamics (LUCID) Project Working Paper 19; Nairobi, Kenya: International Livestock Research Institute.


References


Ntiati P; 2002; Group Ranches Subdivision Study in Loitokitok Division of Kajiado District Kenya; Land Use Change Impacts and Dynamics (LUCID) Project Working Paper 7; Nairobi, Kenya: International Livestock Research Institute.


