

Determination of the Extent of Usage of Timber as a Construction Material in Kirinyaga County (Kenya)

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Abstract—Worldwide it has been established that demand of construction timber far outstrips supply. Kirinyaga County has not been an exemption to this phenomenon. The demand of construction timber persists in the County and especially the hardwood species, the problem of demand outstripping supply informed the decision to carry out this study. The objective of this study was therefore to determine the extent of usage of timber as a construction material in Kirinyaga County. In order to achieve the objective, descriptive cross-sectional research design was used. Data was collected through careful observation and documentation to determine the frequency with which timber was used in comparison to other building materials such as steel. Different aspects of timber such as timber category and types were analyzed.

The results show that there was no evidence of availability of bulk volumes of hardwood timber enough for construction purposes save for small quantities which probably entered the market through theft from government forests. Larger sections of timber could also not be traced. The most available timber sections ranged between 150mm in width and 12.5mm in depth. It was also evident that the longest lengths were utmost 3600mm. Some timber samples contained moisture contents of up to 104.3% (dry basis) hence confirming the view that due to demand, timber is being used as fast as it is converted due to a higher demand. This is an indication that most of the times construction timber is used in its green state.

To counter the shortage of timber in the county and the country at large, there should be a sustained and deliberate effort to increase tree cover to around 10% which is in line with the country's economic blueprint of the Vision 2030.

Keywords— Construction timber, Extent of timber usage, Sustainability.

I. INTRODUCTION

Statistics indicate that there has been a marked increase in Kenyan population which has in turn led to an increase in demand of timber. This increase in demand has far outstripped supply. This pressure on demand of quality timber especially for construction purposes has led to a serious problem of shortage which this paper intends to explore and provide remedies.

The increase in population has often led to an increase in demand of sawn wood with a growth projection of 203,000m³ in 1990 to 262,800m³ in 2020 (Kenya Forestry

Master Plan-KFMP). The shortage of timber has forced the country to turn to Democratic Republic of Congo and other neighboring countries for timber supplies but often at prohibitive costs as high as double digits.

In this study, aspects of demand and supply were analyzed and the results derived confirm that the demand of timber as a construction material actually far much outstrips supply.

II. METHODOLOGY

Various methods were adopted to collect the desired information. One of the methods included a critical review of the existing literature from revered journals, websites, and government publications to determine the extent of usage in comparison to other construction materials.

Descriptive cross sectional design method was also used. In this method, an observation and documentation of usage of timber as a construction material was undertaken. Sampling was done by identifying and visiting specific towns in each of the four constituencies making up Kirinyaga County. These towns include Kagumo town in Kirinyaga central constituency, Kianyaga town in Kirinyaga east constituency, Sagana town in Kirinyaga west constituency and Ngurubani town in Kirinyaga south constituency.

Questionnaires were administered to Contractors, County forest officers, Saw millers and Timber yard owners to extract the required information. Categorization of sampled timber into hardwoods and softwoods gave a clear picture of the extent of availability and usage of each category.

RESULTS AND DISCUSSION

The lack of certain timber species especially the hardwoods and also certain specific timber sections in the market confirm that the demand of timber (especially construction timber) is higher than supply.

Through the laboratory tests carried out, it was established that the sampled species contained a moisture content of even more than 100% and therefore reinforcing the advanced view of unavailability because it can only be hypothesized that there isn't enough timber in the market to allow seasoning before use.

Throughout the County, no single saw mill was found to be operational save for small yards used for splitting wood through the help of hand operated power saws and tractors mounted with splitting blades. The owners of the saw mills complained of a serious shortage of trees for conversion since the government ban on logging in the year 2000.

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Considering the age factor of trees, a rule of the thumb especially for softwoods such as grevillea robusta is that it tends to be colour red when fully matured and whitish in colour when not fully matured. Most of the sampled species showed colour white or a combination of both. Further, 88% of the sampled species showed a compressive strength of less than 40N/mm² after being subjected to laboratory testing. Most softwoods have a compressive strength in the region of 40N/mm². Table I shows the mean compressive strengths and moisture contents derived from the study.

Table I

S/no	Specimen code	Mean compressive strength in N/mm ² (mpa)	Mean moisture content % (dry basis)
1	Euc	35.06	54.04
2	Cord 1	34.86	16.87
3	Cyp	33.94	18.6
4	Gre	32.68	49.75
5	ES	50.05	56.35
6	PS	17.61	16.04
7	DN1	23.55	18.56
8	DK	31.03	98.39
9	GN	20.71	104.31
10	NE	28.88	82.53
11	CS	21.6	54.36
12	DS	23.86	14.99
13	GS	25.57	100.4
14	GK	23.29	54.56
15	EK	45.75	26.84
16	CN	31.57	57.74

Mean compressive strengths in N/mm² (mpa) and Mean moisture contents (%).

The glaring scarcity of hardwood species in smallholder/private farms is a confirmation of the fact that most of the hardwood species generally do well in forests and take years to mature. This time frame could be well over a 100 years.

The poverty levels in the County compels farmer's to prefer planting trees that take a shorter time to harvest so as to bring in quick returns. An example of such trees is grevillea robusta. Further, some of the hardwood species do interfere with the growth of other food crops such as maize and beans and hence not preferred.

On the question of timber sections, larger sections are produced from trees with a bigger circumference and hence smaller trees limit conversion of larger tree sections. Larger sections such as 200mmx25mm, 200mmx50mm, 150mmx50mm among others could not be traced and were only to be available through placing an order.

In terms of supply and demand, the demand will continue to outweigh supply as long as there will be continued increase in population without matching the increase with a similar or more increase in tree planting. Our forest tree cover still remains at a paltry 2% against the globally recommended 10%.

The accelerated economic growth in the last 11 years from

as low as 2% in 2002 to around 6% in 2012 exerts some pressure nationally in terms of resource utilization. Further, in the realization of the vision 2030, more natural resources will be required to achieve this goal. Timber being one of these resources, it is expected a shortage will continue to be experienced unless concrete measures are put in place to reverse the trend.

The Government ban on logging in the year 2000 made majority of saw millers to close shop. The resultant effect of the ban was lack of bulk volumes of trees to cut and convert to timber. Subsequently, the smallholder/private farmer could not sustain the demand in the market.

III. SUMMARY AND CONCLUSIONS

The focus of this study was mainly to explore the uses of timber viz a viz the analysis of the trends in its availability, i.e. a comparison between demand and supply. The pressure on demand of quality timber and especially the hardwoods for construction purposes was cited as a problem that had to be addressed through carrying out this study.

Through extensive literature reviews, questionnaires and observation, data was collected and analyzed to draw informed conclusions. The results derived from the study indicate a glaring general lack of timber converted from specific species and especially the hardwoods save for insignificant quantities. Larger timber sections such as 200mmx25mm from across the board could also not be traced in the market.

The importance of this study cannot be overstated because a confirmation has been made to the effect that demand is higher than supply and therefore the onus is on the Government to take quick action and address the problem immediately. Stepping up campaign to achieve the globally recommended 10% tree cover is critical towards overcoming the problem of a higher demand. Conservation of our natural forests and encouragement of smallholder/private farmers to plant more trees is key to achieving this goal.

ACKNOWLEDGEMENT

This study has been possible as a result of input of many individuals. I am particularly grateful and intellectually indebted to my two supervisors Professor Christopher Kanali (Jomo Kenyatta University of Agriculture and Technology-JKUAT) and Engineer Charles Kabubo (JKUAT) for their valuable guidance and mentorship during the entire study period.

Dr Joseph Githiomi (Director of Kenya Forestry Research institute - KEFRI) was very receptive to me when I approached him seeking access to use their facilities. He went out of his way not only to accept my request but also to provide me with his personal books. I thank him for his kindness to me.

I am also grateful to members of staff of KEFRI and particularly Mr. Dominic Mikile (chief technologist) who offered me unwavering support. I also thank University of Eldoret (UOE) wood science students Irene Mwanisa and

Nancy Ong'uti.

My sincere gratitude also goes to Dr. Henry Kibet Rotich (Kenya Bureau of Standards - KEBS), Korero (KEBS) and Ben Ochieng (KEBS) all of whom assisted me in one way or another to complete this research study.

This section would be incomplete without mentioning Dedan Kimathi University of Technology (DeKuT) Professor Eng. P.N. Kioni, Professor Muthakia and the members of the training committee who extended to me financial support to undertake this research. I appreciate and feel indebted by your generosity.

I thank my family members and especially my wife Nancy Mithamo for her patient and support during the entire study period. I finally thank God for his grace, love and mercies without which I could have despaired on the way

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