



# Population Increase and Settlement Management

## Final Report

## Executive Summary

This report provides an analysis and evaluation of the current population increase and settlement management in the Mara. The rapid expansion in the Mara has brought about increased population densities, more intensive resource utilization and a growth of settlements – all resulting in environmental and socioeconomic challenges for the area. The main facets explored in this report are the current population and growth rate in the Mara, the current understanding and availability of birth control methods, the location of settlements and amenities within the Mara as well as the current level of fencing in the Mara.

Extensive data was collected by five Maasai researchers from 874 homesteads. Data was also collected on schools, clinics, water points, churches and fences. This was undertaken between April and November 2015.

The findings in this report are an integral way of examining demographic trends, the extent of existing infrastructure, and changes in settlement patterns and the data from this study will help lay the groundwork for a more comprehensive plan to manage growth and development across the region. In doing so, a clear rationale behind where future amenities are constructed can assist stakeholders by informing future decision-making in order to best serve the interests of the communities and conservancies.

Key findings and recommendations include:

- Current natural population growth is 8 percent, when net in-migration is included this increases to 10.5 percent. Limiting population growth through family planning is crucial to address the pending population time-bomb and threat to the Mara ecosystem. It will also help the Maasai people achieve a better quality of life by having family sizes they can sustain.
- Longer term contraceptives are not widely used, largely due to a lack of education. Family planning education should include men, women and youth to be effective.
- There is a growth in homesteads with 16 percent being less than one year old. Those buying land are pulled to areas because of a) being close to friends and family, b) resource access for livestock, c) amenities and job opportunities.
- Youth (especially the landless and jobless) are the most mobile sector of society who can be attracted to urban settlements through good amenity provision and job opportunities.
- Projects providing basic needs such as water or nursery education are not pull factors for homesteads and should be dispersed within community areas with the link to conservancies clearly stressed so as to improve perceptions of conservation and wildlife.
- 1/10 children of school age are not in school and only 6% are in secondary education. There is also a large gender disparity with girls very underrepresented in higher levels of education. Interventions are needed to ensure that all school age children attend school, that drop outs (especially for girls) are reduced and that more children transition from primary to secondary school/.
- Only 16 percent of homesteads have a latrine and 83 percent of families defecate in the open, bushes or rivers. This has serious health implications and requires addressing through education.

- On average it takes 80 minutes to collect water in the dry season and mean water used per person per day is only 11.6 litres. 96 percent of homesteads have the capability of collecting rainwater but only 10 percent currently have large water tanks. Encouraging this homestead level approach to water provision has great potential in the Mara.
- 10.3 percent of non-conservancy land within the study area is fenced this has increased by 354 percent over 21 months. Constant monitoring is needed to keep track of the continuous changes. Urgent action is needed if wildlife corridors and even roads are to be kept open as all homesteads intend to fence, to a certain degree.

## Table of Contents

<b>Executive Summary.....</b>	<b>1</b>
<b>Introduction.....</b>	<b>4</b>
<b>Research Motivation.....</b>	<b>5</b>
<b>Research Questions.....</b>	<b>6</b>
<b>Methods.....</b>	<b>7</b>
<b>Findings/Analysis.....</b>	<b>8</b>
<b>Population Dynamics and Growth.....</b>	<b>8</b>
<b>Family Planning.....</b>	<b>12</b>
<b>Settlements.....</b>	<b>15</b>
<b>Education.....</b>	<b>22</b>
Gender Inequality in Education.....	25
<b>Churches.....</b>	<b>30</b>
<b>Water and Sanitation.....</b>	<b>31</b>
<b>Urban Centres and Amenity Location.....</b>	<b>38</b>
<b>Fencing.....</b>	<b>39</b>
<b>Conclusion and Recommendations.....</b>	<b>44</b>
<b>Bibliography.....</b>	<b>47</b>



## Introduction

The following research was undertaken by The Maa Trust (TMT) at the request of Maasai Mara Wildlife Conservancies Association (MMWCA) and funded by Basecamp Foundation Kenya (BCFK). The primary goal of this research was to gather information on population growth and settlement in the Greater Mara region. **This study serves as a baseline for examining demographic trends, the extent of existing infrastructure, and changes in settlement patterns.**

The area studied includes Aitong in the West, Rekero and Enchorro Sidan in the North, Nkoilale and Ilbaan in the East and Talek and Olare Orok in the South. Figure one below highlights the study area and its largest centres. The size of the study area was determined and constrained by time and resources.

Data collected and compiled by Maa Trust in collaboration with MMWCA  
2015-2016

### Mara Conservancies and 2015/16 Study Area

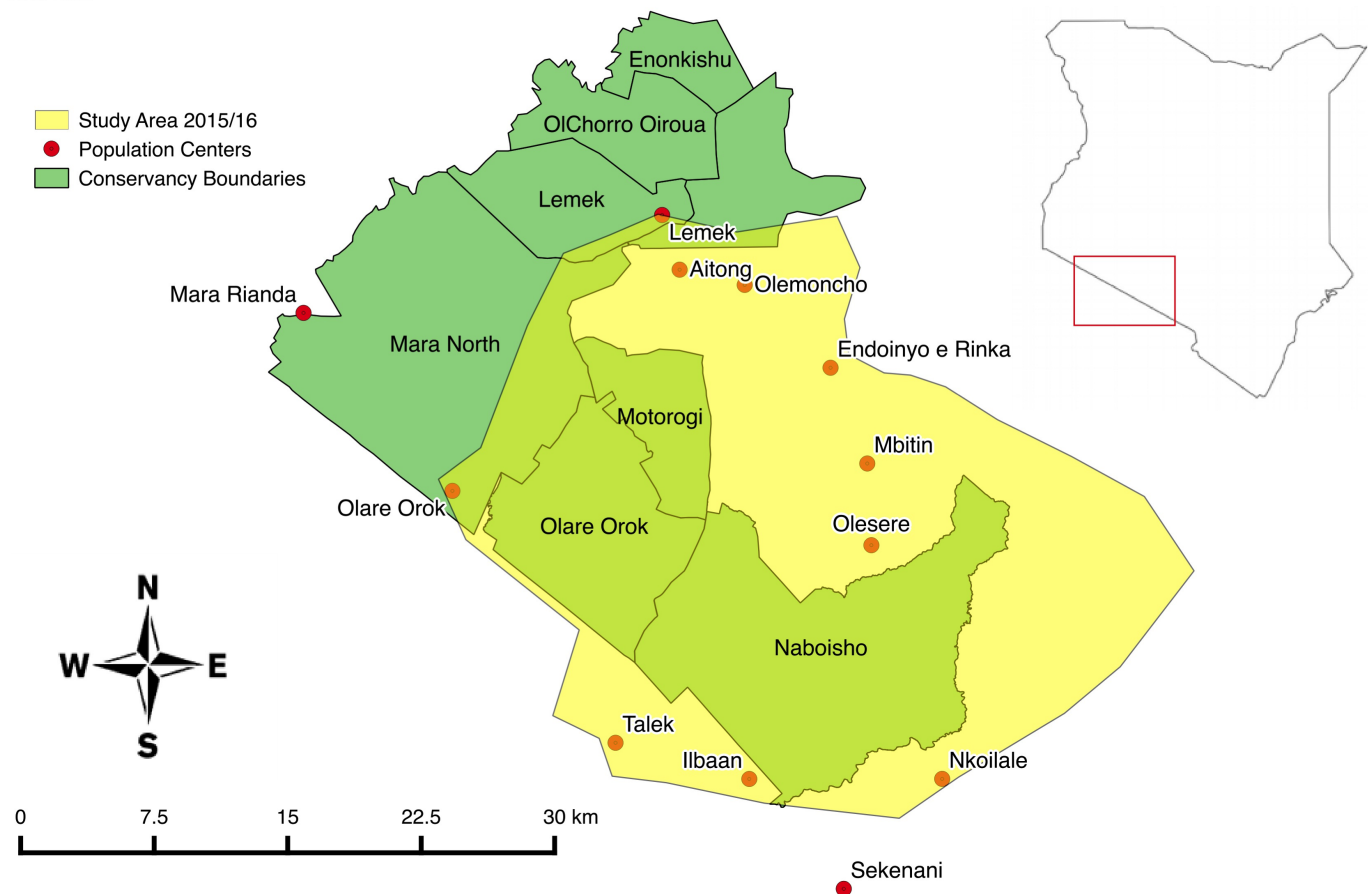


Figure 1. Map of Study Area and Centres

## Research Motivation

Human population growth is visibly increasing in the Mara ecosystem. This rapid expansion brings about increased population densities, more intensive resource utilization and a growth of settlements – all **resulting in environmental, human-wildlife and socioeconomic challenges for the area**. These changes put added pressure on the conservancies and threaten their sustainability, particularly through increasing demand for natural resources found inside their boundaries. More broadly, Courtney (2015: ch 9) found that the 10 largest threats facing conservancies are:

1. Reductions in tourist numbers
2. Increasing land values
3. Land use change around the conservancies
4. Decreasing tolerance of wildlife
5. Unsatisfied community members and increasing demands
6. Increasing livestock numbers
7. Unsupportive policies
8. Lack of financial transparency
9. Political hijacking
10. Population growth

In her opinion (ibid: 266):

The exponential population growth in the Mara is the biggest long-term threat to the conservancies, and yet one that is receiving minimal attention. One of the dangers resulting from this population increase is the proliferation of conservancy landowners, increasing the complexity and reducing the viability of the conservancy model. If one landowner has 10 sons, when he dies, the plot is fragmented through being divided into 10 parts. The result of this is that the rental income will also be divided by 10... In addition to this causing widespread dissatisfaction of benefits (threat five), population growth is also a contributing factor to threats two (land values), three (land use change), four (decreasing tolerance of wildlife) and six (increasing livestock numbers).

Despite the importance of this topic, population growth and contraception are hot topics in the area and ones that NGOs avoid (ibid). In addition, the underlying causes and the effects of local population growth are currently not fully understood. This lack of understanding means that few attempts have been undertaken to curb this increase or mitigate its negative effects.

Settlement management is one mitigation strategy, but it is currently absent. To date, there is no organisation within settlements in the Mara, including where new amenities are located in relation to relative need, as well as how housing settlements are organised. Trading centres are cropping up, ad-hoc and unplanned and but their growth is not yet understood or coordinated. Furthermore, fencing is a new phenomenon in the area, rapidly increasing in popularity, but having potentially very significant effects on conservation efforts and the practices of the traditional Maasai culture. In order to more fully understand these changes, this study focused on the following research questions.

## Research Questions

1. What is the current population and growth rate in the Mara?
  - a. Does this vary over space, and why?
  - b. What are the causal factors influencing this growth?
2. What is the current understanding and availability of birth control methods?
  - a. What is the current level of family planning education within schools and communities more broadly?
  - b. What forms of contraception are currently available, where and at what price?
  - c. What are the current perceptions of the different forms of contraception from men, women, and youth?
  - d. Which options for planning would be most accepted? How could these be implemented?
3. What is the location of settlements and amenities within the Mara?
  - a. How are these amenities, settlements and infrastructure currently distributed geographically?
  - b. What influences the location of these settlements and amenities?
  - c. What are the biggest push and pull factors for households?
  - d. Within society, who are the most mobile subsets, and who are the most fixed?
  - e. Where are the rates of settlement growth highest?
  - f. What influences the nature of settlement design?
  - g. Do settlements differ in the extent to which they are ecologically sustainable?
4. What is the current level of fencing in the Mara?
  - a. To what extent do landowners plan to fence in the future?
  - b. What types of fences are being used, and why? What is the cost for purchasing and maintaining these different types?

As well as highlighting the extent of current challenges through examination of the *Status quo*, the data from this study will help lay the groundwork for a more comprehensive plan to manage growth and development across the region. In doing so, a clear rationale behind where future amenities are constructed can assist stakeholders by informing future decision-making in order to best serve the interests of the communities and conservancies.

## Methods

This research required extensive data collection, this was largely undertaken by five Maasai researchers:

- Ntimama Maatany
- Jonathan Kasaine Sairowua
- David Kortot
- James Lenjirr
- Alex Nkumum

The data was collected between April and November 2015. The researchers travelled by motorbike throughout the day to interview homesteads (a homestead is a cluster of houses where one family, or sometimes multiple families, live), and plot GPS points of fences, centres, water points, churches, and schools. A total of 874 homesteads were interviewed within the study area. Additional casual researchers were hired and trained to map fences in hotspot areas. Additional secondary fencing data was kindly shared by the Gnu Landscapes Project, which was collected in February 2014.

After data collection was complete, the GPS data was input into QGIS software by Chris Harrell and Dominic Rotich, GIS specialists. Niels Mogensen provided GIS support. Data from the household surveys was tabulated and analysed by Katie Hartin and Dr. Crystal Courtney, the authors of this report. Katie was an intern at the trust during her Masters degree in Africa and International Development at Edinburgh University. Dr. Crystal Courtney is the CEO of The Maa Trust. Helen Gibbons, CEO of MMWCA, and Roselyn Kang'ara a later intern at The Maa Trust also edited the final report.

## Findings/Analysis

### Population Dynamics and Growth

This section will address the first research question regarding the current population and growth rate, as well as how and why population growth varies over space, including causal factors for growth.

A total of 874 homesteads were identified, mapped, and surveyed within the study area. Within these homesteads, there are a total of 16,587 people, an average of 18.9 people per homestead. As the study site is 236,000 acres this gives a **population density of 0.07 people/acre**. If conservancy land is removed from the equation the ratio is **0.15 people/acre**.

Data collected and compiled by Maa Trust in collaboration with MMWCA  
2015-2016

### Mara Conservancy Population Study 2015-2016

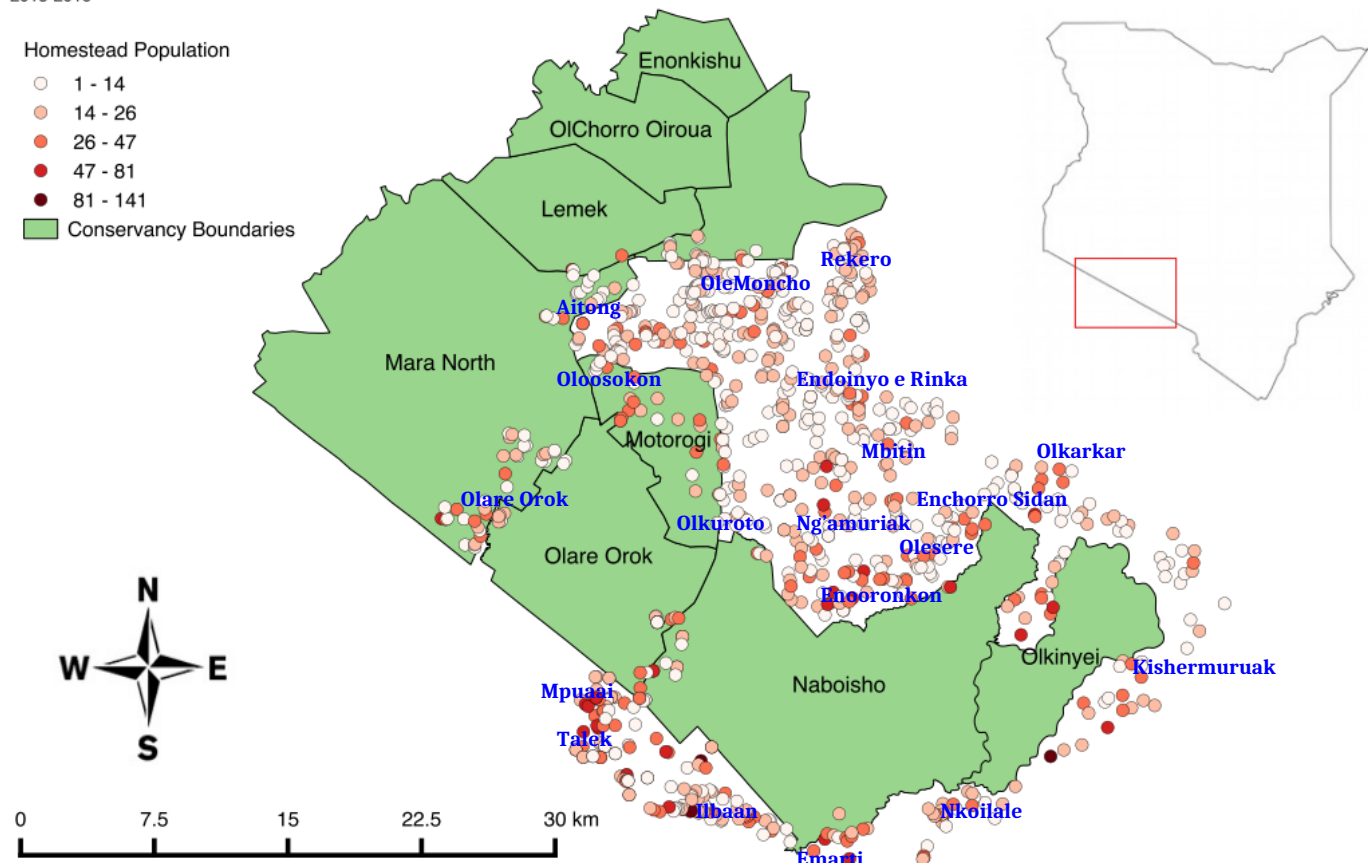


Figure 2. Map of homesteads coloured according to population

In terms of people per homestead, the top ten percent ranged from 35 people to over 140. These multi-generational homesteads were clustered toward the southern boundary of the study area around Ilbaan, Emarti, Talek and Olare Orok. The lowest decile ranged from 1 to 7 people per homestead and featured more prominently

around the urban centre of Aitong, representing single men living alone or in small groups, or young couples with few children. Figure 2 suggests that homestead populations around the borders of conservancies are higher than more remote areas in the north of the study site. One possibility is that families are concentrating in homesteads on conservancy borders because of grazing access. Along the northern border of the conservancies there is an almost unbroken line of homesteads circling the conservancies.

**The average number of people per house in this study is 3.94.** This is a reduction from the 4.61 figure calculated by Lamprey (1984) which was used by the Mara Count (Reid et al., 2002) to extrapolate number of houses into human population. As a result, **previous studies may have overestimated the population of the Mara.** Homesteads often have uninhabited houses which includes those used as kitchens, storage or pens for young livestock. 9.2 percent of houses counted in this study were uninhabited and these are often included in aerial assessments of house numbers. It is increasingly popular for women to each have two houses, one to sleep in and a separate kitchen, which usually has the traditional flat mud roof.

Each homestead was asked the number of men and women who live there, as well as the number of children. There are a total of 2,354 men and 3,254 women, for a **gender ratio of 1:1.38**. This ratio does not necessarily indicate an anomaly in births, but possibly occurs because men will often leave to other areas in search of work or economic opportunities and are therefore not resident in their homestead for long periods of time (Coast 2001).

In terms of population age dynamics, **exactly two-thirds of the population is under age 16 years of age (66 percent). The number of children under one year of age is 1,449, or roughly 8.7 percent of the current population.** Within Narok district, **only 2 percent of the population is over 65 years of age** (CRA, 2016).

In order to calculate population growth rates it is necessary to work out the Crude Birth Rate (CBR). This is calculated by:

$$CBR = (\text{number of births in one year}) \times 1000 / \text{estimated population at mid-year}$$

$$CBR = 1439 \times 1000 / 15959$$

$$CBR = 90.8 \text{ or } 9.1\%$$

**In the study site there is a crude birth rate of 90.8 per 1000 population.** This is almost double the highest birthrate of any country in the world (Niger at 46 per 1000 population). **The average birth rate in Kenya in 2015 was 28.3 per 1000 population** (Index Mundi, 2016).

Population growth rates are not even across the study site, as figure 3 below displays.

## Population Percentages of Children Under One Year

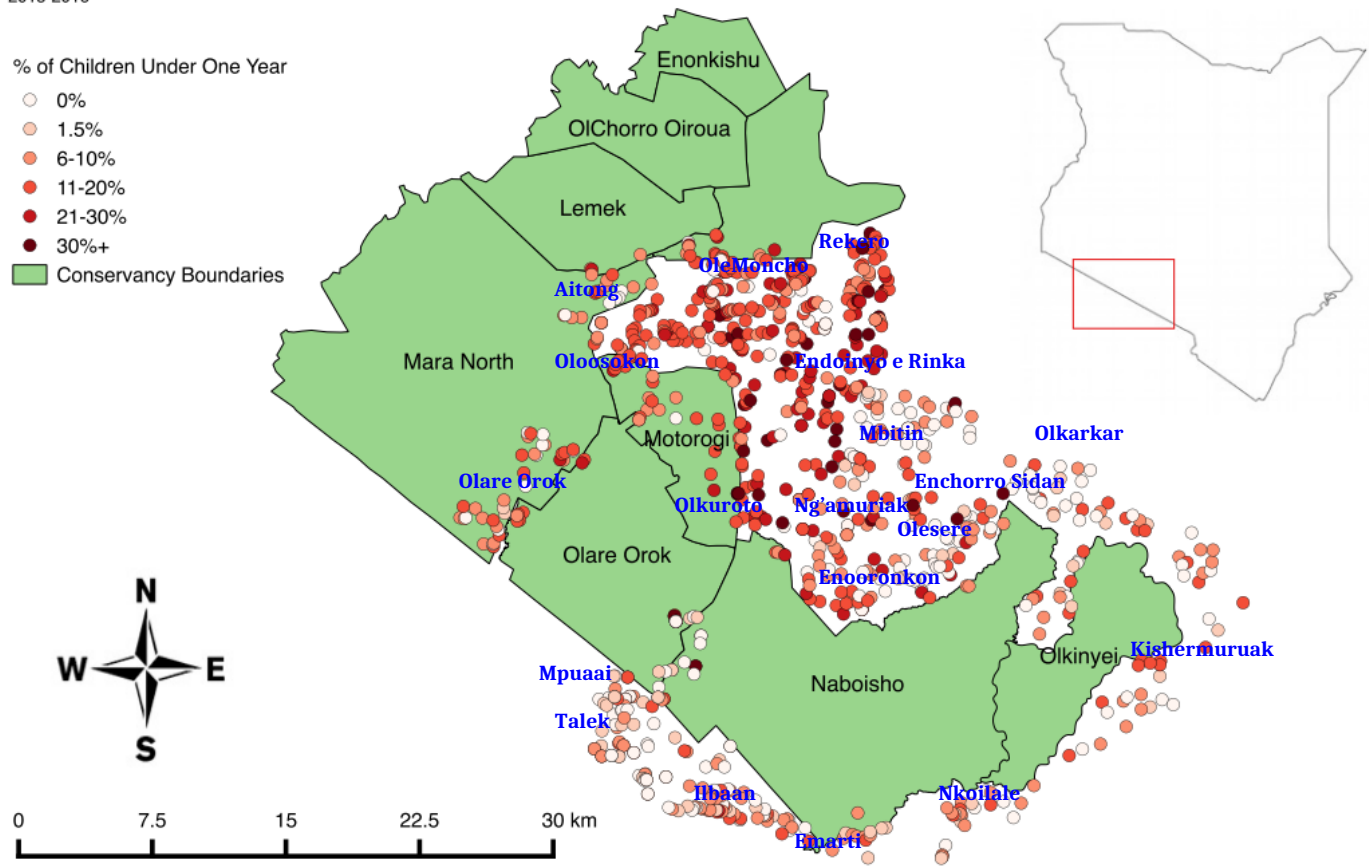


Figure. 3 Homesteads and their population percentage of children under age one

Figure 3 shows that more interior areas, especially in the **North and Western areas of the study site have a higher proportion of under ones per household than those living closer in the Eastern and Southern areas of the study site**. The Rekero area in the far North of the study area is a population growth hotspot. This extends down to Endoinyo e Rinka, Mbitin, Nkirgir, Ng'amuriak and Olkuroto. To the East, communities in Enkeju Enkorien, Oloosokon, Olare Orok and Ololomei also have high proportions of under one year olds. **More urban areas including Talek, Aitong centre and Nkoilale had lower proportions of under one year olds in their homesteads**. Reasons for this could be twofold. Many of those moving to urban centres are young people who do not yet have families. Also, these individuals who are attracted by work opportunities are often more educated and more career orientated which could coincide with a desire to have a smaller family.

The death rate – the other figure needed to calculate the natural population increase – was not collected during this study because death is a very sensitive subject. It is also very difficult for people to accurately assess how long ago someone died. This is easier for birth rate as the majority of infants have medical cards noting their age. If any participant was unsure whether a child in their homestead was under one, whether they could walk yet or not was used as a determining criterion.

Using the Statistical Abstract (2013) from the Kenya National Bureau of Statistics it is estimated that the **average death rate in Narok District is 1.1 percent or 11 per 1000 population**. This is calculated from the level of deaths reported in the district (1380) and multiplied by five to take into account the coverage rate of 20 percent. This figure of 6540 is 1.1 percent of the total population of Narok District (in 2012), which was 576,300. **This figure of 1.1 percent is close to, but slightly higher than, the national average of 0.9 percent or 9 per 1000 population** (World Bank, 2015). The low nature of this figure, in comparison to the birth rate, can be attributed to the population age demographics. As noted, within Narok district, **only 2 percent of people are over 65 years of age**

**A birth rate of 9.1% and death rate of 1.1% results in a natural increase of 8%**

In addition to natural population changes, there is also migration into and out of the study area. **Out-migration is when local residents move out of the area, often to more urban areas**. This may be temporary for education purposes, or permanent. It is common for a man to migrate to more urban areas for work opportunities and leave his family at his rural home where he will return to periodically, and when he retires. This is a major factor contributing to the greater number of women than men found within the study site.

**In-migration is the result of people from outside being attracted to move to the area by pull-factors, most notably economic opportunities**. For Maasai people this includes jobs as herders, in the tourism industry, or Maasai women marrying local men. Other ethnic groups are also pulled to the area. Many Somali nationals, Somali-Kenyans and Kikuyu are drawn by small-scale business opportunities such as running local shops. The majority of builders, and skilled labourers such as mechanics, carpenters and electricians, and a proportion of those working in the tourism industry in the Maasai Mara, are also in-migrants. **Coast (ibid) and the 1999 population census (Republic of Kenya, 1999) both estimated net in-migration to be 2.5 percent for Narok County**. This is likely to be even higher in the Maasai Mara area specifically due to pull factors associated with tourism. As there is no estimate for the Maasai Mara sub-location, this figure of 2.5 percent will be used.

**When this net in-migration of 2.5 percent is added to the natural population growth of 8 percent, the net population growth of the Mara is estimated at 10.5 percent per year**.

**If this remains unchanged, the population will DOUBLE in less than 7 years, and quadruple in less than 14 years. By 2033 the population of the study site could exceed 100,000 people.**

As noted, in 2015, the national average population growth rate for all of Kenya was 2.83 percent (Index Mundi, 2016). Figure 4 below shows the predicted population growth for both the national average of 2.83% and the study finding of 10.5%. Poverty rates cannot account for the difference between these figures; Narok County is low in Kenya's county poverty rankings (42<sup>nd</sup> out of 48) (open data, 2006). **The difference between this national average and natural population growth in the Mara can be attributed to low education levels and lack of knowledge around family planning**.



## Predicated Future Population Growth

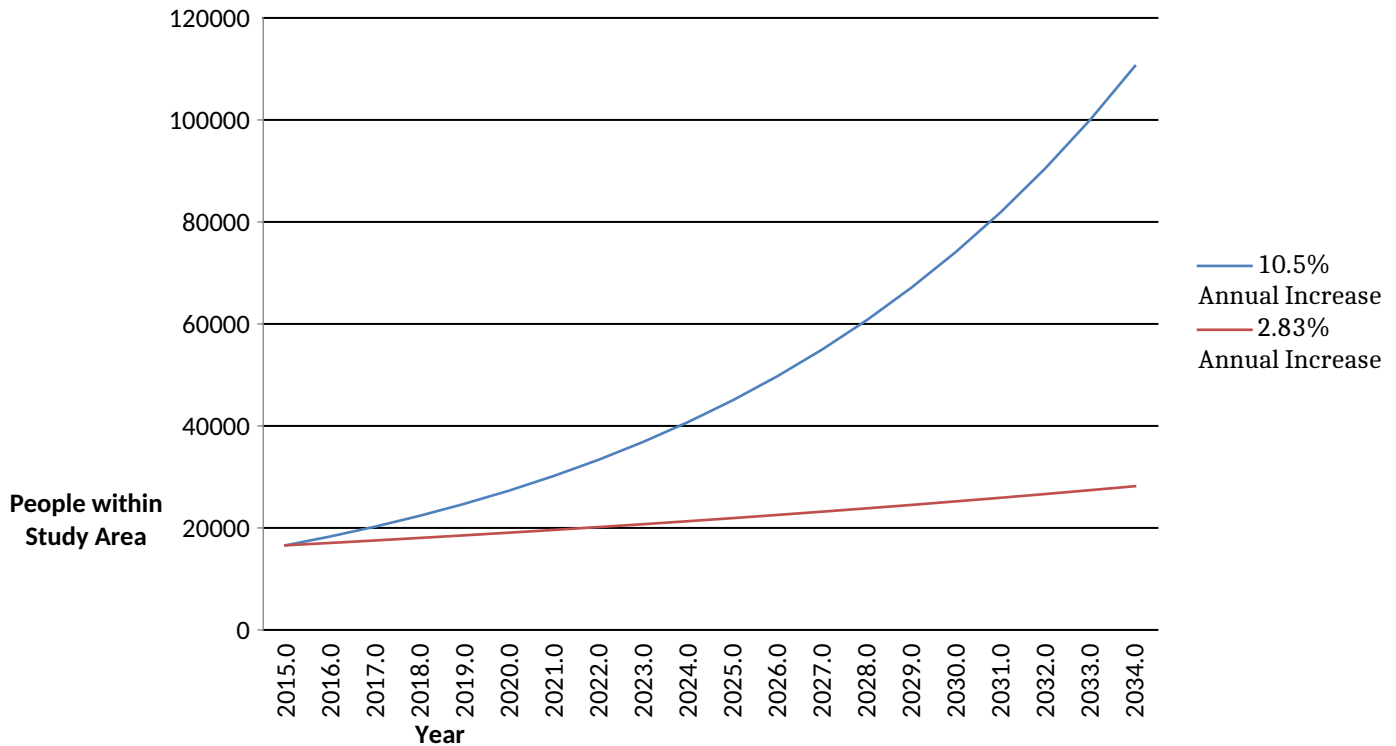


Figure 4. Predicted population growth.

### Family Planning

**A key reason for the high birth rate in the study site is the lack of family planning knowledge and availability amongst all strata of society within the study site.** This includes education in schools and amongst adults in the community– both men and women. Family planning and population growth have been taboo subjects for the majority of organisations working within the Mara, and is a topic that politicians avoid. One suggested reason for this is that if the Maasai population grows, Maasai politicians will have a greater support base through tribally aligned politics.

The little education on family planning that has been undertaken has focused on women. The vast majority of women in the Maasai Mara would like to control the size of their families to manageable levels, but they feel that the decision regarding family size is one that lies with their husbands. To date there has been very limited work on population growth with Maasai men. In the study site, **older men still believe that the number of children that you have shows wealth.** This is a common reason as to why they want their wives to have many children. In contrast, **younger men define wealth as having fewer children** who can progress all the way through their schooling, go to university and get good jobs. This transition in the definition of wealth amongst men is

encouraging younger men to have a smaller family size. Whilst an improvement, the scale of this reduction may not be sufficient to prevent calamitous population increase as choosing to have 6–7 children is still unsustainable within this study site.

In large, **churches support family planning** because they believe that it will be of benefit for the rights of the children. The churches advocate that if people have fewer children, they will be healthier and will do better than of the family is very large.

Within the study site, different forms of family planning are available from clinics and pharmacies. The locations of clinics in the study site are displayed on figure 5 below.

Data collected and compiled by Maa  
Trust in collaboration with MMWCA

2015-2016

## Clinics

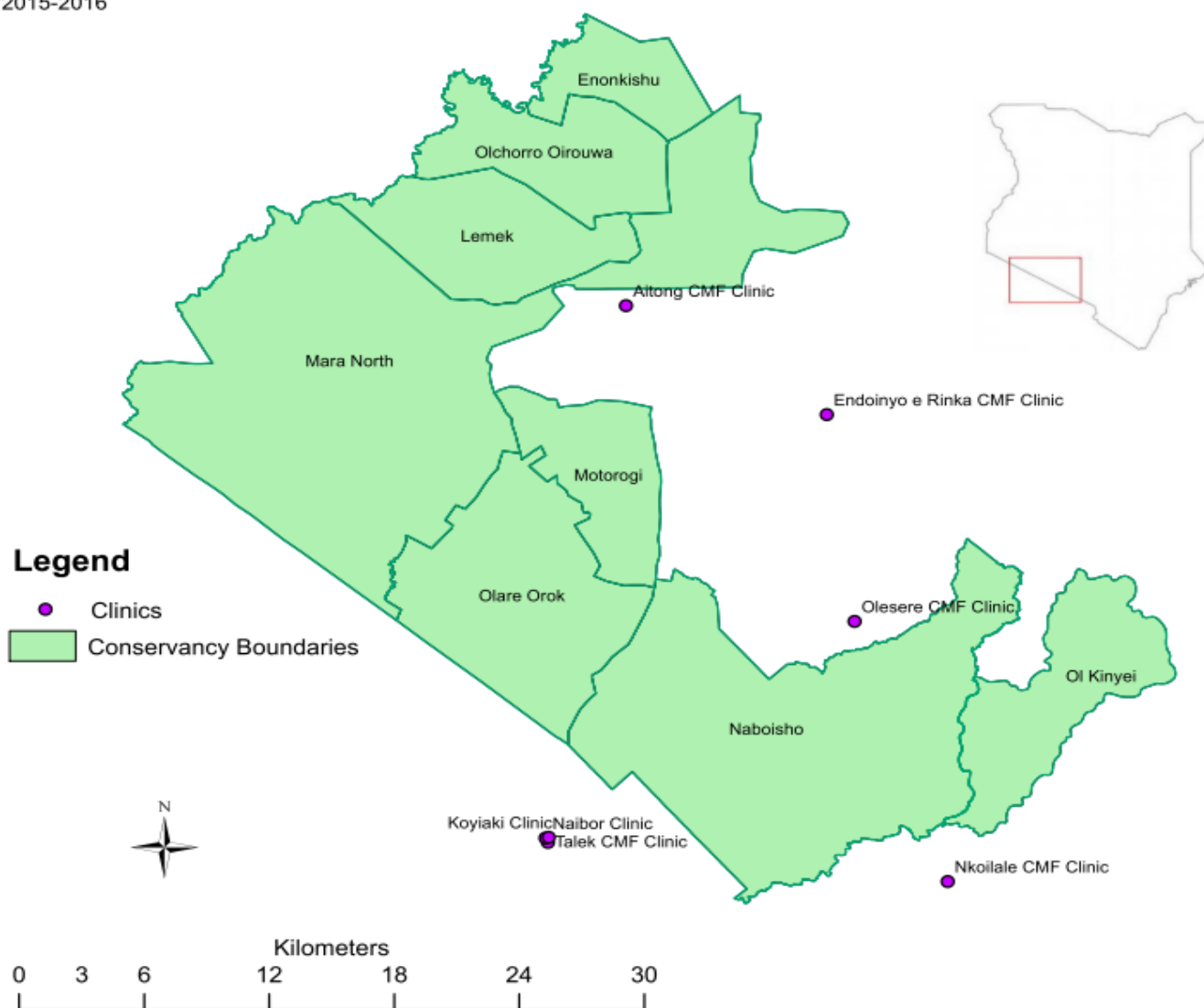


Figure 5. Map of Clinics

CMF (Christian Medical Fellowship) and privately owned clinics, as well as pharmacies, were visited to learn more about issues surrounding the use of contraception. The most common contraceptives on offer are: condoms; daily oral contraceptives, such as Femiplan or *Changuo Lako* tablets; Depo Provera injections; Implanon arm implants; and Intrauterine Contraceptive Devices (IUCDs).

These institutions indicated that **at present the most popular form of contraceptives are condoms**, which are given out free of charge in the clinics. **Following this, Daily oral contraceptive tablets are the next most popular.** These cost 200 KSH per three cycles, or 12 weeks. Depo Provera – an injection that is effective at preventing pregnancy for 12 weeks – is also common at 200 KSH per vial. **Implanon arm implants cost 500 KSH per implant and prevents pregnancy for three years. Clinics suggested that this is not currently very popular, and many women indicated that they were unaware of this long-term option.** Likewise, CMF said that people do not often get IUCDs because they are unfamiliar with them. CMF believe that IUCDs are the most effective form of contraception with fewer side effects and risks of pregnancy from misappropriate use. However it is expensive and cost-prohibitive both for the patient and for the clinic, where equipment is necessary for its storage.

There is variation between the medical institutions in the Mara in terms of who qualifies for family planning medication. For example, Nalepo Community Clinic in Talek only gives contraception to adults (i.e. over 18 years) and if unsure they will ask patients to provide national identification. The majority of pharmacies allow anyone sexually active to attain contraception, including school children. CMF say they have private Guidance and Counseling rooms where they can learn more about a patient's situation and intent for contraceptive use, but ultimately, they will provide contraception to anyone asking for it.

Despite the clinics' self-reported high use of contraception, there **are many factors that inhibit uptake.** These include:

- Many sexually active individuals are not aware of the different kinds of family planning available at clinics or pharmacies;
- Contraceptives can be inaccessible for those living in rural areas;
- Some women's groups have had discussions on family planning, but the women say ultimately their husbands decide the size of the family and women fear being beaten if their husbands find out that they are taking contraceptives without their permission.

Another inhibiting factor is that **Maasai women hold common misconceptions about family planning.** These include:

- If you use contraception the lady becomes sick – CHAT suggested that this belief comes from women experiencing more monthly bleeds and cramps by not being pregnant;
- If you take contraception for a long time, when you stop, the first child will be disabled;
- The older generation believe that those using family planning go against Maasai law by preventing children being born;
- In Coast's (2007) study of Maasai in Tanzania, she found that participants' knowledge of condoms was limited; they doubted the efficacy of condoms; and they were embarrassed by having to dispose of them. Maasai people are also uncomfortable about condoms within the study site. When SAFE Maa performed a drama piece on HIV prevention in Nkoilale town, half of the audience ran away in horror when the

performers held up condoms as part of the sketch.

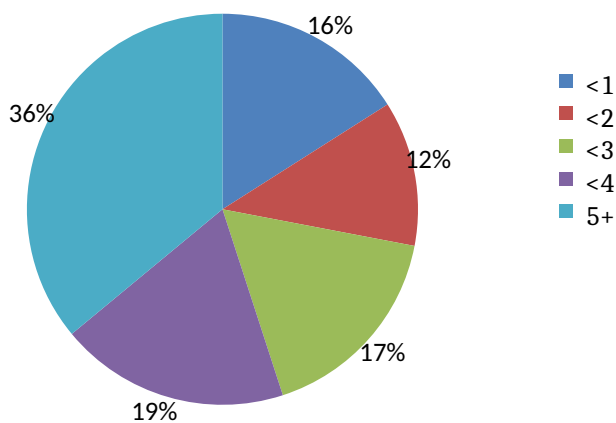
Overall, the high rate of growth in Maasai Mara can be attributed to several causal factors. For some people, especially men, there continues to be a desire to have large families. Many people do not understand the consequences of population growth on future generations. For those who would like to manage if and when they become pregnant, access to contraceptives and knowledge regarding the different options are limiting factors. Incorrect 'old wives tales' regarding what will happen if you use family planning also remain prominent.

## Settlements

This section will address the factors influencing the locations of settlements. First, the current situation regarding family homesteads will be described. Next, the reasons for changing patterns of settlement will be discussed in light of recent changes to land use and livelihood strategies. Lastly, the eco-nature of settlements will be described.

To get a sense of the rate of growth of settlements, participants were asked to state the age of their homestead. Although more than one-third (36 percent) responded that their settlement was five years or older, **an astounding 16 percent had a settlement that was less than one year old (figures 6 & 7).**

Figure 6. Age of Settlement (in years)



## Age of Surrounding Settlements

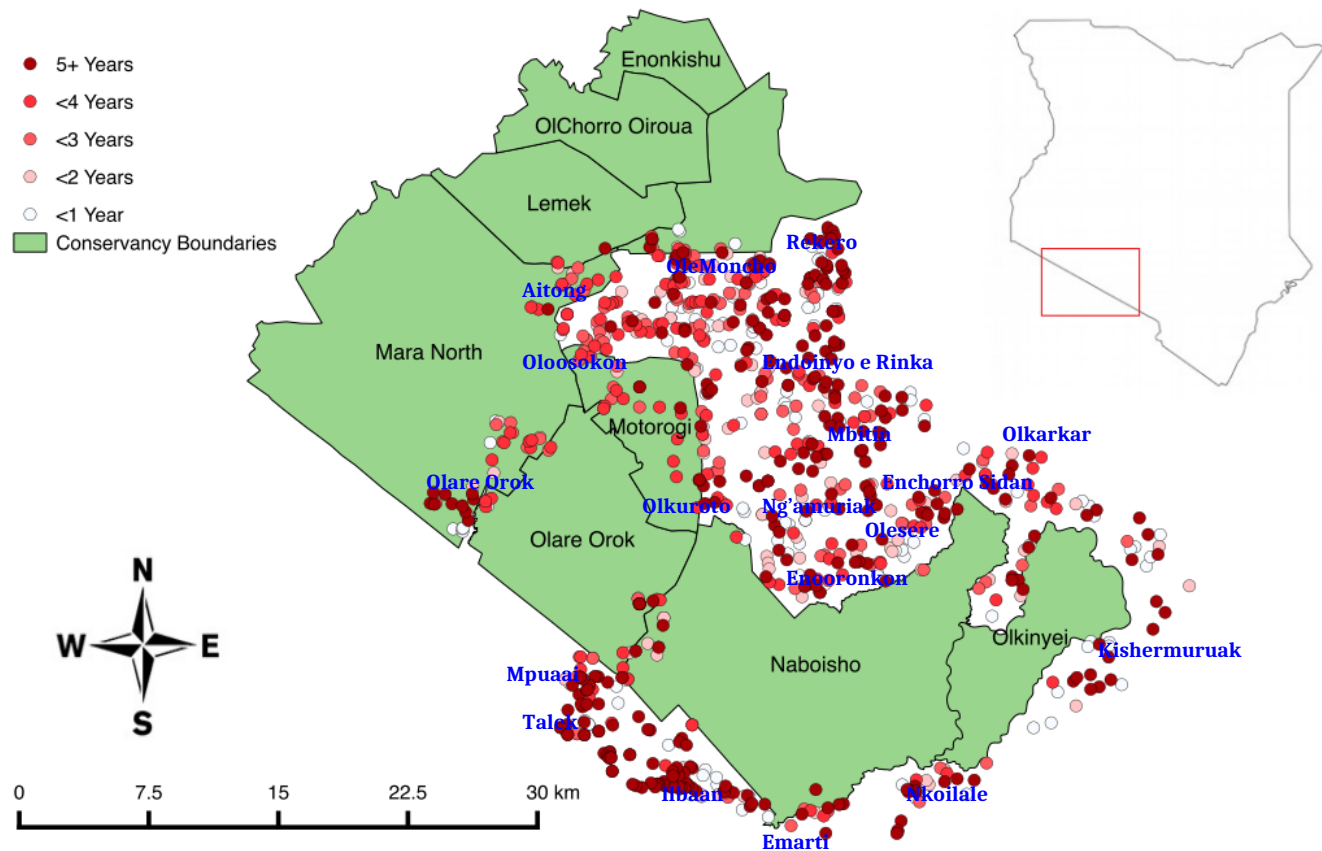


Fig.

### 7 Age of homesteads

There are homesteads greater than five years old spread across the study area, however, there are visible clusters around Talek and Mpuaai, Olare Orok, Mbitin, Endoingo e Rinka, Rekero and Olemoncho. There is a concentration of homesteads 3-4 years old around Aitong and Motorogi Conservancy. New settlements under one year old, are again found across the study area but there are visible **clusters around the border of Naboisho and Olkingei Conservancies, the Southern side of Olare Orok community and around Olemoncho.**

**Alongside population growth, there is undoubtedly an increase in the number of homesteads.** Bedelian (2014) found that in the five years between 2006 and 2011 there was an overall 18 percent increase in the total number of homesteads in Koigaki Group Ranch. Whilst 64 percent of the households surveyed for this study were constructed in the last four years, some of these represent the **relocation of an existing homestead** as opposed to the creation of a new one. For example, some families are still moving from their previous location to the land they were allocated during subdivision or have bought. However, in addition to the relocation of existing settlements, new additional homesteads are also appearing. One trend is that new homesteads are being built on the borders of existing settlements. Many of these instances are sons creating their own homesteads on their father's land in the absence of their own plot.

The graph below shows a prediction of future settlement growth, based on Bedelian's (2014) settlement growth finding.

## Settlement Growth

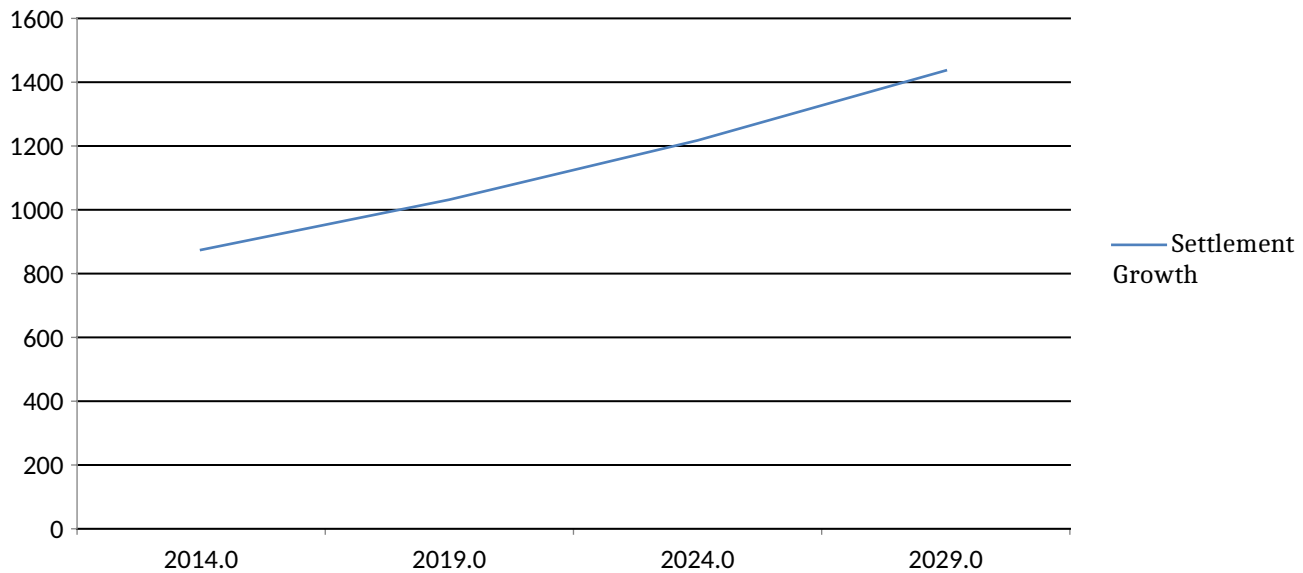


Figure 8. Projected Settlement Growth

The rate of growth is limited by static factors, such as available land, as well as variable factors, such as pressures from drought or other shocks. Nevertheless, this is currently a very high rate of growth, and one that cannot be sustained in this area.

The growth in settlement numbers is accompanied by the fact that more people are choosing to build permanent settlements, rather than temporary or semi-permanent structures (see figure 9).

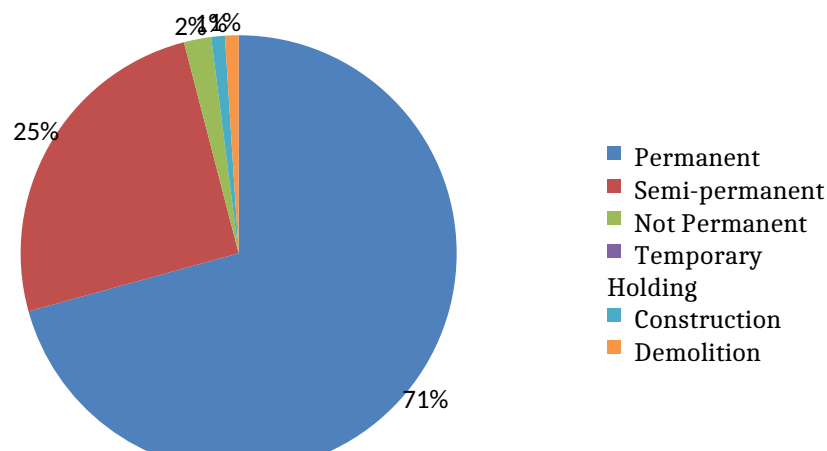


Figure 9. Settlement by Type

The Maasai people were traditionally nomadic as they travelled with their herds during the wet seasons, but today families have become sedentary. For this study, a “permanent” homestead was one defined as that which is intended to last for several years. This may be built from stone or cement, but well-made mud houses also



qualified. “Semi-permanent” homesteads are often those used by herders for part of the year or may be families who know that they will be relocating shortly. These are made from mud and sometimes iron sheets.



Figure 10. A permanent house. Photo taken by Mechanica Lolkumum.



Figure 11. A semi-permanent house. Photo taken by Nkoeki ole Mwatata

In order to get a sense of the rationale behind why people settle where they do, participants were asked to state why they reside on this particular piece of land. **Over two-thirds (69 percent) said that they were allocated this**

land during subdivision, while roughly an equal number of participants indicated they had bought the land or had inherited the land through subdivision (12.7 percent and 12.5 percent, respectively). Thirty-eight participants (or 4.8 percent) indicated that their land is within the boundaries of the conservancy, so they needed to live somewhere else. In such instances, families live on host parcels. **Over 90 percent indicated that their land is owned by someone who lives at the homestead**, while only a few responded that the land was owned either by a relative or a friend (2.5 percent and 3 percent, respectively).

Of those who bought their land (n=101), **roughly three-quarters (76 percent) said that the main influencing factor when deciding where to live was that they wanted to be near to family or friends**. This is a major factor for young men who can only afford to buy a small amount of land but want to marry and build their own village. In such instances, young men buy a plot near land owned by friends or relatives so that livestock can graze beyond the land bought. **Approximately 20 percent bought their land because of resource access for livestock (particularly grazing). This is evidenced by people buying land in communities bordering conservancies. Only 5 percent chose to purchase their land because of access to amenities**. Within amenities, particularly for the younger generation moving to more urban areas, **pull factors included employment opportunities, commerce proximity followed by access to education, health or water**.

Interestingly, factors influencing where people live do not directly tally with participants' perceptions of the greatest problems in their area. All households listed several issues (see figure 12). Although **water, grazing and salt for livestock ranked very highly**, as it did with settlement influencing factors, the majority of respondents said the biggest challenge was the **distance to a clinic**. Despite ranking distance to clinic as the biggest challenge in for almost 60% of homesteads, this was not considered a dominant influencing factor when deciding where to settle. ***This suggests that residents would like / expect services bringing to communities as opposed to communities moving to services.*** The **distance to water for human consumption** was a problem for almost half of homesteads as well as a **lack of job opportunities**. Other major challenges are captured below. Others identified by homesteads included drought, lack of firewood, land privatization, and population increase (n=4).



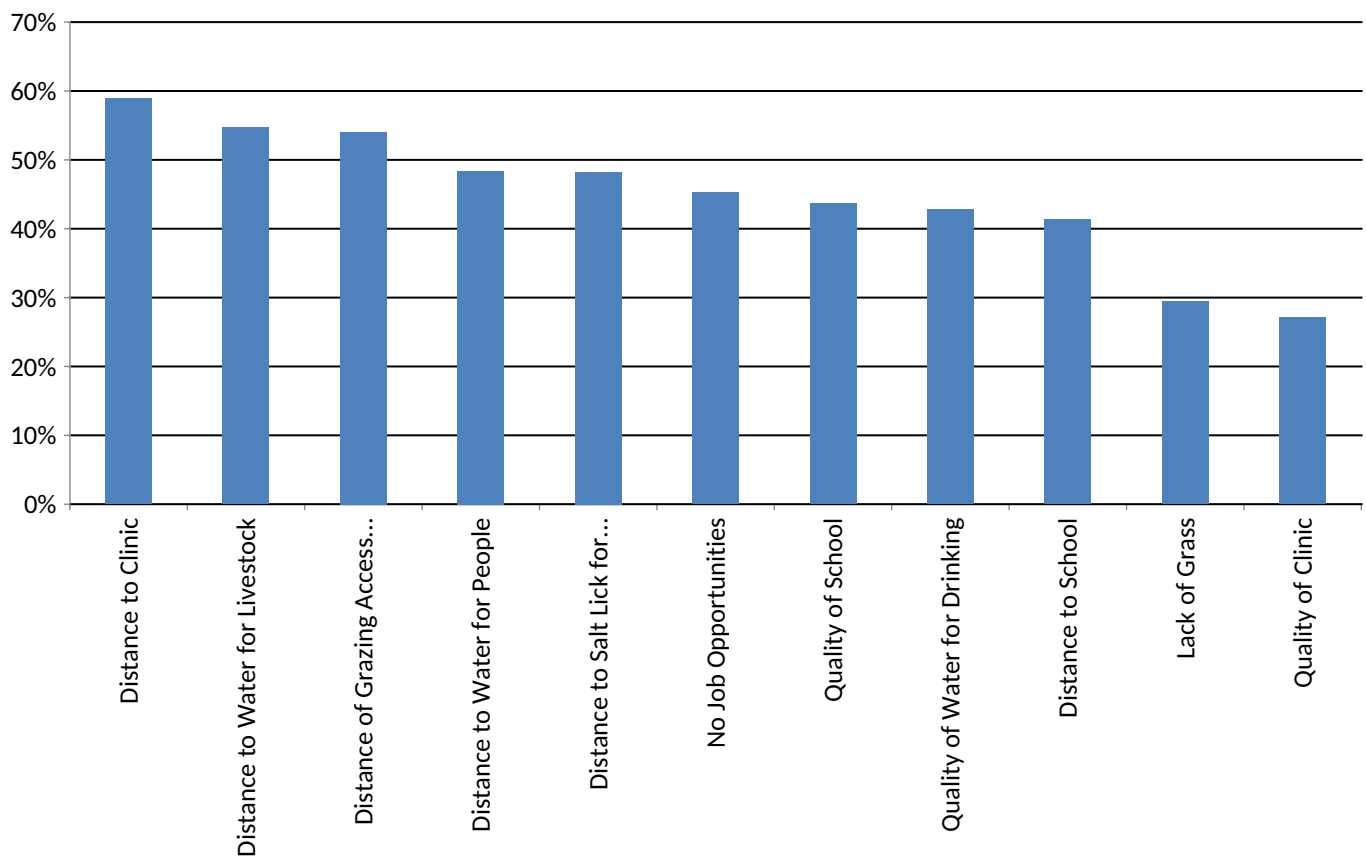


Figure 12. Biggest Challenges identified by Homesteads

It is interesting to note that **for schools, the quality is a greater concern than the distance**. This backs up a finding in Courtney (2015) that children now sometimes walk past their closest school to reach one perceived to be of better quality. However, in this survey, for water and clinics, it is the distance that is stated to be a greater problem than the quality. In the majority of cases, it was a male member of the household who was interviewed by the researcher in this survey.

Courtney (ibid) found that regarding perceptions of development, men focus on the construction of infrastructure (i.e. building a clinic or school) whereas women put a greater emphasis on the quality of the facility. The likely reason for this is that it is women who most often take their children to the clinics and understand the importance of quality care. As men were the dominant interviewees for this study, this may explain why distance to water for livestock is ranked as a bigger problem than distance to water for people. Maasai women continuously stress that for them, distance to water for human consumption is a paramount issue. Men often turn a blind eye to this problem, as it is women who are forced to walk long distance in search of this.

**The most mobile section of society is the youth.** Young people, particularly young men, are willing to relocate to find better opportunities. One reason for this is that young men under 34 did not qualify for land under land subdivision and so many do not own their own land. As such, they can be influenced as to where they settle, particularly if this may provide income-earning opportunities that could allow them to buy land and marry in the

future. Without land or income earning opportunities, youth remain in a cycle of dispossession within society.

**The eco-nature of settlement design varies depending primarily on two factors – whether the residents own the land and their financial ability.** Settlements are made from locally available materials, primarily wooden poles and doors, mud, sticks, and sheets. Wealthier members of the community, particularly safari guides, often have permanent stone or cement houses, and this is what everyone aspires to have. **Iron-sheet roofed structures (see figure 13) comprised nearly two-thirds (63.6 percent) of the total houses in homesteads studied.** Each homestead has an average of 4.7 houses, 3.1 of which have an iron-sheet roof. **96 percent of homesteads have at least one iron-sheet roof from which they could harvest water.** *The number of iron-sheet roofed structures were assessed because they represent opportunities for rainwater to be harvested.* As will be discussed shortly, this is currently an underused source of water collection.



Figure 13. Iron sheet roofing and some guttering on a house. Picture taken by Kimanyisho Sikona

**Families who own their own land are more likely to invest in permanent structures, such as good quality houses, cattle enclosures and private dams.** Good quality cattle enclosures, however, equates to cedar posts in the vast majority of cases, which has severe ecological consequences when not harvested responsibly. Similarly, fencing is becoming increasingly common, especially among the younger generation. This has serious ecological implications, both in terms of cedar and other wood posts used and cutting off migration corridors, as will be discussed shortly.

## Education

At present there are **32 schools** within the study area (see figure 14). These range from nursery to full primary boarding schools and there are two new secondary schools in Aitong and Talek. The Talek Secondary School is due to open in 2016.

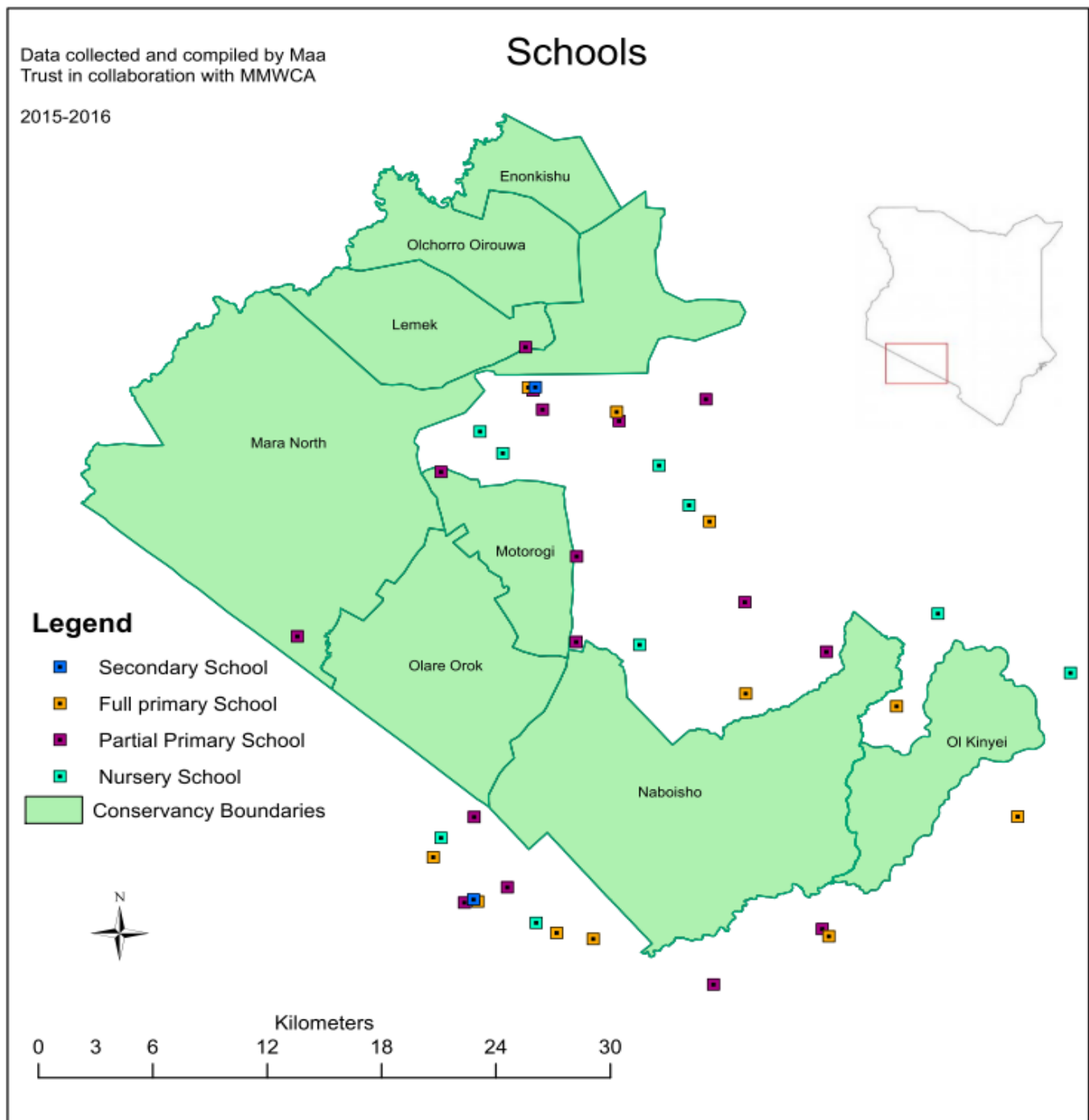


Figure 14. Schools in the Study Area

Exactly two-thirds of the population is under age 16 (66.6 percent). Of those who are of school-age, three quarters (75 percent) are in either primary boarding or day school, 9 percent are at day school but living at another house, 6 percent are in secondary school and 10 percent are not in school at all (figure 15).

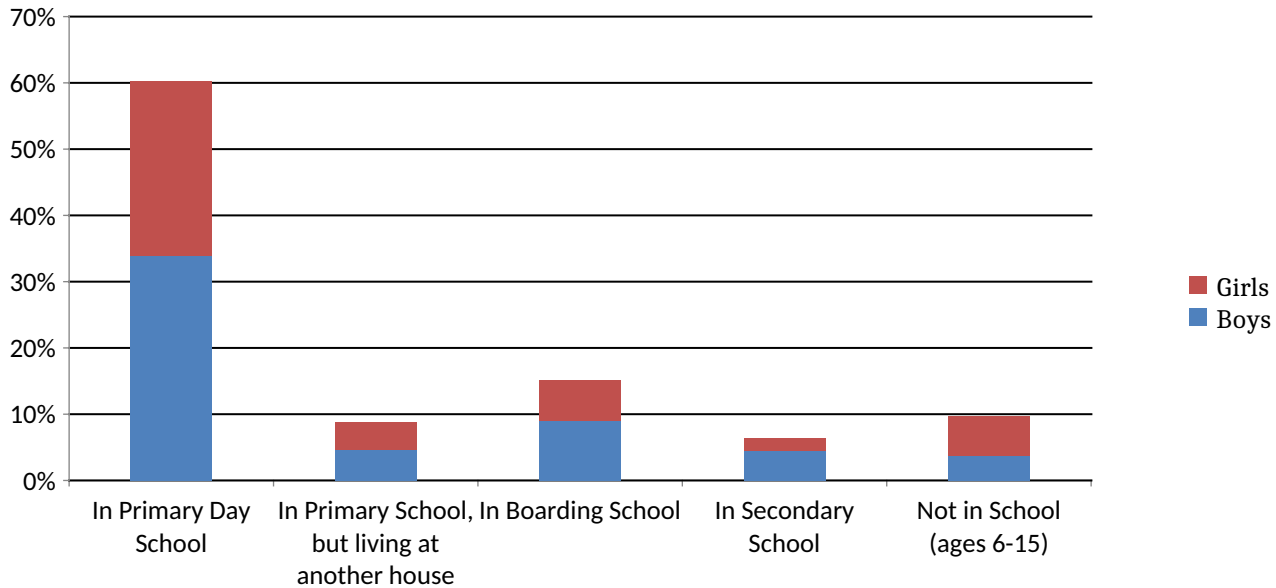


Figure 15. School Attendance of School-Age Children.

The two most concerning figures are that **one in ten children of school-age are not in school at all**, and that **only 6 percent currently attend secondary school**. It is also very possible that the number of children not in school at all is higher than that presented as it would be shameful for families to admit to the researchers that their children are not in school. Also, the understanding of what “school-age” is to participants will vary greatly as children can be as old as 10 or 12 before starting school. There is a visible gender differentiation in school attendance, with fewer girls in boarding school and secondary school, and more girls than boys not in school. We will return to gender inequality in education shortly.

Data collected and compiled by Maa Trust in collaboration with MMWCA

### Homesteads Containing School-Age Children Not in School

There are also geographical influences regarding school attendance, or the lack thereof. Figure 16 shows that the Northern and Western portions of the study site have higher rates of school-age children not in school, in comparison to the North and Eastern communities. In particular, Olemoncho, Oloosokon, Olare Orok and Olturotua have many homesteads with children not in school.

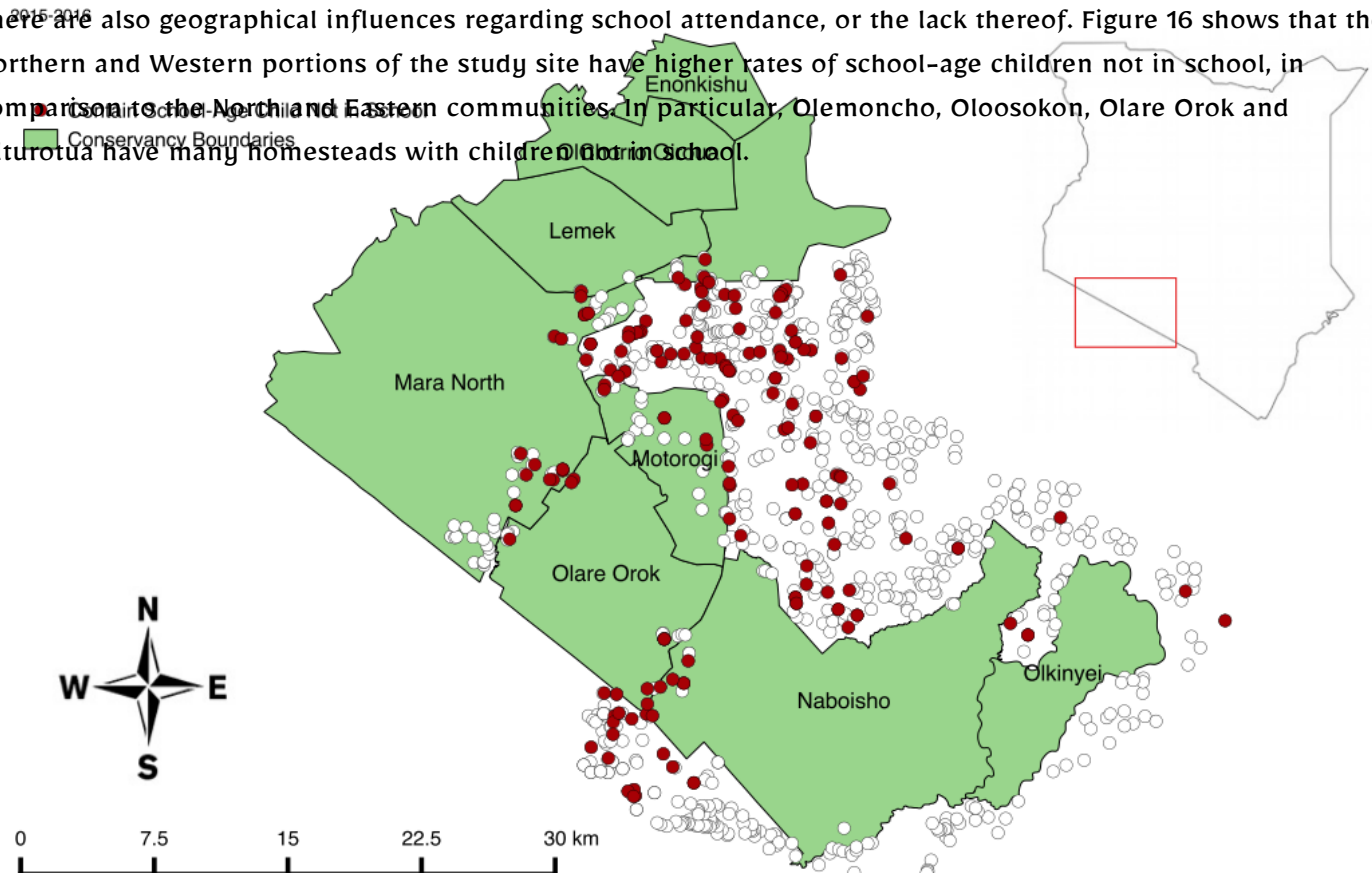




Figure 16. Map of Homesteads with School-Age Children Not in School

When also looking at the location of schools on top of this map, there is a possibility that the proximity to a school is one of the reasons why some school-age children may not currently be in school (see figure 17).

## Homesteads Containing School-Age Children Not in School

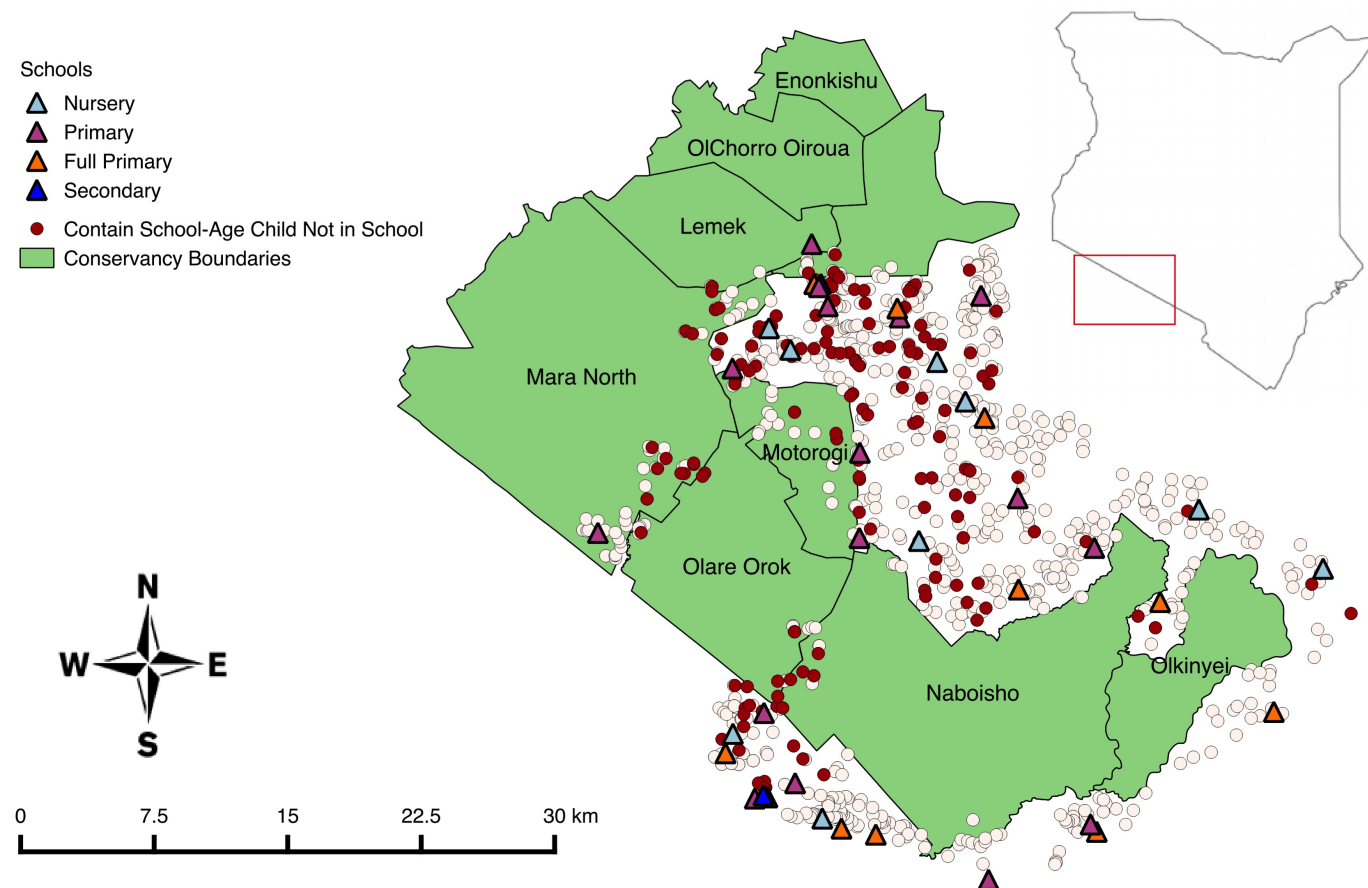


Figure 17. Schools and Homesteads with School-Age Children not in School

The Olchorro area just to the North of Motorogi Conservancy shows a cluster of homesteads with school-age children not in school, and there are no schools within a 3-4km walking distance. Similarly, the 10 homesteads in Mara North Conservancy, to the North of Olare Orok community with children not in school are a considerable distance to Olare Orok School. On the other side of Olare Orok Conservancy, around the Ngila area there are many houses with children not in school. Although Mara Hills Academy is in this area, this is a private school, which may be more expensive than families are able or willing to pay for education in this area.

### Gender Inequality in Education

The data shows that girls are beginning to attend school at a more comparable rate to boys (although not yet equal), but they are still greatly over-represented in figure 15 in the categories “not in school” and underrepresented in boarding and secondary school. The drop out rate for girls through school progression is significantly larger than boys, this is represented in figure 18 below from nursery to secondary school.



## Gender in Education

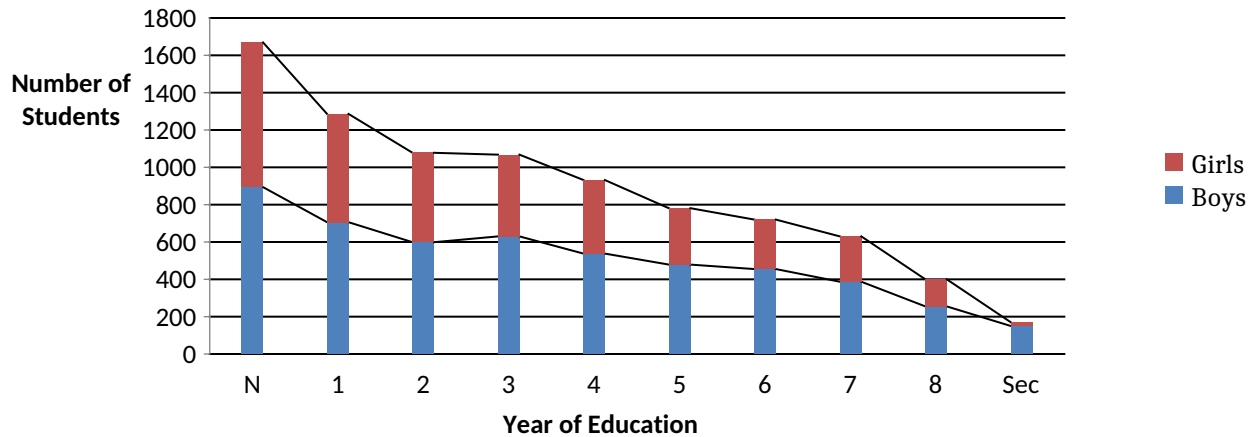


Figure 18. Gender Inequality through Education

There are currently 5093 males and 3643 females enrolled in all schools, equating to an average gender ratio of 1:0.72. This however, varies greatly according to education level. Figure 19 below shows that in nursery the ratio of boys:girls is 1:0.87 but in secondary school this is down to 1:0.13. The greatest decrease is between primary and secondary school, however, a drop is also visible after class four when girls are often withdrawn for marriage once they near puberty.

## Gender Ratios in Education

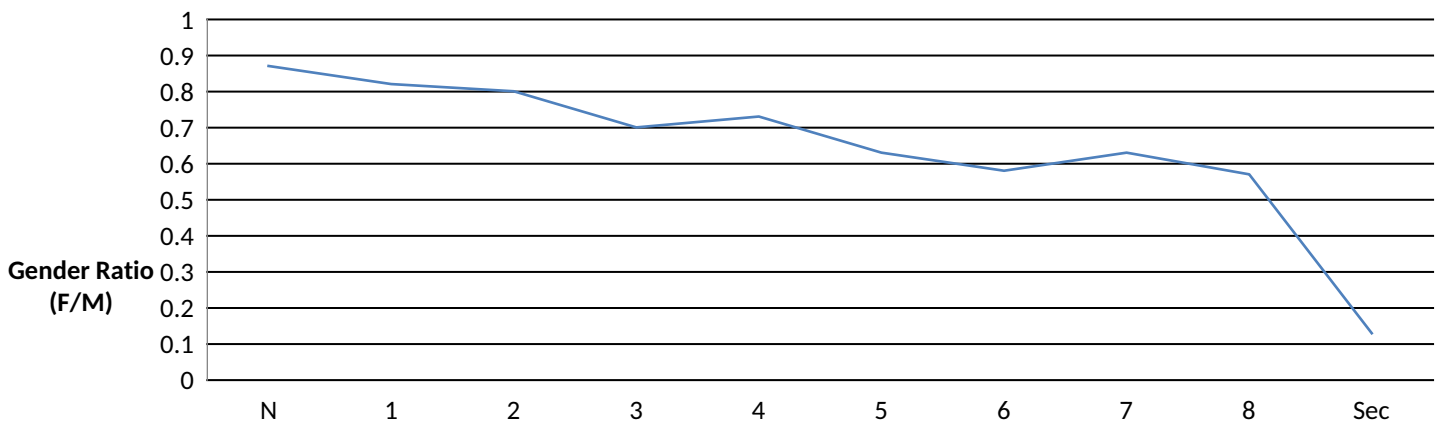


Figure 19. Gender Ratios in Education

Figures 18 and 19 both show that there are decreases in the proportion of girls present in education within the study site and their representation in secondary schools in the Mara is particularly striking.

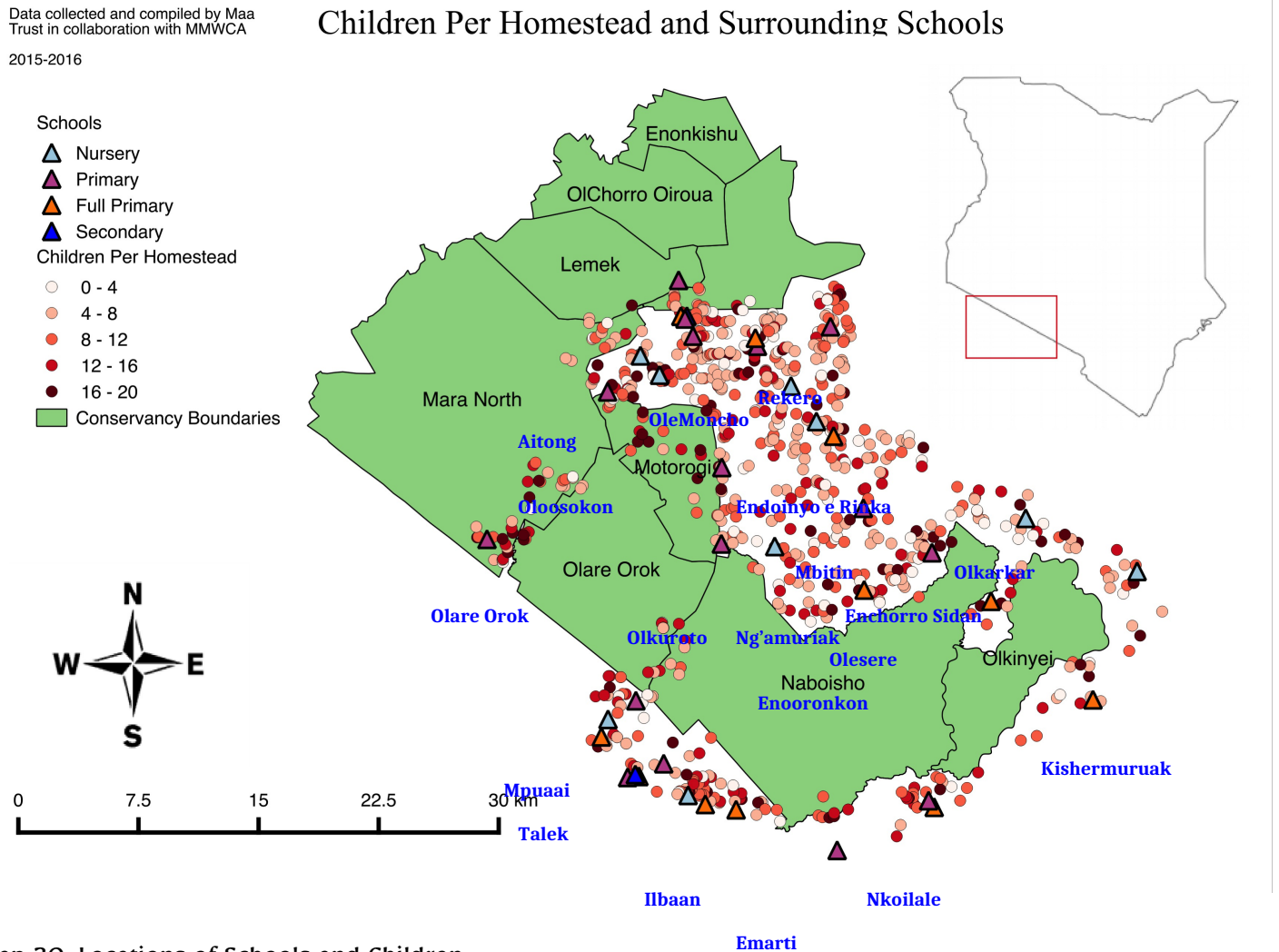
In table 1 below, a pink M:F ratio indicates that there are more girls at the school than boys. A purple ratio indicates a higher than average proportion of girls. Blue indicates a lower than average proportion of girls. The table shows that it is more common for girls to outnumber boys in institutions in the lower end of the education scale. Endoingo e Rinka School is the one anomaly – a full boarding primary school that has more girls than boys.

Highest Grade	School Name	M	F	M:F ratio	Total Students	Total Teachers	T:S ratio
Nursery	Puan Academy	25	22	1:0.88	47	3	1:16
	Olkarkar	51	34	1:0.67	85	2	1:43
	Ewangan	15	15	1:1	30	3	1:10
	Mara Pardmat Academy	10	3	1:0.3	13	1	1:13
	Osero Academy	37	24	1:0.65	61	3	1:20
	Mayian Academy	29	30	1:1.03	59	4	1:15
	Ntipilikwani Academy	12	14	1:1.17	26	1	1:26
	Mara Valley Academy	30	25	1:0.83	55	2	1:28
	Olomelok Junior	11	12	1:1.09	23	3	1:8
<i>Subtotal</i>	9	220	179	1:0.81	353	23	1:15
> Grade 1	Mara Light Academy	34	24	1:0.71	35	4	1:9
> Grade 2	Naboisho Primary	50	63	1:1.26	113	3	1:38
> Grade 3	Nterere Primary	39	48	1:1.23	87	4	1:22
	Olkuroto Primary	51	35	1:0.69	86	4	1:22
	Mara Elite	48	47	1:1.2	95	5	1:19
> Grade 4	Olare Orok Primary	112	116	1:1.04	228	8	1:29
	Mbitin Primary	130	68	1:0.52	198	6	1:33
> Grade 5	Emarti Primary	109	62	1:0.57	171	4	1:43
	Enkeju Enkorien	55	45	1:0.82	100	5	1:20
	St. John Mission	153	148	1:0.97	301	12	1:25
> Grade 6	Olkimitare Primary	99	119	1:1.2	218	9	1:24
> Grade 7	Talek Vision Academy	141	115	1:0.82	256	11	1:23
	Rekero Primary	135	91	1:0.67	226	7	1:32
	Mara Hills Academy	187	100	1:0.53	287	14	1:21
	Molibany Primary	146	81	1:0.55	227	9	1:25
	Oloolomei (Oloosokon)	218	163	1:0.75	381	11	1:35
<i>Subtotal</i>	16	1707	1325	0.77	3032	116	1:26
Full Primary (to grade 8)	Oloibormot Primary	74	52	1:0.70	126	9	1:14
	Olesere Primary	313	203	1:0.65	516	11	1:47
	Olemoncho Primary	177	162	1:0.92	339	13	1:26
	Talek Primary	401	229	1:0.57	630	21	1:30
	Loigero Primary	228	122	1:0.54	350	17	1:21
	Nkoilale Primary	370	248	1:0.67	618	20	1:31
	Kishermuruak Primary	292	217	1:0.74	465	15	1:31
	Ilbaan Primary	321	186	1:0.58	507	18	1:28
	Oloochurra Primary	230	135	1:0.67	365	16	1:23
	Aitong Primary	321	257	1:0.80	578	22	1:26
	Endoinyo e Rinka	289	308	1:1.07	597	9	1:66
<i>Subtotal</i>	11	3016	2119	1:0.70	5135	171	1:30
Secondary	Maasai Mara	150	20	1:0.13	170	9	1:19
	Talek Secondary	Opening 2016					
<i>Subtotal</i>	2	150	20	1:0.13	170	9	1:19
<b>Total</b>	38	5093	3643	1:0.72	8736	319	1:27



On average there is a teacher:pupil ratio of 1:27. Nursery schools have a lower average of 1:15. The worst ratios were found at Olesere Primary School with 1:47 and Endoinyo e Rinka School with 1:66.

Figure 20, below, shows the number of children per homestead in addition to the location of schools. This map was made in order to assess whether there are large concentrations of children residing in areas where there are no schools. The only areas standing out are those within conservancies, namely Motorogi and Mara North.



### Map 20. Locations of Schools and Children

## Homesteads With Children in Secondary School

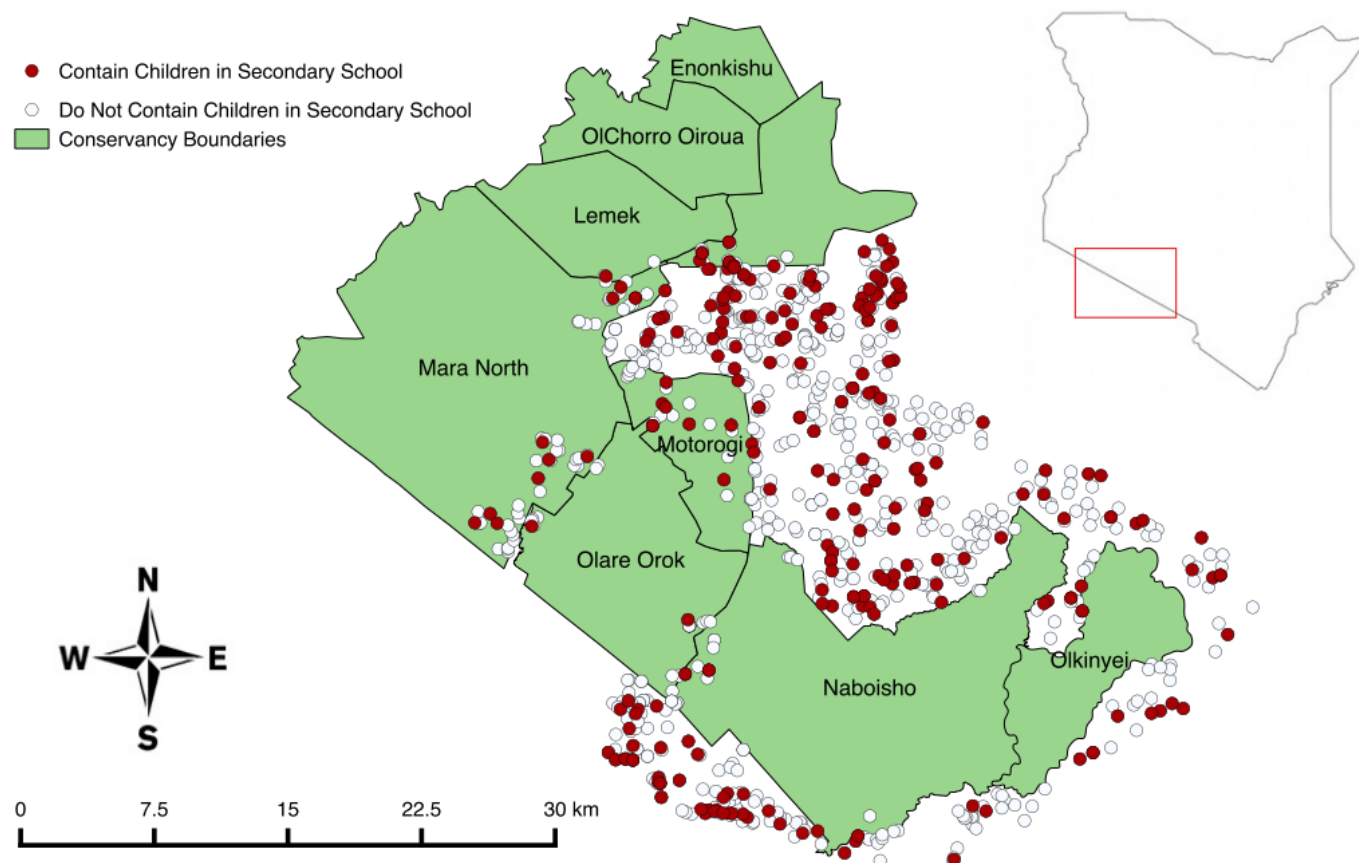


Figure 21. Homesteads with Children in Secondary School

Figure 21 above displays the location of homesteads with children in secondary school. One surprising find is that remote communities such as Rekero have few children not in school, and many in secondary school. There are fewer homesteads in other remote communities bordering the Pardamat Hills (Mbitin, Enchorro Sidan and Olkarkar) with children in secondary school. There are also relatively few homesteads located within conservancies with children in secondary school. Together with the former finding, this suggests that **homesteads inside conservancies are more likely to have children of school-age not attending school at all, and fewer reaching secondary school**. Whilst living in such locations can have benefits for livestock by being close to grass banks, it may have a detrimental impact upon children's education.

## Churches

There are 20 churches spread quite evenly across the study site. Their location is shown on figure 22 below.

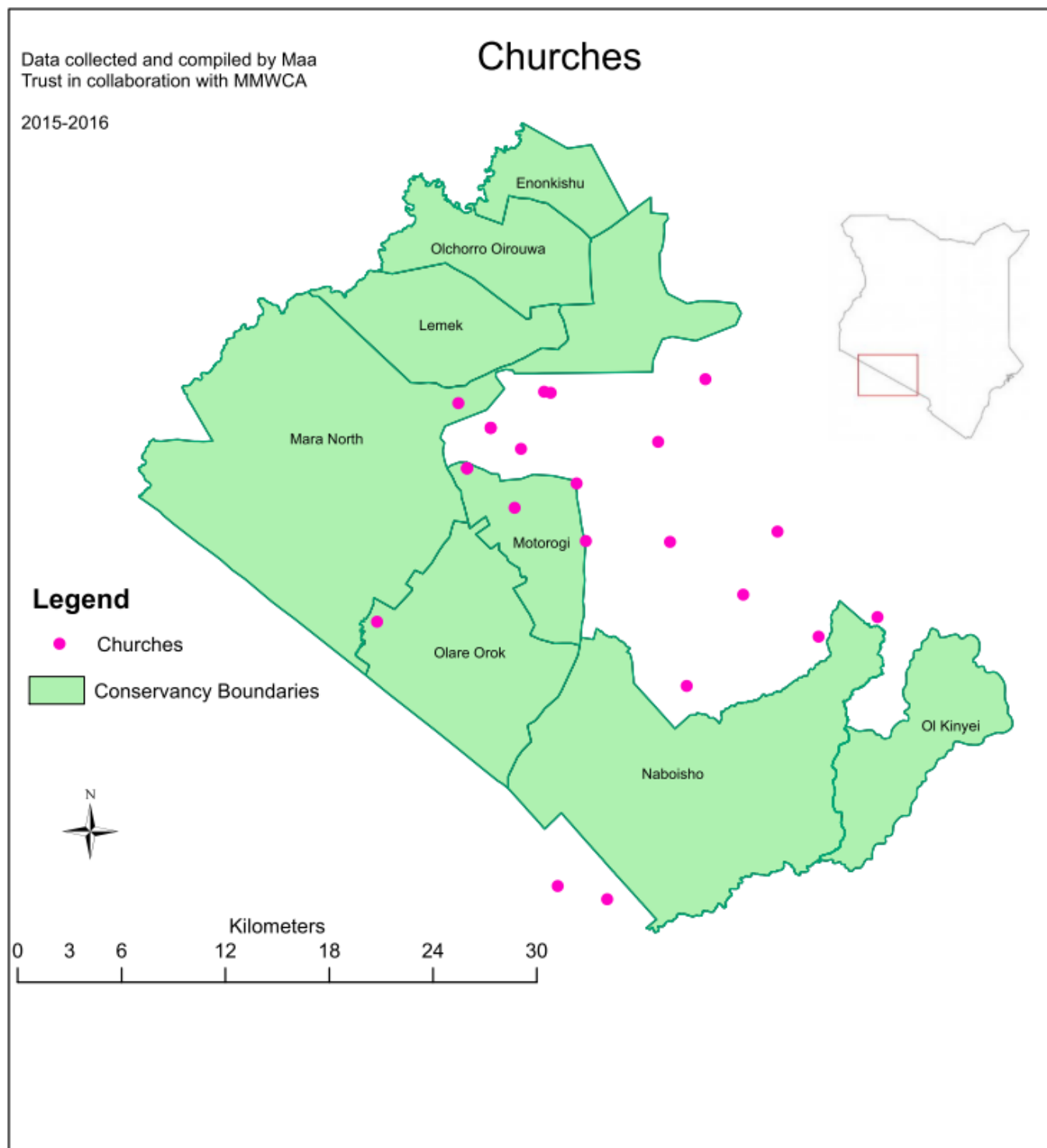


Figure 22. Churches within the Study Site

## Water and Sanitation

Participants were also asked where they collect water for human consumption and how long it takes them to go to the source, collect the water, and return home. During the dry season:

- 50 percent of people collect their drinking water from a nearby spring
- 16 percent from a borehole
- 11 percent from a hand pumped-well
- 13 percent from a river.

**On average, it takes people 80 minutes to collect this water. Only one-quarter of people (25 percent) are able to collect their water in 30 minutes or less – the UN threshold of acceptability for the human right to water and sanitation.**

When looking at the communities most easily able to obtain water for human consumption during the dry season, Olesere, Mbitin, Talek, Enkeju Enkorien and Nkoilale have the highest concentrations of people able to collect water in 30 minutes or less. Olesere, Talek, Enkeju Enkorien and Nkoilale all had functioning boreholes during this research (with the exceptions of when they run dry), and there is a permanent spring in Mbitin. At the other end of the extreme – **people who must travel for two hours or more in the dry season to get drinking water – populations are clustered around Rekero, Endoingo e Rinka, Oloosokon, Oloochura, Osilale and Olare Orok.**

In comparison, **during the wet season 85 percent of people are able to collect their drinking water within 30 minutes.** This is primarily due to the fact that nearly half (49 percent) use rainwater-harvesting methods (albeit basic), and the remainder can use seasonal streams, or replenished springs and rivers.

Figures 23, and 24 show the location and type of water points and those that are improved water sources respectively.

Data collected and compiled by Maa  
Trust in collaboration with MMWCA

2015-2016

## Water Point Types

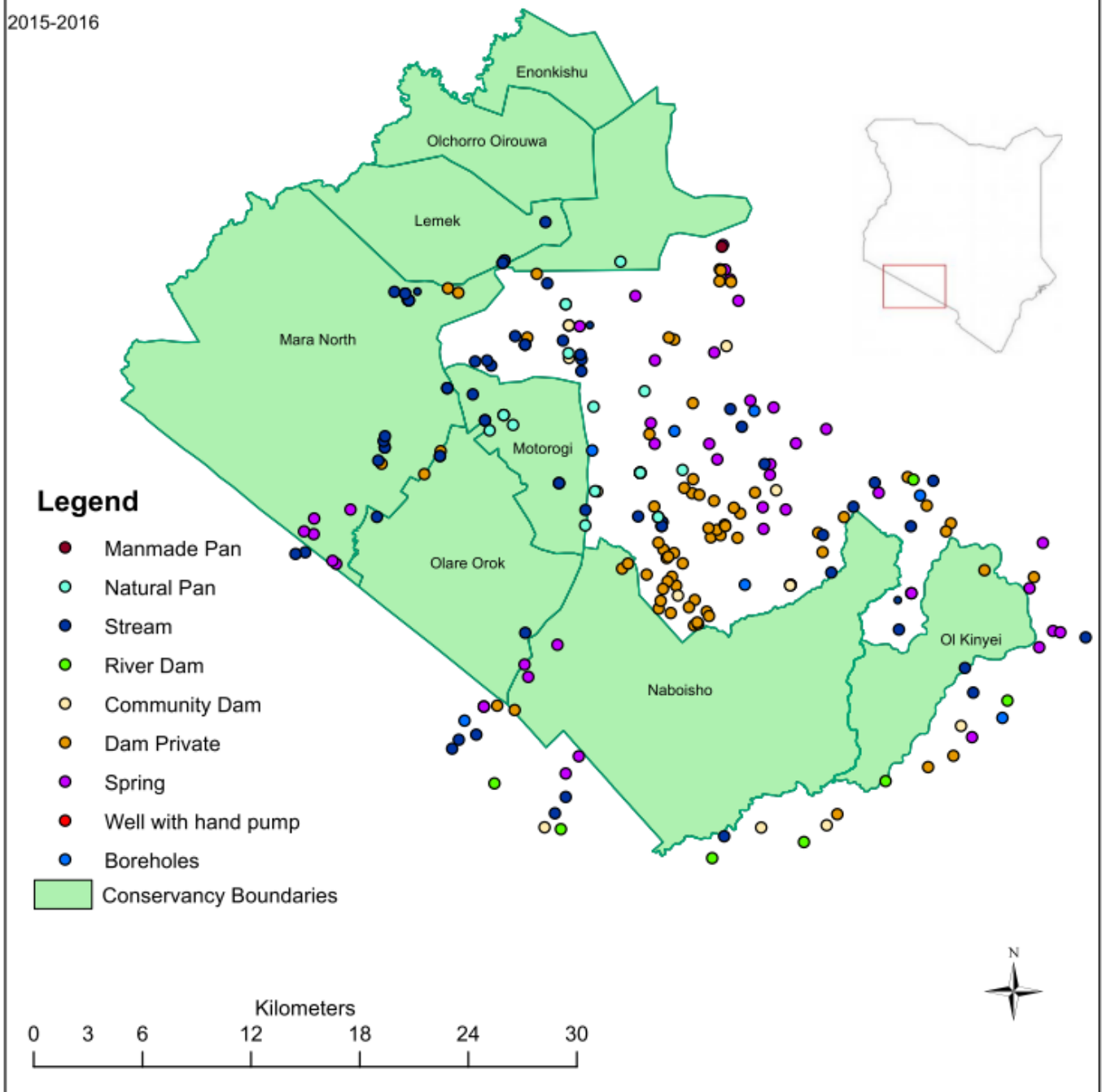


Figure 23. Water Point Types

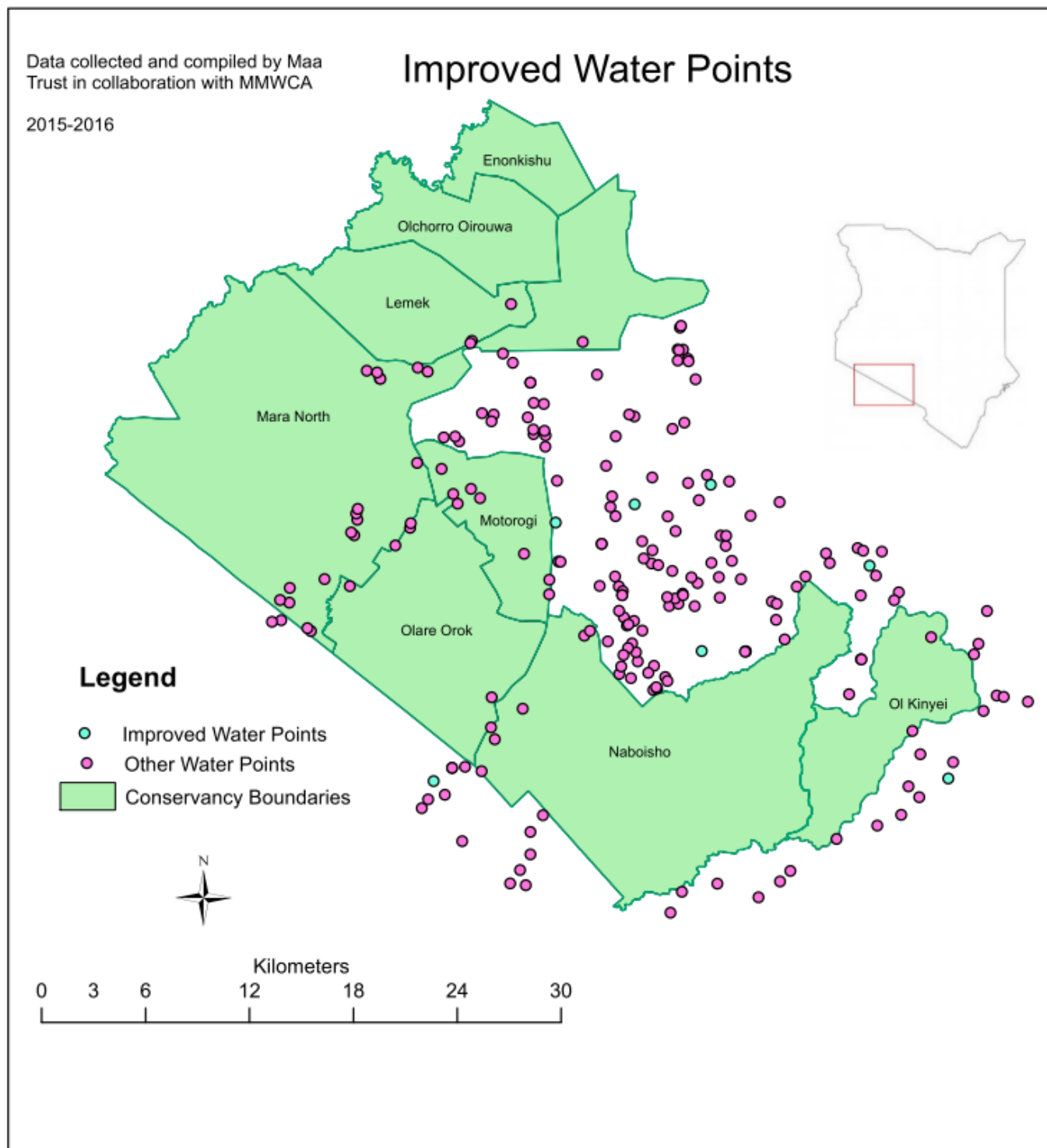


Figure 24. Improved Water Points

Over 90 percent of homesteads reported having some type of rainwater-harvesting collection method. However, approximately half (49 percent) of homesteads only collect rainwater using basins or buckets. About one-third (31 percent) use drums and 10 percent have plastic rainwater tanks. Given the overwhelming presence of iron-sheet roof structures in homesteads – 96 percent having at least one – **homestead level rainwater harvesting has a great potential in clean water provision across the study area.**

Participants were also asked to estimate the number of jerry cans of water they collect per day. From these figures, it was estimated that **the average homestead uses about 213 litres of water per day, or 11.6 litres per person per day**. The median, however, is less at 160 litres per homestead, and 10.9 litres per person. *This is below what the WHO considers necessary for drinking, basic personal hygiene and basic food hygiene needs – which is 20 litres per person per day*. Large homesteads tended to have higher averages of water consumption than smaller homesteads. There was an enormous range in estimations, from just over 1 litre per person per day to up to 60 litres per person. **The majority of homesteads, however, fall between 4 and 20 litres per person per day**. Figure 25 below suggests that there is little geographical variation with regard to water usage per person. Surprisingly, however, the Talek area seems to have low water consumption despite reliable borehole water provision.

Data collected and compiled by Maa  
Trust in collaboration with MMWCA  
2015-2016

### Homestead Water Usage Litres/Person/Day

Water Consumption Litres/Person/Day

- 1 - 10
- 10 - 18
- 18 - 27
- 27 - 36
- 36 - 44

■ Conservancy Boundaries

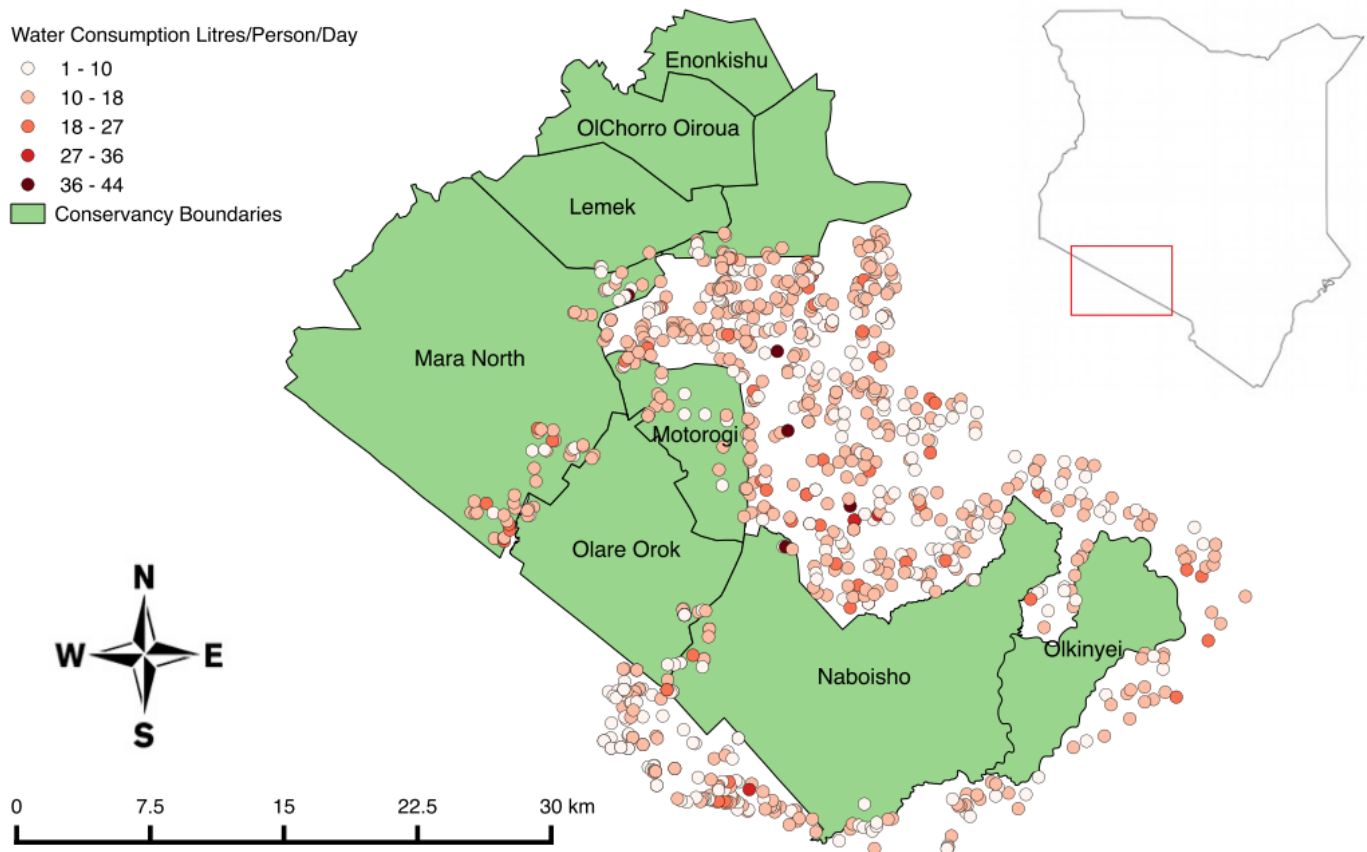


Figure 25. Average Water Usage

**Only two of every five homesteads (42 percent) indicated that they treat their drinking water.** Of those who do use some form of water treatment, roughly half (52 percent) boil their water. Approximately 30 percent use water guard or chlorine tablets, while 20 percent use filtration.



Given that people are generally reliant on livestock for their livelihood, participants were also asked where they take their cattle, goats, and sheep to drink during the wet and dry seasons and how long this takes. *During the dry season, it takes people on average just under two hours (110 -115 minutes) to drive their cattle or shoats (the collective term used for sheep and goats) to a water source, while in the wet season it takes on average only 23-25 minutes. During the dry season, the vast majority of people take their livestock to either a private or community dam or river; in the wet season, the primary sources are rivers or seasonal streams.*

Issues of access come into play when looking at the trends around how far a homestead must travel to collect water. Some homesteads appear close to water source on the map, but travel long distances for water. For livestock water this is because these closer water sources are private dams on other peoples' land and thus they still must travel great distances to enable their livestock to drink. For water for human consumption another contributing factor to not using the closest water source is the quality of the water, especially if this is shared with livestock and wildlife. Furthermore, only a handful of water collection points have water throughout the year. The vast majority run dry at some point during the dry season, again pushing people to travel further to collect water. In a dry period during the research period, even 100m boreholes were running dry due to the over-usage

of

Data collected and compiled by Maa  
Trust in collaboration with MMWCA

2015-2016

and

season

withir

## Seasonality of Water Points

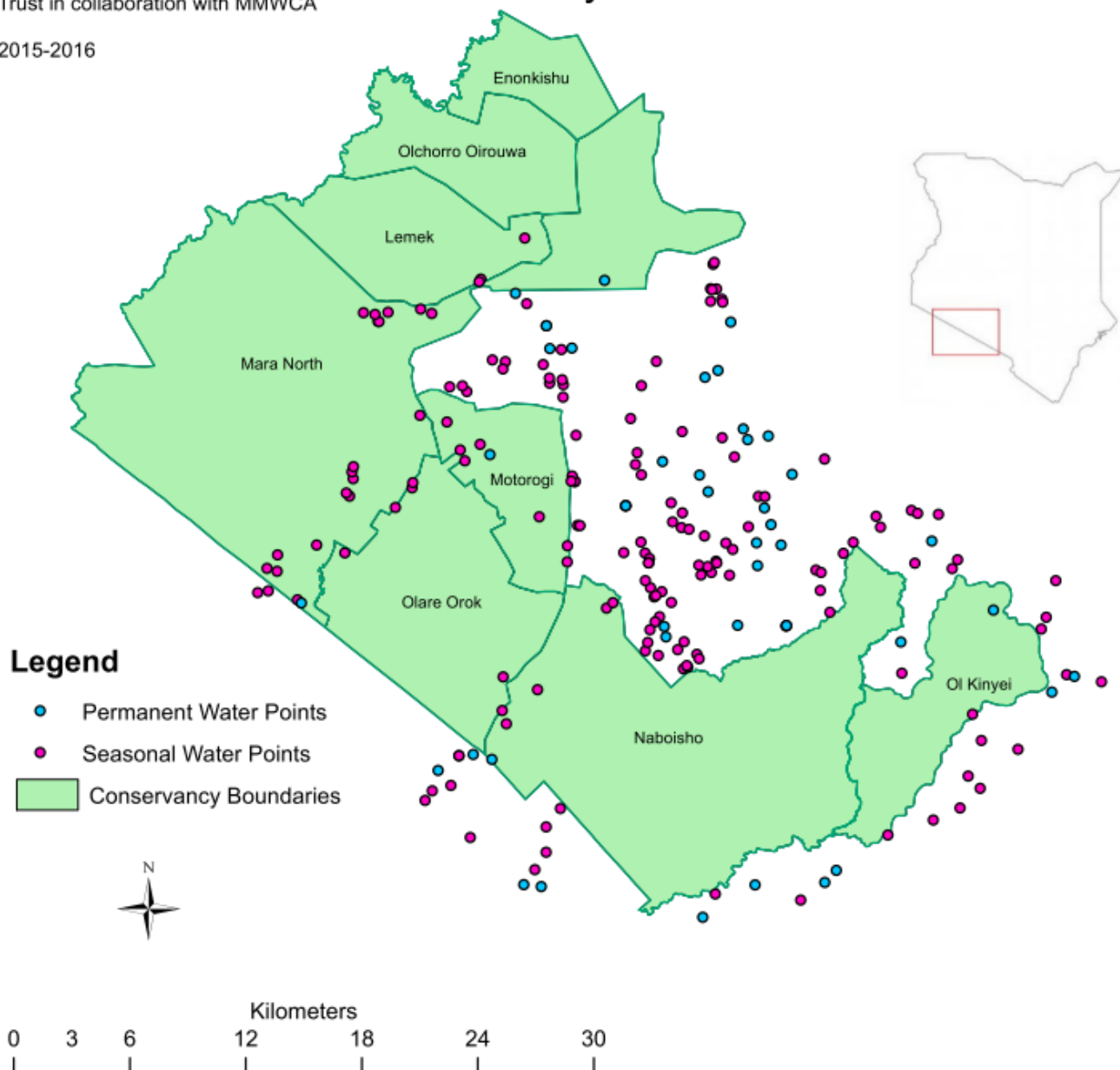


Figure 26. Seasonality of Water Points

While the location of available water sources is an important issue, **it does not seem to be the primary driver determining where people settle**. For example, when a landowner in Olesere chose to subdivide his land plot to form a shopping centre, the surrounding population spiked. This was during an extended, two-year period when the Olesere water project was not functioning. A lack of water should have been a deterrent, but it was not. For youth, employment opportunities are the key factor determining settlement, at least in the short term. In areas where land has been subdivided and people have put up infrastructure – such as permanent houses, high quality livestock enclosures or private dams – these households are adamant that they will not move away on the basis of water availability. Water is not a big enough pull for them to abandon what they have invested in their piece of land. This is especially as it is a chore that falls to women, and men are usually the ones who decide where to settle and stay.

Only 16 percent of homesteads reported having a latrine. **83 percent of homesteads defecate in the open**. This includes bush, open areas and rivers, or on rare occasions (0.8 percent) a neighbour's toilet or at a school/clinic/church latrine (0.1) is used. Forty homesteads have two or more latrines, but this still only makes for a mean of 0.2 latrines per homestead, or **less than 0.01 latrines per person**, across the whole study area. Figure 27 shows the location of homesteads with latrines.

## Latrine Distribution Among Homesteads

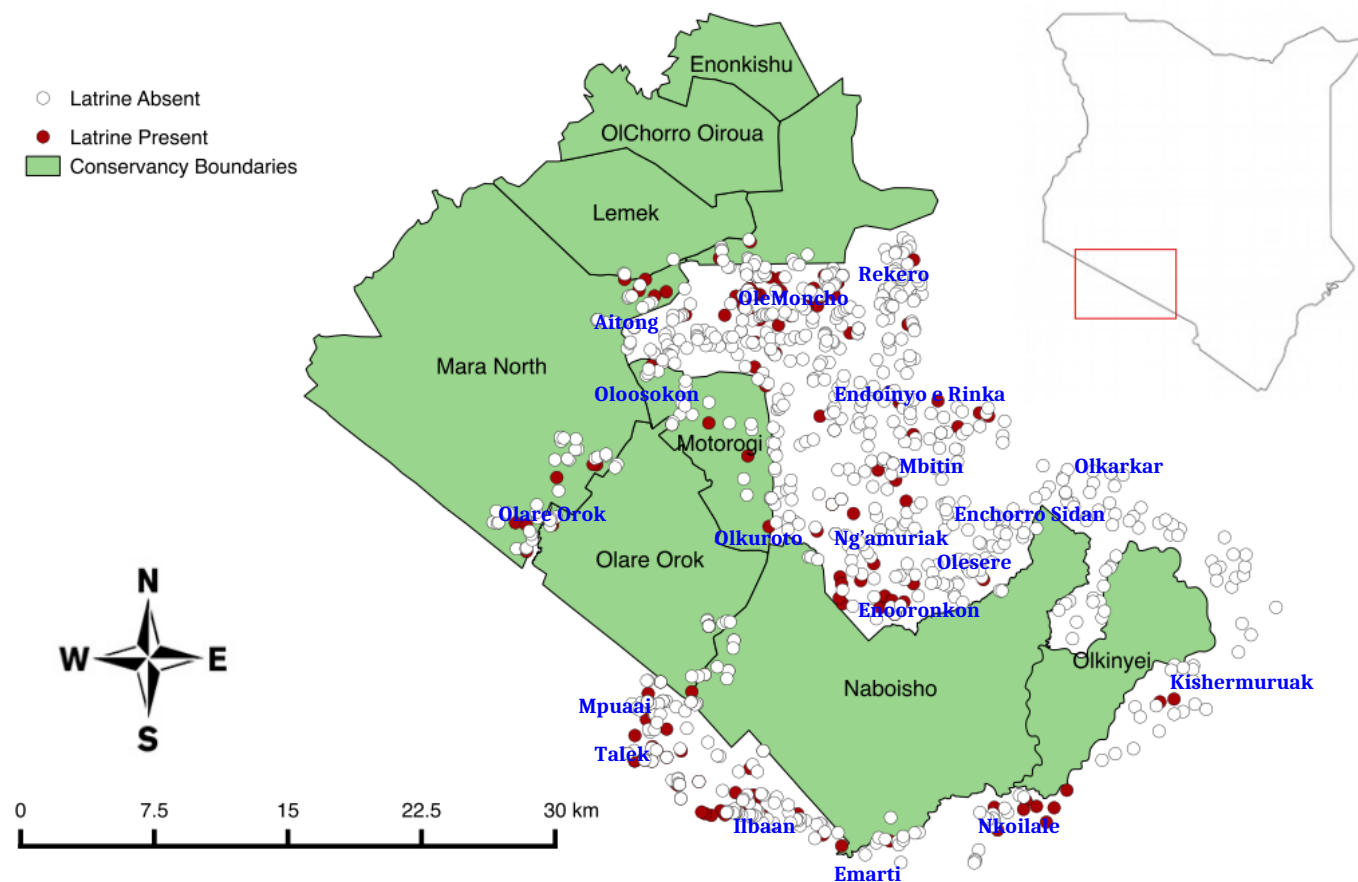


Figure 27. Homesteads with latrines

Figure 27 above shows that there are clusters of homesteads with latrines around more urban centres including Nkoilale, Talek, Ilbaan and Aitong. Surprisingly there is also a cluster in the Enooronkon and Ng'amuriak area. There are two possible reasons for a cluster in this rural location. Firstly, there are several safari guides who live in this area in modern houses with toilets and they may have encouraged neighbours to follow suit. Secondly, these homesteads are on an open plain with few bushes, trees or rivers to defecate in or seek privacy from.

Homesteads were also asked about their hand-washing habits and the availability of soap at their homestead. **All participants indicated that they typically wash their hands with soap** and 98% indicated that they currently have one or more bars of soap at the household. It should be remembered, however, that is unlikely that participants would have admitted openly to not washing their hands, or not having soap. Participants were also asked what type of hand-washing equipment they have available. **Nearly 90 percent use hand-poured containers, while 8 percent have a "tippy tap" or "leaky tin"**. The remaining 3 percent are evenly split between having a running tap or using an open container in which to dip their hands.

### Urban Centres and Amenity Location

The designs within shopping centres is inconsistent as each individual landowner decides how to lay out the buildings on his plot. **There is no broader plan for the collective design of centres and consequently the construction is done in an *ad hoc* way.** The eco-nature of centres depends upon the level of community organisation and the partnerships that these communities have with external organisations. Nkoilale has a higher eco-rating than other villages, because it has its own community development organisation that comes together to make decisions and is supported by a Dutch organisation called Stitching Nkoilale. For example, Nkoilale Primary School has recently set up their own recycling scheme and is generally very proactive in these matters. Other communities that have close affiliations with conservancy organisations are also more conscious of ecological issues than others. Exemplifying this, Mara North Conservancy has assisted Aitong with trying to manage the disposal of waste in their community.

**If the desire is to build up centres rather than spread the population evenly across the study site then the location of major amenities – larger schools, health facilities and the bulk of skilled and unskilled labour opportunities – should be located in more urban areas to attract the landless and job-seekers.** The planning of these locations should also fit into the broader set of strategic objectives for rangeland management. For example, Talek Centre, which developed at the entrance of Maasai Mara Game Reserve and at the juncture of many conservancies, presents an issue for wildlife migration and increases the likelihood of human-wildlife conflict. At present there is no organisation as to where new centres should develop. Olesere centre was created when one landowner decided to subdivide his land into small plots and sell it to local Maasai investors who built properties which are leased to businesses.

**While the construction of main centres, and job opportunities that can attract youth should be planned along the borders of the Mara ecosystem, other amenities that are not pull factors, but are basic needs that influence quality of life (such as water points and nursery schools) should be widely dispersed.** Without these basic amenities the burden would be placed on women to travel longer distances for water for human consumption, and the children would be disadvantaged by not getting access to crucial early childhood development classes, or perhaps even no school at all. Currently, nursery and feeder schools are appearing rapidly, often in residential areas that are more than 1km from existing primary schools. It is often guides who will start these small, private schools, and sometimes their wives who will run them. **It is important for there to be a plan for these institutions, however, to ensure that they do not develop into full primary schools in inappropriate locations.**

**This research suggests that the provision of such basic amenities does not affect settlement patterns.** For example, the Motorogi water troughs at Enkeju Enkorien are presently the only source of livestock water for many kilometers in dry seasons. People come with livestock from as far as Endoinyo e Rinka and Rekero, but they are not moving and settling in the area – only bringing their livestock when necessary.

If water projects were restricted to urban areas, this could potentially negatively impact perceptions of conservancies, which restrict access to traditional water sources. People may also be unwilling to take their livestock to urban areas for water, and instead drive them onto conservancy land, which would put further pressure on conservancies. Conservancy managers explained that **a lack of water for livestock as a rationale for needing access into conservancies. This is often a thinly-veiled guise to give them access to grazing on conservancy land. *Providing water for livestock within a reasonable distance can therefore***

*reduce livestock pressures and tensions for conservancies.*

Furthermore, *placing initiatives such as water points in rural areas has the opportunity to improve peoples' perceptions of conservancies.* Many people do not realise that, even in the absence of conservancies, they would not be able to access their traditional water sources, as these would now fall on land owned by an individual. If the link is clearly made between water projects and conservancies, conservancies can be seen to be proactively addressing the needs of communities.

## Fencing

Fencing remains a divisive issue in the Mara as a whole, but **ALL homesteads questioned intend to fence to some degree in the future.** As such, fencing is a central issue to be grappled with. At the time of the survey, homesteads were split roughly evenly on whether they currently had any form of fencing at their homestead – **52 percent with and 46 percent without.** Figure 28 below shows the location of fences as of November 2015.

Data collected and compiled by Maa Trust in collaboration with MMWCA

2015-2016

### Homesteads and 2015 Fence Study

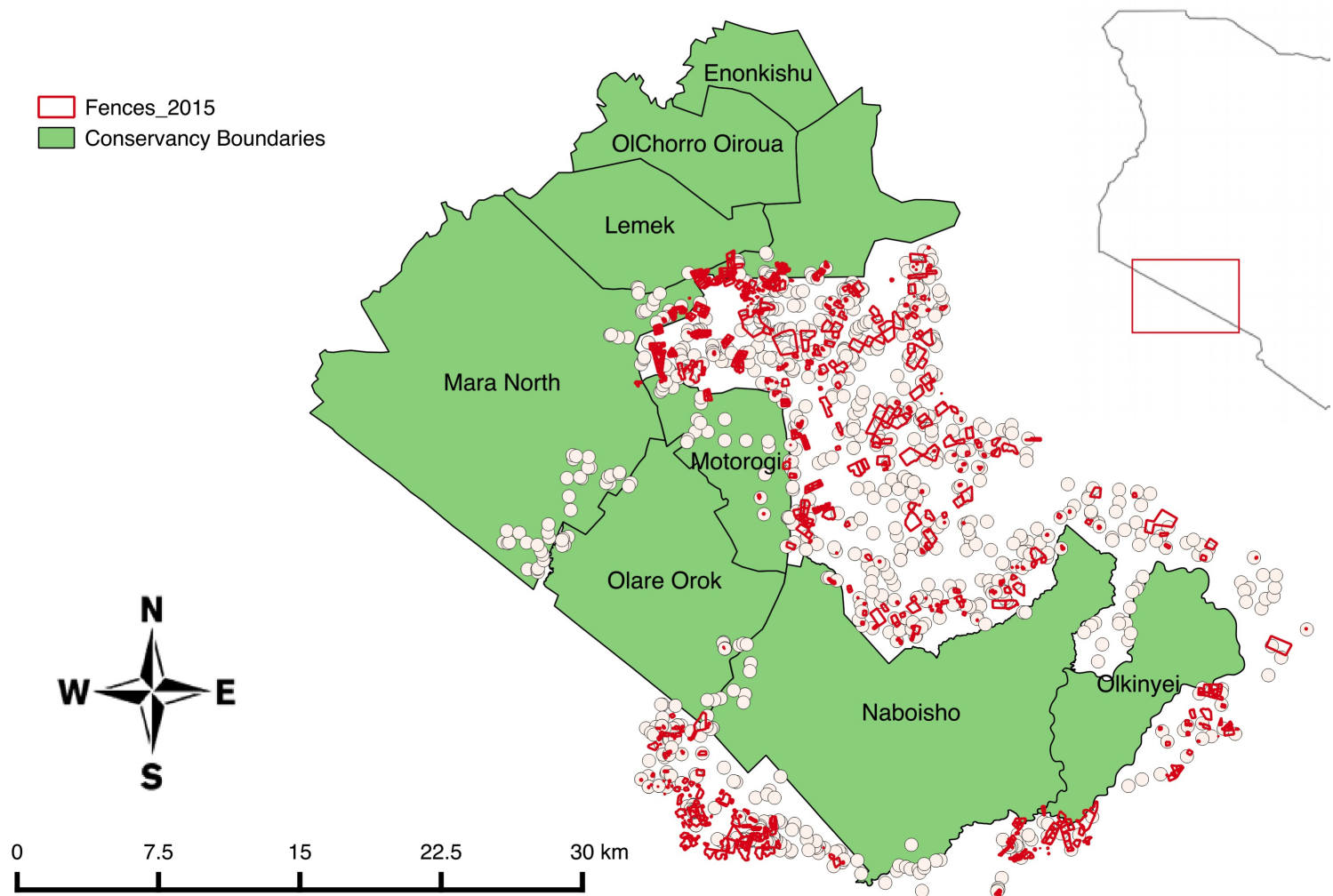


Figure 28. Fences and homesteads

The total area studied was 236,000 acres. 123,600 acres of this study area is conservancy land. Of the remaining 112,400 acres, **11601 acres are inside the fencing** shown on figure 28. This equates to **10.3 percent of non-conservancy land** within the study area.

The researchers evaluated what type of fencing the homestead had while on site. Of the 52 percent who had fenced, the researchers observed that approximately **half of these homesteads (65 percent) had constructed a fence or laid branches around their houses. 68 percent had clearly fenced a portion of their land for livestock grazing – either a small amount of land (43 percent) or a large amount of land (25 percent).** These were subjective estimations, but a large parcel of land was generally considered to be more than five acres. In 33 percent of fencing cases, both the houses and a portion of land had been fenced.

While many older people were initially opposed to fencing, **younger adults (ages 20–40) spearheaded this effort and now it is SEEN AS THE ONLY WAY FORWARD. The main reason for this is that *traditional grazing practices could no longer be applied today*.** Previously, elders and area leaders would decide which areas were to be grazed and when, and which grasses would be allowed to grow and regenerate. Fences were unnecessary, as everyone would obey these instructions. However, this management system cannot work as things stand on privatized subdivided land with individual owners.

Today, people **find fences desirable because:**

1. It prevents other peoples' livestock from eating grass on their land.
2. It allows grass to grow which can be used to fatten bulls or for livestock during drier periods.
3. It stops wildlife from 'stealing' grass intended for livestock. Wildlife is increasingly seen as direct competition against livestock as more landowners begin to understand livestock : land stocking ratios.

As more people put up fences, the pressure increases for each individual to enclose any remaining unfenced land. Tension is also building at the community level, as **people are beginning to stand up to those who have fenced their own land and yet continue to graze their sheep on other peoples' land** – but denying access to livestock is culturally an alien practice. Conservancy landowning companies are also considering restricting conservancy grazing access to those who have fenced all of their land in order to protect what is left of the commons. **Fencing and grazing are such inextricable issues that if fencing is to be undertaken, grazing must be managed.**

The materials people use to fence vary widely, including both natural and non-natural materials. The most common natural, fencing materials are poles made from local trees (60 percent) or cedar posts (30 percent). These cedar posts are usually felled illegally and come at a direct cost to the Mau and Loita forests. The remaining 10 percent of natural materials used include gum posts or acacia branches.

Individual landowners, as well as schools and clinics, often also use non-natural materials to fence an area. Of these, barbed wire is the most commonly used (64%), followed by electric fencing (29%) and chain link (7%). Electric fences powered by solar panels are becoming increasingly popular, as they are thought to be able to keep out larger wildlife. **This costs approximately 500,000 KSH to fence 90 acres of land.** However, not all fences are well maintained and this is a cost that is often not understood when initially constructing a fence. If poorly



maintained, some fences only have a lifespan of two to four years.



Figure 29. Broken fence at Nkoilale. Photo taken by C. Courtney

The current rate of growth in fencing is astonishing. While undertaking the study, it was difficult for the researchers to even keep up with the growth of fences. They would attempt to gather data from a certain region, but found that only a week or two later, they had to retrace their steps, because new fences had cropped up. This was especially true in the run up to rainy seasons whereby landowners rushed to put up fences to benefit from new grass growth brought by the rains. Figure 30 below shows the fences mapped by the Gnu Landscapes Project in February 2014 against those in November 2015.

## Changes in Fenced Area Feb 2014 - Nov 2015

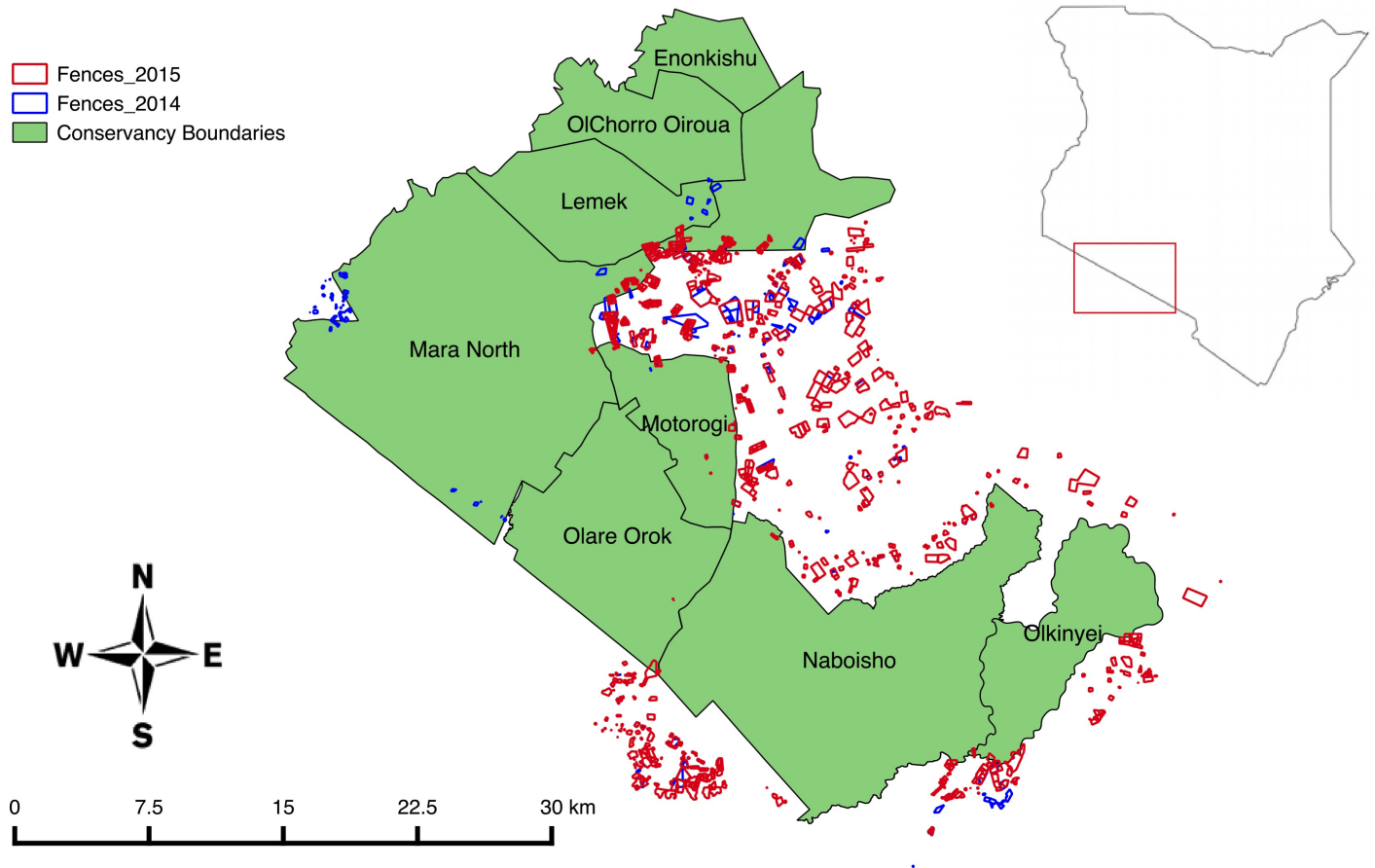


Figure 30. Fencing in February 2014 and November 2015

In February 2014 the total area fenced was 13.27km<sup>2</sup> or 3279 acres and the area mapped extended beyond the study site for this research. In November 2015, the fencing within the smaller study site was 46.95km<sup>2</sup> or 11601 acres – a **354 percent increase over 21 months**.



## Conclusion and Recommendations

The following recommendations and conclusions have been put forward from the research conducted:

### **Current population and growth rate**

The study revealed an astronomical crude birth rate of 90.8 per 1000 population in the Mara. This is 3.2 times greater than the average birth rate in Kenya, which was 28.3 per 1000 population. As a result of this population growth there is a very skewed population dynamic with two-thirds of the population under age 16 years and only 2 percent of the population over 65 years of age.

Keeping the population growth rate in the Mara at bay will be crucial in avoiding a population explosion and its subsequent environmental consequences on the Mara ecosystem. The introduction of family planning will also help the Maasai people achieve a better quality of life by having family sizes they can sustain. Also, it will help in checking the environmental, human-wildlife and socioeconomic challenges faced in the Mara.

### **Current understanding and availability of birth control methods**

The decision regarding family size is one that lies with the husbands and older men still believe that the number of children that you have shows wealth while, on the contrary, younger men define wealth as having fewer children. The most popular form of contraceptives as discovered in the research is condoms followed by daily oral contraceptive tablets. Implanon arm implants, a longer term contraception is available but not as popular and many women indicated that they were unaware of this long-term option. There are various factors inhibiting uptake of contraception and misconceptions held by women which need addressing to enhance the impact of a family planning project.

Education on the consequences of current population and the benefits of family planning is urgently needed for men, women and youth. Women should be adequately educated and empowered to participate significantly in decisions regarding family planning. On the other hand, family planning programmes, when started, should be intensified to incorporate the male folk and improve people's knowledge and perception on the benefits of contraceptive use in order to achieve the desired behavioral change towards family planning in the Mara ecosystem. By having the women know what options they have as regards birth control methods and having their male counterparts support their decisions, husbands and wives will be in the know and can possibly and subsequently plan family sizes together. Education amongst school children is also urgently needed drop outs resulting from pregnancy are common.

### **The Location of Settlements, Urban Centres and Amenities**

The research revealed that 16 percent of homesteads are less than one year old, however, some of these are settlement relocations. There are clusters of settlements under 1 year around the border of Naboisho and Olkingei Conservancies, the Southern side of Olare Orok community and around Olemoncho. The main influencing factor when deciding where to live was that they wanted to be near to family or friends, however, approximately 20 percent bought their land because of resource access for livestock (particularly grazing). This is a potential explanation for the clusters of newer settlements around conservancies. Only 5 percent of homesteads that have bought land chose the location because of access to amenities. Proximity to an urban centre, amenities and

employment opportunities are most important for the younger generation. Despite 60% of homesteads ranking distance to clinic as their biggest challenge, this was not considered a dominant influencing factor when deciding where to settle. This suggests that residents would like / expect services bringing to communities as opposed to communities moving to services.

While the construction of trading centres, large schools and health centres that create job opportunities that can attract youth should be planned along the borders of the Mara ecosystem where urbanization is desired so as to attract landless youth and job-seekers. At present urbanization is occurring in an adhoc way with no land use planning. This should be rectified to improve the functionality, attractiveness and eco-nature of the centres. Other amenities that are not pull factors, but are basic needs that influence quality of life (such as water points and nursery schools) should be widely dispersed within community areas. This research suggests that the provision of such basic amenities does not affect settlement patterns. If water projects were restricted to urban areas, this could potentially negatively impact perceptions of conservancies, which restrict access to traditional water sources.

### **Education**

At present one in ten children of school-age are not in school at all, and only 6 percent currently attend secondary school. Living within a conservancy may have a detrimental impact upon children's education as these homesteads have more children than average not in school and fewer attending secondary school. Large gender disparities in education remain; this worsens as children advance through education.

A greater emphasis needs to be placed on ensuring that children attend school, and do not drop out. This is particularly important for the girl child. Actions also need to be taken to improve transition between primary and secondary school. This can be undertaken through a combination of community-wide education regarding the importance of education and encouraging area chiefs to fulfill their task to ensuring that children are in school.

### **Water and sanitation**

Only 27% collect water from an improved water source while 50% collect water from a spring. It was discovered that on average in the dry season, it takes people 80 minutes to collect water. Only one-quarter of people (25 percent) are able to collect their water in 30 minutes or less – the UN threshold of acceptability for the human right to water and sanitation. 85 percent of people are able to collect their drinking water within 30 minutes during the wet season. The mean average of water consumption per person is 11.6 litres and the median is 10.9l. This is below what the 20l per person per day that WHO considers necessary for basic needs. Over 90 percent of homesteads reported having some type of rainwater-harvesting collection method. However, only 10 percent have large rainwater tanks. Homestead level rainwater harvesting has a great potential in clean water provision across the study area as 96 percent of homesteads have at least one iron-sheet roof from which they could harvest water. This approach of each homestead collecting their own water should be spearheaded as the way forward in bringing water closer to the masses.

Only 16 percent of homesteads reported having a latrine. 83 percent of homesteads defecate in the open. Less than 0.01 latrines per person, across the whole study area. The extent of open defecation in the Mara presents a major health and safety issue. Bacteria and worms in feces are often accidentally ingested (especially where

proper hand washing is not observed) and this may result in a range of health problems from diarrhea to enteropathy, a chronic sickness that prevents the absorption of calories and nutrients. Social norms and habits need to be changed if open defecation is to be successfully fought. Initiatives to educate people about the dangers of open defecation, and steps to encourage the construction of latrines should be encouraged.

### **Fencing**

The rate at which homesteads are being fenced is astonishing and fencing remains a divisive issue in the Mara as a whole. All homesteads questioned intend to fence to some degree in the future. Fencing has become more desirable because landowners want to prevent other people's livestock from grazing on their land, preventing wildlife from eating grass intended for livestock, and enable the grass to grow tall. Traditional grazing practices can no longer be applied today and fencing is seen as the only way forward, especially by younger adults. At the time of the survey, homesteads were split relatively evenly as to whether they currently had any form of fencing at their homestead. 10.3 percent of non-conservancy land within the study area is fenced this has increased by 354 percent in 21 months between February 2014 and November 2015. The speed of the growth in fencing means that this issue requires constant monitoring, someone continually mapping the creation of new fences. If wildlife corridors are to be secured and kept open, urgent action to halt the growth in fences needs to be taken.

### **Concluding Remarks**

The Maasai Mara is in a period of great change and flux. The population is increasing at an astronomical rate and with the limited and fragile ecosystem this requires urgent action if the conservancies and the greater Maasai Mara ecosystem are to survive. Action would also improve the lives of Maasai people, especially women. Fencing is a recent change that also has a great impact upon the Maasai Mara.

At a smaller scale, this study also assessed the relative importance of push and pull factors in settlement locations, and the development of urban centres. Socio-cultural challenges remain in the Mara, particularly regarding school attendance and sanitation. It is hoped that this research can inform policies and decisions regarding how best to target these challenges so that we can all work together for the improvement of the Maasai Mara for its inhabitants – wildlife, livestock and people.

## Bibliography

Bedelian, C. (2014). Conservation, tourism and pastoral livelihoods: Wildlife Conservancies in the Maasai Mara, Kenya. Ph.D. University College London.

Coast, E. (2007) Wasting semen: context and condom use among the Maasai. *Culture, Health and Sexuality* 9 (4): 387-401.

Coast, E. (2001) *Maasai demography*. PhD Thesis. University of London. London: LSE Research Online. Available at: <http://eprints.lse.ac.uk/archive/OOOOO264/>

CRA, (2016) Narok <http://www.crakenya.org/county/narok> Accessed 13/1/16.

Index Mundi, (2015) Country Comparison, Birth Rate. <http://www.indexmundi.com/g/r.aspx?v=25>  
Accessed 13/1/16.

Open Data, (2006) Poverty Rate by District <https://www.opendata.go.ke/Poverty/Poverty-Rate-by-District/i5bp-z9aq> Accessed 13/1/16.

Republic of Kenya, (2007) Economic Survey. Government Printer: Nairobi, Kenya.

World Bank (2015) *World Development Indicators: Kenya*. Available at:  
<http://databank.worldbank.org/data/reports.aspx?source=2&country=KEN&series=&period=>