

# Linking Vi- Agroforestry Data with the Triple L Initiative

Working Report

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Triple L - Land, Livestock and Livelihood Dynamics

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## Acronyms & Abbreviations

AOC	-	Area of Concentration
KNBS	-	Kenya National Bureau of Statistics

## **1. Introduction**

The semi-arid areas of West Pokot County in north-western Kenya have seen dramatic developments over the past few decades. The traditional lifestyle of the Pokot people is pastoralism; however, rapid cultural, institutional and land use changes are now taking place. The Triple L initiative seeks to study, analyse and understand the causes, processes and consequences and effects of these changes and relate them to other areas with similar livelihood and land use issues (Triple L Concept Note, 2013).

The County under study, West Pokot, is an area where the NGO Vi- Agroforestry has been long term active. Their activities have been more intensive in some sub-divisions and less in others.

The Triple L initiative has a very close cooperation with Vi- Agroforestry. The aim of this report is to present and summarize work undertaken using already collected Vi- data to inform the topics under study at the Triple L initiative. Vi- Agroforestry has since 2001 undertaken large- scale surveys aimed at measuring the organization's impact on their target group, providing valuable and long- term socio- economic data. The surveys chosen to make part of this study are the ones undertaken in 2001 and 2007/08. They were chosen in order to be able to do comparative analysis over time. However, the surveys do not create a set of panel data, as there was no conscious re- interviewing of households.

### **1.1 Poverty levels in West Pokot**

Although various transformations have taken place in West Pokot County over the decades as discussed above, the County still faces high poverty incidence. About 53 per cent of the population lives below the poverty line in almost all the divisions. This level is higher than the provincial poverty incidence that is estimated at 49 per cent and national poverty at 46 per

cent. Studies carried out by the KNBS in 2008 projected that the population that live below the poverty line was expected to rise from 91,018 in 2008 to about 103,033 in 2012. Only 9.6 per cent of the total county area has high to medium agricultural potential, supporting 47 per cent of the population. The remaining county area (90.4 per cent) is mainly arid and semi-arid and this is where the remaining 53 per cent of the population lives. The district's hard-core poor is estimated at 35.9 per cent and food poverty is the most prevalent type of poverty (KNBS, 2006; KNBS, 2009).

The main causes of poverty include retrogressive traditional culture of cattle rustling, ethnocentrism and proliferation of illegal arms. This deprives the community of their livelihood, leads to displacement of people and livestock looting, destruction of property, reduced economic activities, collapse of educational facilities and low investment in the area. Other causes are lack of employment opportunities, poor marketing outlets, ignorance and slow uptake of new farming technology and methods. The poverty situation is further made worse by lack of affordable economic activities for the larger population, with low saving rates leading to low investment (KNBS, 2009).

## **2. Vi- Agroforestry**

Agroforestry means growing trees and several kinds of crops together. This variety of techniques carries the potential to achieve multiple beneficial outcomes in terms of household welfare as well as in environmental matters, through preventing erosion, increasing outputs and in large opening up for more sustainable agricultural practices.

Vi- Agroforestry (Vi-skogen) is a Swedish development cooperation organization that works with support to farmers in the Lake Victoria Basin in Eastern Africa. The organization works in four countries: in Kenya in the Kitale and Kisumu regions, in Uganda around Masaka and Kampala, in Tanzania in the Mara and Kagera regions and in Rwanda around Kigali. Vi's mission statement is "Through agroforestry and support to farmers' organisations contribute

to poverty reduction, the right to food, increased incomes, increased biodiversity and climate adaption.” (viagroforestry.org). The more immediate objectives are hence: Increased firewood, food and nutritional security at household level, and the establishment of sustainable market oriented production with emphasis on agroforestry products (Vi-Agroforestry, 2007).

## **2.1 Objectives of Surveys**

Since 2001, Vi- Agroforestry Kitale Project has been carrying out large- scale surveys in the areas where the project has been long- term active. By the time the 2001 surveys were carried out, Vi- Agroforestry had been operating for almost 20 years; however, not much had been done to quantitatively measure change and improvement. The motivation for the 2001 baseline survey was hence to establish a benchmark for comparison with future surveys (Vi-Agroforestry, 2003: 1). It was carried out using structured questionnaires (see Appendix 1), in the month of October 2001 (Vi- Agroforestry, 2003: 1). Then, in the following years, Vi-Agroforestry carried out surveys annually or at least every two years.

The 2007/2008 survey was carried out during the months from May to July in the respective years. Just as the previous surveys, this survey was meant to assess the impact of the project on its target group through assessing the communities’ awareness and adoption of agroforestry practices and the appropriateness of activities and technologies in relation to immediate objectives and outputs- In other words, through assessing the impact of Vi’s activities in relation to the overall Vi objectives (for more information on the objective of the survey, see: Vi- Agroforestry, 2007: 3).

## **2.2 Sampling strategy**

The 2001 survey consists of 330 respondents from Chepareria and Kongelai Districts of West Pokot. The survey was decided to be carried out in these two zones only. This was because in

Chepareria, Vi- Agroforestry had been active since 1983, marking the beginning of Vi, unlike in Kongelai where its activities started in 1997. Hence, the idea was to both create a baseline, but also to compare and verify the achievement of Vi's objectives through comparison of the two zones (Vi- Agroforestry, 2003: 1).

The methodology for data collection was based on both random and cluster sampling. Respondents were selected randomly from a list of farmers consisting of all the farmers in the chosen Areas of Concentration (AOC's).

The 2007/2008 sample consists of 296 respondents from all over West Pokot. The sampling methods employed during the 2007/2008 survey were multistage and complete simple random where from the division, locations were selected at random. Within the locations, villages were then selected at random from a list of villages. Each village was divided into three clusters. From each of the three clusters in each village, farmers were randomly picked by use of the farmers list as the sampling frame. The idea was that the number of farmers picked from each village should be in the ratio: 3:3:4 for the first, second and third clusters respectively giving a total of ten farmers per village, which was the case for most villages; However, some villages in the final sample consist of fewer respondents, which we expect have had to do with time and/ or budget constraints at the time (for more detailed information on sampling strategy, see Vi- Agroforestry, 2007: 4). The survey was conducted using structured questionnaires (see Appendix 2) in one to one interviews (Vi- Agroforestry, 2007: 4). Observation was also employed as a method of data collection, especially during the tree inventory and inventory of agroforestry technologies present on farm, which have however not been further analysed in this study, as it does not belong to the main interests of Triple L.

The topics under study were similar in the questionnaires from the two years, however the way questions were asked differed substantially in some cases. This creates challenges in

terms of creating comparative analysis, however, in the following certain key topics have been chosen, which were analysed separately for the two years and then presented together to give an as informative overview of the topics as possible, based on the data available.

### **3. Analysis**

In the following, findings from survey analysis will be presented. For the purpose of analysis and also to secure the data in digitalized form for future research, an SPSS database of the two sets of questionnaires was created during the period of November- December 2013. For this, the questions that were not pre- coded were post- coded. The tree inventory sections of the questionnaires were largely left out, as these were difficult to capture in SPSS and also as this is out of the main focus of the Triple L initiative. Analysis of the data was done mainly using descriptive statistics, tables and correlations.

#### **3.1 Land size**

Land is a limited factor of production in Kenya and also an interesting aspect to focus on in the Triple L initiative which has issues of land as one of its key pillars. Results of the analysis indicated that in 2001, on average farmers owned about 15 acres of land ranging between less than one acre and 200 acres of land. It's interesting to note that a more detailed look at the distribution of the size of land among the farmers indicated that less than 5 per cent of the farmers owned less than one acre of land. Equally, less than 5 per cent of the farmers owned more than 100 acres (see Table 1). Roughly six years later, the average size of land seemed to be on a declining trend. The rounds of surveys carried out in 2007/08 showed that farmers on average owned about 5 acres of land ranging between less than an acre and 56 acres, as can be seen in Table 1. These findings are in line with those of the KNBS (2001) and KNBS (2009) which also indicate that the average land sizes are on a declining trend, from an

average of slightly over 10 acres (2001) to less than 5 acres (2009). Further analysis through a correlation matrix indicated that when the zone and the total land size were interacted, there was a positive relationship. In 2001, since the study was carried out mostly in Kongelai and Chepareria, results of the study showed that farm sizes in Kongelai were bigger than those of their counterparts in Chepareria (see Table 2).

Table 1: Land size

Variable	2001	SD	2007	SD
Land size (acres) min	0.00	17.73	0.5	7.13
max	200.00		56.0	
mean	14.99		5.40	

Notes: SD means standard deviation  
Min means minimum

Source: Vi Agroforestry survey, 2001 and 2007

**Table 2: Comparison of land sizes by area (2001)**

Variables	chepareria	kongelai
Average land (acres)	13.7	16.7

Source: Vi Agroforestry survey, 2001

### **3.2 Perceived changes in crop production**

Maize and beans are the main crops in the area, with as good as all households interviewed in both years of surveys growing both crops (Vi Agroforestry Survey 2001, Vi Agroforestry

Survey 2007, see also: Wernersson, 2013: 48). Other common crops are sorghum, millet and bananas.

As the question of perceived changes in crop production over the past two years was asked in both rounds of surveys, it poses a good background for comparison and analysing change over time. The results of analysis clearly show that changes in crop production was perceived as predominantly “improved” in 2001 while it was clearly seen as “reduced” in 2007: In 2001, 62 % of farmers answered that crop production had improved over the past two years, while only 24 % answered it had reduced and 10 % said it had remained the same (the remaining 4 % answered “I don’t know”). In 2007/08 however, 49 % indicate that crop production has reduced over the past two years, and only 28 % perceive it as improved, with the remaining 23 % stating it had not changed.

Keeping in mind that the sample areas are not identical during the two rounds of surveys, one should not draw too quick conclusions. However, even when analysing only Chepareria and Kongelai Districts separately, analysis still shows the same picture. The question around perceived changes in crop production hence creates an interesting background for further investigation. It should be studied why this change in perception of crop production occurred between the years of the surveys, and also how crop production is perceived today. If the image is still a predominantly negative one, then the underlying reasons for this perception should also be further investigated. One hypothesis as to why the perception of crop production changed between the two rounds of surveys might be the dramatic decline in land size occurring during the same time. This issue would be particularly interesting to follow up on during the upcoming qualitative fieldwork.

### **3.3 Fertilizer and pesticide use**

The question whether artificial fertilizers and pesticides were used on farm was only posed in 2007. 35 % of households did use artificial fertilizers, mainly for growing maize and beans. Only 14 % used artificial pesticides. Pesticides were mainly used for vegetables.

When correlating perception of crop production with use of fertilizers and pesticides, there is a positive correlation in both cases (2- tailed, significant at the 0.01- level). Unsurprisingly, this means that those households who use fertilizers and pesticides have a better perception of their crop production. The numbers of households using pesticides and fertilizers are still comparatively low, which means there is large scope for improvements in yields and agricultural productivity.

### **3.4 Food security**

Food security is an important indicator of household welfare. As described in Wernersson (2013), the land- use changes that have taken place in the area in the past three decades have in large improved the welfare of its inhabitants- through increasing the production of milk and other outputs and due to the higher market prices people can now fetch for their healthy livestock (Wernersson, 2013: 36). However, food security still remains an issue in the area.

In 2001, households were asked whether there was enough food to feed the family all year, and 33 % answered “yes”, while the other 67 % answered “no”. Those who had a negative answer in the next step had to indicate how many months they were self-sufficient with food. The average here was 5 months. In additions, households had to indicate how many meals they eat per day. The majority of households had three meals per day (67%), followed by 26 per cent who had two meals per day. Seven per cent of households only had one meal per day, while less than one per cent had four meals per day.

In 2007, the question was posed differently: households only had to answer how many months a year they were self- sufficient with food, with the pre-coded answers being “1-3”, “4-6”, “7-9” and “10-12”. The results can be seen in Table 3.

**Table 3:** Food self-sufficiency (2007)

1-3 (months/%)	9
4-6 (months/%)	36
7-9 (months/%)	36
10-12(months/%)	19

Source: Vi- Agroforestry Survey, 2007

Then, households had to indicate how often they include animal proteins, vegetables and fruits in their diet, with “daily”, “weekly”, “monthly”, “annually” and “never” the possible pre- coded answers. As can be seen in Table 4, the diet seems to be balanced, with animal proteins, fruits and vegetables included in the diet on a daily or weekly basis by the majority of households. However, it is still a concern that 6 % of households never eat fruit, and 19 % do so only on an annual basis. Also, this quantitative analysis cannot give any indications as to whether the amounts available are enough to meet the dietary requirements of all members of the households, and also whether all members of the household get to include the different food sources in their diet. Some foods might be reserved only for certain members of the households.

**Table 4:** Inclusion of animal protein/ fruit/ vegetables in your diet (2007)

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	Daily	Weekly	Monthly	Annually	Never
Animal proteins (%)	50	35	8	6	<1
Fruits (%)	7	45	23	19	6
Vegetables (%)	84	6	5	4	<1

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Source: Vi- Agroforestry Survey, 2007

The results show that food security is still a concern in the area, which is in line with the KNBS stating that food poverty is the most prevalent type of poverty in West Pokot (KNBS, 2006). Although the diet seems to be balanced, with vegetables, fruits and animal proteins included in the diet by the majority of the households on a regular basis, there is a need to further investigate intra- household dynamics when it comes to food security. In this regards it is also interesting to note that the gender dimension might play a larger role in food security than previously expected- Wernersson's (2013) case study of Chepareria showed that men and women have different preferences in how to use land, with women in the area generally prioritizing long term food security for the family while men were more in favour of large short-term projects that produce money (Wernersson, 2013: 43). Hence, the gender of the person who leads the household in decision making processes plays a role in food security, the extent and nature of which are in need of further studying.

### **3.5 Firewood availability**

Majority of the households in West Pokot depend on firewood as their source of fuel. In 2001, the households were asked how they would compare the availability of firewood then

and two years ago. Slightly over 50 per cent indicated that firewood availability had reduced while only about 15 per cent of them said that the firewood situation had improved, as shown in Table 6. In 2007, the aspect of firewood availability was also captured, but in a different way. During the rounds of surveys in 2007, households were asked how many months in a year they were self-sufficient with firewood. As can be seen in Table 7, over 57 per cent of the households said that they were self-sufficient with firewood for 10 to 12 months in a year while less than 10 per cent of the household were on self-sufficient with firewood for less than four months in a year.

A more detailed analysis of the 2001 data where only areas in Chepareria and Kongelai were sampled indicated that over 50 per cent of the respondents revealed that firewood availability had reduced over the past two years compared to their counterparts in Kongelai where only about 40 per cent of the respondents indicated that firewood availability had reduced (see Table 5). In both areas, less than 20 per cent of the respondents sighted an improvement in the availability of firewood over the past two years.

Table 5: comparison of firewood availability in Chepareria and Kongelai (2001)

	Chepareria	Kongelai
Same (%)	22.0	40.8
Improved (%)	14.0	18.3
Reduced (%)	62.4	40.1
Don't know (%)	1.6	0.7

Source: Vi agroforestry data, 2001

Table 6: comparison of firewood availability now and two years ago (2001)

Same (%)	30.2
Improved (%)	15.9
Reduced (%)	52.7
Don't know (%)	1.2

Source: Vi agroforestry survey, 2001

Table 7: firewood self- sufficiency 2007

1-3 (months/%)	9.1
4-6 (months/%)	12.5
7-9 (months/%)	19.6
10-12 (months/%)	57.4

Source: Vi agroforestry survey 2007

### 3.6 Family structure and Dependency Ratio

Information on family structure and dependency ratio offers useful social aspects about the West Pokot population which would further help inform the Triple L initiative both socially and economically. In 2001, majority of the household heads in West Pokot were married (see Table 8 and Table 11) and this trend remained through to 2007. In both 2001 and 2007, over 90 per cent of the household heads were married while less than 10 per cent were, single, widowed or divorced (for 2001 data, see Table 10).

In 2001, the aspect of dependency was captured in the form of a question regarding whether the household head had any children going to school and if yes, how many. The results that can be seen in Table 8 showed that approximately 70 per cent of the household heads had

children going to school. The number of boys and girls in both primary and secondary school ranged between 4 and 8 children per household. More specifically, on average each household had at least one girl child and one boy child in primary school, while on average, few of the households had any children in secondary school.

A more detailed look at the distribution of the number of children going to school among households in the two study areas in 2001 showed that households in Chepareria had a higher dependency ratio with a maximum of 8 school going children compared to a maximum of 5 school going children in Kongelai (see Table 9).

Table 8: Family structure and dependency ratio (2001)

		2001
Children going to school? (% yes)		69.9
If yes girls primary	min	0
	Max	6
	Mean	1.35
If yes boys primary	min	0
	Max	8
	Mean	1.47
If yes girls secondary	min	0
	max	4
	mean	0.15
If yes boys secondary	min	0
	Max	5
		0.21
Marital status of Household head (married %)		95.4

Source: Vi, Agro forestry survey, 2001

Table 9: Comparison of family structure and dependency ratio in Chepareria and Kongelai (2001)

	Chepareria	Kongelai
Children going to school? (% yes)	69.2	70.8
If yes, girls primary	min	0
	Max	5
	Mean	1.25
If yes, boys primary	min	0
	Max	5
	Mean	1.27
If yes, girls secondary	min	0
	Max	4
	Mean	0.19
If yes, boys secondary	min	0
	Max	2
	mean	0.18

Source: Vi agroforestry survey, 2001

Table 10: Marital status of the household heads in Chepareria and Kongelai (2001)

	Chepareria	Kongelai
Single (%)	1.1	1.4
Married (%)	96.2	94.2
Divorced (%)	0.5	0
Widowed (%)	2.2	4.3

Source: Vi agroforestry survey, 2001

In 2007, the dependency ratio was captured by a question on the size of the household by age group. The age groups captured were less than six years, between 6 and 12 years, between 13 and 17 years, between 18 and 35 years, between 36 and 65 years and finally above 65 years.

Taking into account all the age groups captured, the size of each household ranged between 2 and 12 members (Table 11).

Table 11 : Family structure and dependency ratio (2007)

	N	min	max	mean	sd
Age group (< 6 years)	284	0	5	1.57	1.25
Age group (6-12 years)	284	0	8	1.47	1.19
Age group (13-17 years)	283	0	4	0.90	1.05
Age group (18-35 years)	284	0	12	1.64	1.39
Age group (36- 65 years)	284	0	5	0.99	0.90
Age group (> 65 years)	283	0	2	0.07	0.29
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Marital status of Household head (married %)		90.1			

Source: Vi Agroforestry survey, 2007

### 3.7 Education and Training

In the 2007/08 survey, the highest educational level attained by the household head was asked. 40 % of household heads had completed primary school, 13 % secondary, and only 9 % had attended tertiary education. 38 % of household heads had no education at all. The respondents were asked, in the same survey, whether they had ever been trained on financial matters, and only 17 % had.

### 4. Suggestions for qualitative study

As has already been indicated, there are several issues that are in need of further investigation.

For the upcoming qualitative field study, it would be interesting to include questions on the perception of crop production today, as well as why crop production was perceived so negative in 2007 compared to the rather positive picture shown in 2001. The scope for improvement of crop production should be investigated, and with it the reasons for why many households do not use fertilizers and pesticides. As for food security, today's status and perception of food security in the area should be included in the study, as should intra-household dynamics in terms of food distribution. Also, it would be interesting to include issues like changes in land size, land utilization and land tenure system so as to have a broader understanding of the factors that have had a major influence on the changes in the various aspects regarding land.

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