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Socio-Economic Importance of Tree Nurseries in Eldoret Municipality, Uasin Gishu County (Kenya)

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Abstract

Tree nurseries in urban areas are a major source of planting materials for afforestation and associated ecosystem services including carbon stock accumulation in both urban and rural landscapes. The practitioners, however, operate under informal (and sometimes illegal) land tenure with those establishing tree nurseries by the roadside and on road reserves being common. The socio-economic benefits of such urban tree nurseries have not been well documented and appreciated and the growers are generally perceived to be engaged in a last resort economic activity. This study was done to determine Socio-economic importance of tree nurseries in Eldoret Municipality (Kenya). Specific objectives were to: (i) identify tree species being raised in tree nurseries within Eldoret Municipality, (ii) determine the monetary value and market sources for the tree seedlings raised in the Municipality, (iii) quantify contribution of tree nursery enterprise to the provision of employment opportunities in Eldoret Municipality, and (iv) identify the challenges facing the tree nursery business. Stratified random sampling of urban tree nurseries was done and semi-structured questionnaires administered to the nursery head persons at 30% sampling intensity. A large proportion (86.1%) of tree nursery owners in Eldoret Municipality are young (between 18 and 43 years) and have attained post primary level of education (64%). There is gender parity with regards to proprietorship of tree nursery enterprise in Eldoret Municipality. The tree nurseries are of great socio-economic importance. Twenty nine (29) tree species are grown in the nurseries and the main ones are Cupressus lusitanica (10.4%), Callistemon spp (9.75), and Grevillea robusta (9.3%). Ninety seven percent (97.2%) of the tree nursery owners had employees, and the tree nurseries in the Central Business District put together generated Ksh 7.5416 million per production cycle. The tree nursery owners however experienced the following challenges (by % respondents): water shortage (24%), theft (17%), market related problems (13%) and Evictions by municipal authorities (9%). Recommendations on the enterprise land tenure and the proprietors' capacity building have been made.

Key Words: Urban Forestry, Tree Nursery, Eldoret Municipality, Ecosystem, Species, Afforestation

Introduction

Tree nurseries are recognized worldwide as a critical component of urban landscape and infrastructure, and the successful incorporation of trees into the physical and social fabric of towns and cities clearly requires integrating forestry into overall urban planning. Trees are not only useful as a source of income, fuel, wood and construction material but are also essential in protecting the soil from erosion, giving the land its beauty and for attracting rain (Haile, 1991). In Kenya, the need for availability of quality tree planting material to support afforestation involving farmers, Governmental and Non- Governmental

Organizations has been emphasized in the Forest Act No.7 of 2005 (Republic of Kenya, 2005).

Tree nurseries in urban centres provide a wide diversity of trees that are needed in urban forests, not only to guard against incidences of plant pests and diseases, but also to "put the right tree in the right place" as the evolution of our cities and suburbs creates new settings for tree planting (Santamour, 1990). The nurseries supply fruit tree seedlings and cuttings. In Kenya, most of the fruit tree planting materials are propagated by seeds and vegetative means and are sourced from tree nurseries, particularly in urban areas. Most of the nurseries operate as small scale and medium scale businesses. Other nurseries are government-owned and include those managed by Institutions like Kenya Agricultural Research Institute (KARI), Kerio Valley Development Authority (KVDA), Tana and Athi River Development Authority (TARDA), and Government of Kenya (GK) prisons. The nurseries in urban areas are a major source of planting materials for afforestation and associated ecosystem services including carbon stock accumulation in both urban and rural landscapes. They usually provide planting materials within their localities (Karuri, 2016).

The rate of establishment of urban tree nurseries within Eldoret Municipality has greatly increased within the past fifteen years (Odhiambo, per. com., 2016). Whereas the existence and importance of the urban and peri-urban tree nurseries have been recognized by the general public, the practitioners quite often operate under informal (and sometimes illegal) land tenure with those establishing tree nurseries by the roadside and on road reserves being common. The socio-economic benefits of such urban tree nurseries have not been well documented and appreciated and the growers are generally perceived to be engaged in a last resort economic activity. This study was done to determine Socio-economic importance of tree nurseries in Eldoret Municipality (Kenya). Specific objectives were to: (i) identify tree species being raised in tree nurseries within Eldoret Municipality, (ii) determine the monetary value and market sources for the tree seedlings raised in the Municipality, (iii) quantify contribution of tree nursery enterprise to the provision of employment opportunities in Eldoret Municipality, and (iv) identify the challenges facing the tree nursery business.

Materials and Methods

Study Area Description

This study was carried out in Eldoret municipality, Uasin Gishu County (Kenya). The County is located in the former Rift Valley Province which extends between longitudes 34^o 50'and 35^o 37' East and 0^o 03' and 0^o 55' North. The County has common boarders with Trans Nzoia to the North, Elgeyo Marakwet to the East, Koibatek to the South East, Kericho to the South, Nandi to the West and Kakamega to the North West. With a total area of 3,345.2 $km^{2,}$, the County lies between 1200 and 2100 metres above sea level and has a mean annual maximum temperature of 24 – 26 ^oC, and mean annual minimum temperature of 6 -10 ^oC (GOK, 1997).

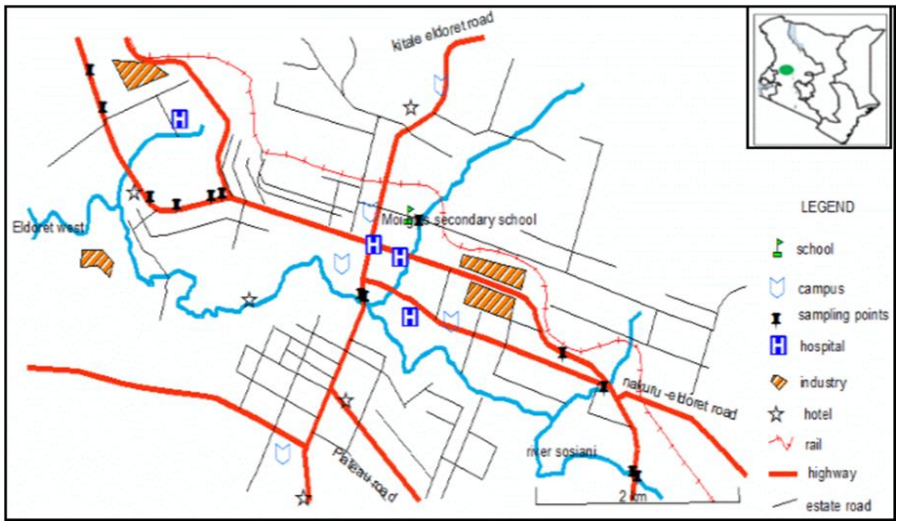

Figure 1. A Sketch Plan of Eldoret Municipality and the Location Sampled Tree Nurseries

Eldoret town is the major urban centre consisting of a human population of 290,454 by the year 2001 (GOK, 1997) and is surrounded by large expanse of agricultural land with the dominant landscape being undulating plateau with no significant mountain or valley (GOK, 1997).

Uasin Gishu has a rich agricultural resource base with 80% of the land tenure being privately owned. Private ownership of land has encouraged investment in permanent and long term improvements of development on farms. Small scale farming subsector (0-30 acres) accounts for 75% of the total agricultural produce (CGUG, 2013). The County has a total of 29,802 hectares of gazetted forests out of which 13,184 hectares (or 44%) is under plantation while 16,618 (or 56%) is under indigenous forest cover. The growing of woodlots is scattered across the County and is emerging as a significant carbon sink and income generating activity. There exists a big market both in the County and outside for forest products such as poles, timber and wood fuel (GOK, 1997; CGUG, 2013).

Sampling Design, Data Collection and Analysis

The study area was divided into eight (8) clusters comprising seven major Estates and Central Business District (CBD) in the Municipality and a total of thirty six (36) tree nurseries were sampled following proportional allocation. The following are number of sampled tree nurseries (given in parenthesis) per stratum: (i) Elgon view (4), (ii) CBD (6), (iii) Langas (4), (iv) Annex (6), (v) Huruma (4), (vi) Kapsoya (6), (vii) West Indies (5), and (viii) Stadium area (1). Semi-structured questionnaires and personal observations were used to collect information on socio-economic importance of the tree nurseries, with the nursery owners being the respondents. The data were coded and descriptive analysis done using SPSS software (version 22). The results were presented in Tables, bar graphs and charts.

Results and Discussion

Demographic Information of Respondents

Eighty six percent (86.1%) of the tree nursery owners were aged between 18 and 43 years, with males and females equally represented (50% each) as tree nursery owners (Table 1). Majority of the owners (64%) had attained secondary and tertiary level of Education. Also many of the tree nursery owners (66.7%) had households of relatively small size (1-5 members) while a small proportion of the nursery owners

(11.1%) had relatively larger households (over 10 members) (Table 1).

Table 1. Demographic Information of Tree Nursery Owners in Eldoret Municipality, Kenya

Characteristics (Variable)	Rank	Frequency	Percent	Cumulative Percent
Age (%)	18-30	16	44.4	44.4
	31-43	15	41.7	86.1
	44-56	5	13.9	100.0
Gender (%)	Male	18	50.0	50.0
	Female	18	50.0	100.0
Educational level (%)	primary level	13	36.1	36.1
	Secondary	19	52.8	88.9
	tertiary level	4	11.1	100.0
Household size (%)	1-5	24	66.7	66.7
	6-10	8	22.2	88.9
	11-15	3	8.3	97.2
	above 15	1	2.8	100.0

Individuals with post primary level of education qualification would generally be expected to aspire for white-collar jobs. The fact that majority are relatively young and have post primary level of education is an indication that the nursery enterprise is attractive and has marked socio-economic importance. Adolescent occupational choice is influenced by many factors, including life context, personal aptitudes, and educational attainment (Ferry, 2006). Youth unemployment is significant in both urban and rural areas but is greater in urban areas (Zepeda, Leigh, Ndirangu & Omolo, 2013) and this may explain why a greater proportion of the tree nursery owners in Eldoret Municipality are relatively young.

Species of Seedlings Raised in Tree Nurseries in Eldoret Municipality

A total of twenty nine (29) species of tree seedling were raised in the thirty six (36) tree nurseries studied, most of which are for commercial purposes. The top eight of the species in order of proportional dominance were *Cupressus lusitanica* (10.4%), *Callistemon erectus* (9.7%), *Grevillea robusta (9.3%), Eucalyptus saligna (9.0%), Dovyalis caffra* (6.9%), *Persia americana* (5.2%), *Markhamia lutea* (5.2%) and *Casuarina equisetifolia* (5.2%) (Figure 2).

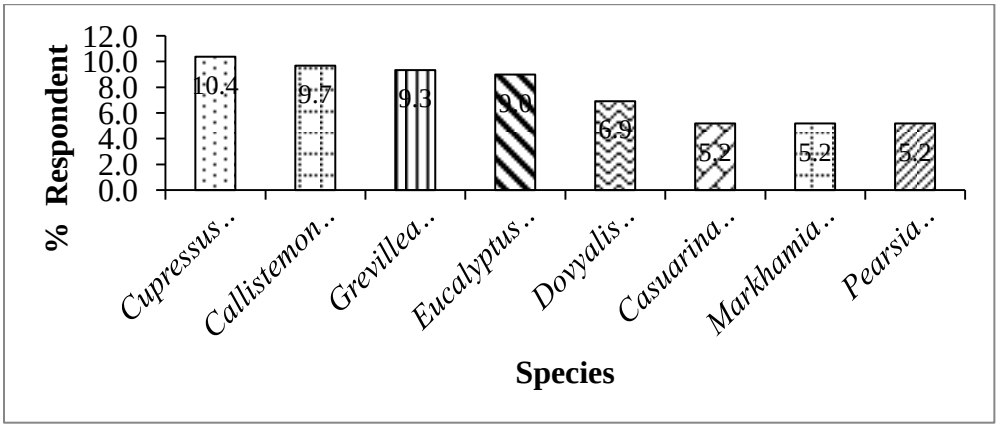

Figure 2. The Most Commonly Raised Tree Species in Eldoret Municipality, Kenya

There has been a steady increase in the growing of woodlots in Uasin Gishu County (CGUG, 2013) occasioned by high demand for softwood sawn timber, particularly of cypress (*C. lusitanica*). This could be the main reason for high number of *C. lusitanica* and *G. robusta* seedlings in the tree nurseries. Robust construction industry

in the fast growing Municipality and its environs has lead to increased demand for Eucalyptus products like round wood, thus the increased production of the seedlings. Species like *Callistemon citrinus*, *Dovyalis caffra* (Kei apple) and *Casuarina equisetifolia* are in high demand due to the need for landscaping following construction and real estate industry boom in the Municipality (Odhiambo pers. com., 2016).

The Monetary Value and Market Sources for the Tree Seedlings Raised in Eldoret Municipality

Monetary Value of Tree Seedlings Raised in Eldoret Municipality

Callistemon erectus seedlings were the most sold and generated the highest amount of income per production cycle (Ksh. 7.8661 million) followed by *Eucalyptus saligna* (Ksh. 2.0265 million), *Grevillea robusta* (Ksh. 1.416 million) *and Cupressus lusitanica* (1.107 million) and others (Ksh. 2.318 million) (Figure 3a). This implies that an averaged amount of Ksh. 14.7336 million was generated from the eight species of tree seedlings from the 36 tree nurseries, and thus an average of Ksh. 0.409 million per tree nursery per production cycle. A production cycle takes 3-5 months, and a nursery can have 2-3 overlapping cycles in a year. On average, a tree nursery can generate Ksh. 33,000.00 a month.

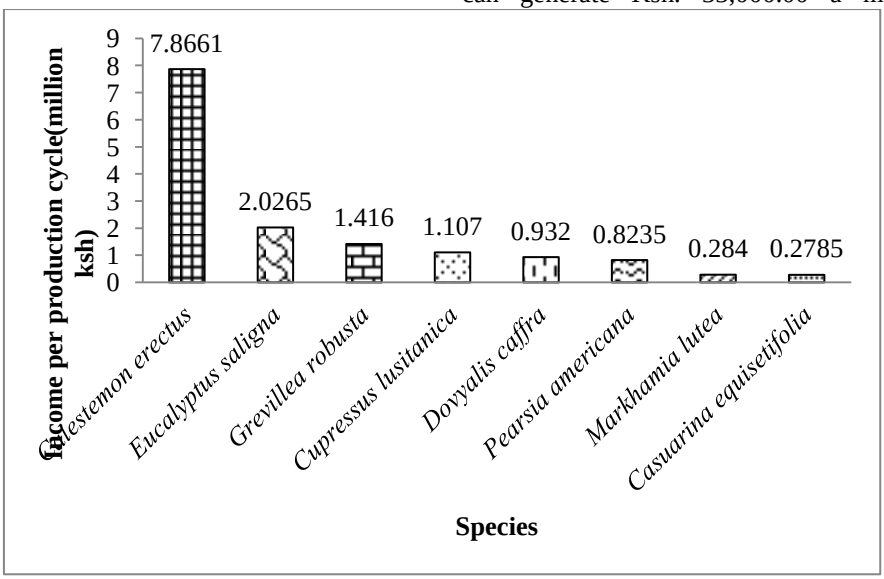

Figure 3a. Mean Income Generated from Sale of Seedlings of Different Tree Species per Production Cycle in Eldoret Municipality

The highest amount of income was generated from tree nurseries within the CBD (Ksh. 7.5416 million) followed by those close to the CBD, that is tree nurseries in Elgon view (Ksh. 1.6725 million) and Langas (Ksh. 1.4665 million) Estates as indicated in Figure 3b. A large number of human population (including those on transit) tend to concentrated within or near the CBD and this could be the main reason for the high amount of income that was generated from the tree nurseries within or near the CBD.

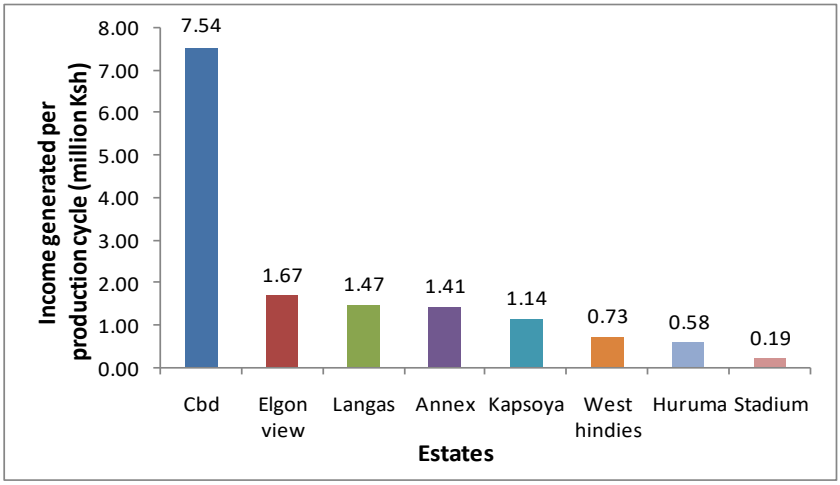

Figure 3b. Income Generated from Tree Nurseries Production Cycle per Estate in Eldoret Municipality

Market Sources for Seedlings that are Raised in Tree Nurseries in Eldoret Municipality

Market sources for the tree nurseries in the municipality are referred herein as "customers". As indicated in Figure 4, the main customers were passersby (38%), private firms (28%) and the Municipality (19%). Tree seedling industry is highly competitive and is characterized by several small-scale operators who employ similar strategies and produce and sell nearly homogenous products. Consequently, competition is based on price rather than on strategies that require capital investments such as branding, product differentiation and product promotion (Oduol & Franzel, 2014). Thus, passersby and other customers end up at the nurseries due to dire demand for the seedlings. The tree nurseries, hence, play socio-economic role in the Municipality and its environs (Basweti, Lengkeek, Prytz & Jaenicke, 2001).

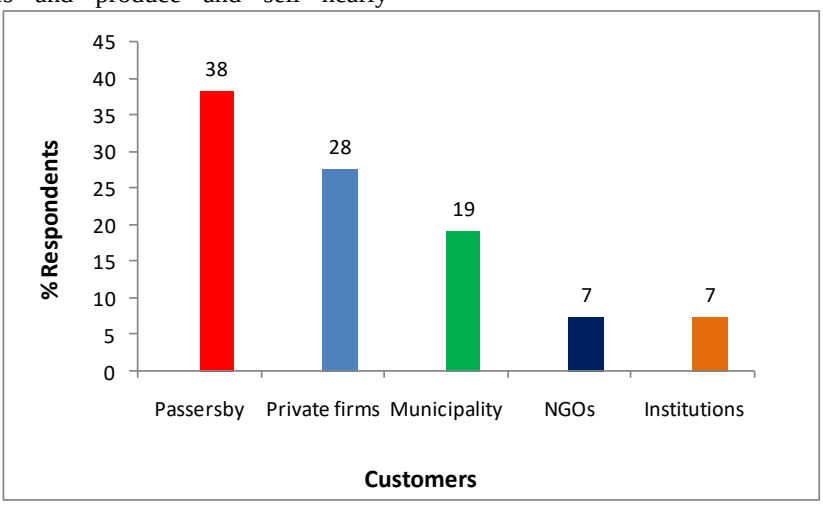

Figure 4. Market Sources for Seedlings that are Raised in Tree Nurseries in Eldoret Municipality

The Contribution of Tree Nursery Enterprise to the Provision of Employment Opportunities in Eldoret Municipality

A very large proportion of the tree nurseries (97.2%) engaged employed labour (Figure 5a). This is an indication of the importance of the tree nurseries in the provision of employment opportunities, and consequent enhancement of livelihoods of part of the ever increasing urban population in the Municipality, although most of the nurseries (69%) employed 1-2 individuals (Figure 5b). The term livelihood has been used here to mean the capabilities, assets (stores, resources, claims and access) and activities required for a means of living (Krantz, 2001).

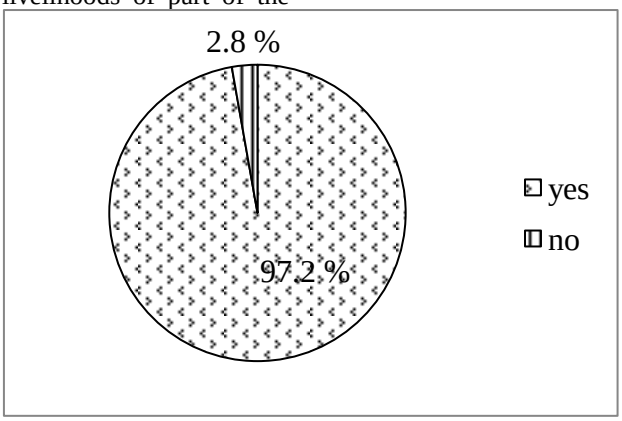

Figure 5a. Proportion of Tree Nurseries in Eldoret Municipality that Engaged Employees

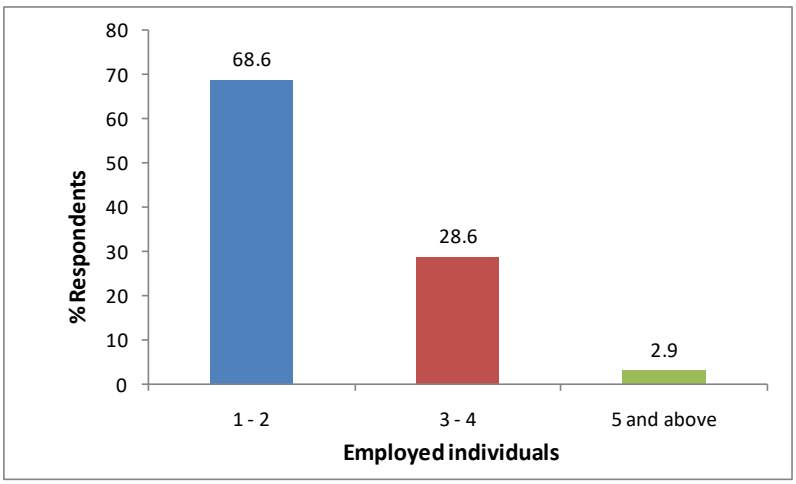

Figure 5b. Proportion of Tree Nurseries in Eldoret Municipality with Different Class Size Categories of Number of Employees

Challenges Facing the Tree Nursery Business in Eldoret Municipality

The main challenges facing tree nurseries in Eldoret Municipality as ranked by % respondents are water shortage or water availability (24%), theft (17%), markets sources (13%), and evictions by the Municipality Council (9%) (Figure 6). Because most of the tree nursery owners operate without valid legal land or property tenure, it is extremely difficult to install permanent security structures like fences and other installation like water supply systems, all of which require approval by

Municipality Council Authorities. Hence water delivery to the tree nurseries may not be based on a regular and reliable system. Likewise, their operations often conflict with Municipality town land use and spatial planning. This explains why at times it becomes necessary to evict the owners from "their" locations of enterprise. Therefore, there is a need to set aside, during town planning, a section of the town for urban tree nursery enterprise on, say, rental basis.

According to Nieuwenhuis and O'Connor (2000), small-scale tree nurseries and their managers have an important role in ensuring the sustainable development of rural communities in the highland regions of East Africa, and it is essential that they obtain access to the knowledge, skills and resources necessary to maintain and enhance their capacity to produce the seedlings which form an integral part of the local agroforestry systems. This suggests the same forms of support that should be given to the tree nursery owners in urban centres like Eldoret Municipality.

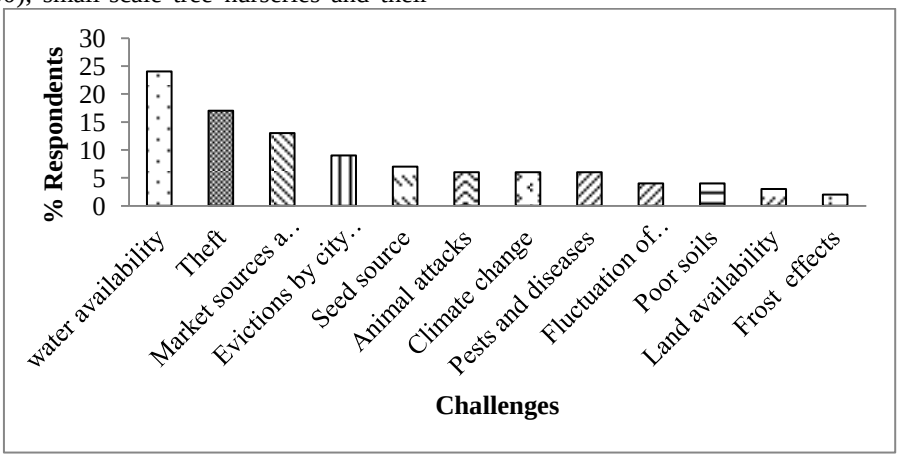

Figure 6. Challenges Facing the Tree Nursery Business in Eldoret Municipality

Conclusion and Recommendation

The following conclusions were made:

(i) A large proportion (86.1%) of tree nursery owners in Eldoret Municipality are young (between 18 and 43 years) and have attained post primary level of education (64%). There is gender parity with regards to proprietorship of tree nursery enterprise in Eldoret Municipality (50% each).

(ii) The dominant species of tree seedlings raised in tree nurseries in Eldoret Municipality are *Cupressus lusitanica* (10.4%), *Callistemon erectus* (9.7%), *Dovyalis caffra* (6.9%), *Persia Americana* (5.2%), *Markhamia lutea* (5.2%) and *Casuarina equisetifolia* (5.2%).

(iii) A tree nursery in the Municipality, on the average, can generate Ksh. 33,000.00 a month in one production cycle taking 3-5 months.

(iv) The main market source for products from tree nurseries in Eldoret Municipality are passersby (38%), private firms (28%) and the Municipality (19%).

(v) A large proportion (97.2%) of the tree nurseries engaged employed labour, thus contribute to enhanced livelihoods of part of the urban population.

(vi) The main challenges facing tree nurseries in Eldoret Municipality as ranked by % respondents are water shortage or water availability (24%), theft (17%), markets sources (13%),

and evictions by the Municipality Council (9%).

Therefore, there is a need to set aside land, during town planning, for urban tree nursery enterprise that can be leased to those willing to engage in the business legally.

The tree nursery owner's capacity should be built by key stakeholders (e.g. the County Government of Uasin Gishu, Forestry Training Institutions like University of Eldoret, and NGOs like World Vision) through access to the knowledge, skills and resources necessary to produce affordable and profitable seedlings of superior genotypic qualities.

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