



## Dynamics of Timber Value Chain in the Southern Highlands of Tanzania

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### ABSTRACT

The dynamics of the timber value chain in the Southern Highlands of Tanzania well known. The study strove to identify key actors, their roles, functions, and interactions in various nodes along the timber value chain. Data were collected using key informants' interview, focus group discussions and researchers' direct observation. The study identified various value chain nodes: land, inputs, production, harvesting, processing, transportation, and marketing. Actors of the timber value chain identified were village government, villagers, tree growers, seedlings producers, middle-men, institutions, district government, traders, saw millers, and porters. The paper describes points out outstanding differences and similarities across the three study districts. Results revealed that there was a considerable variation (dynamics) in the study districts in terms of seedlings quality, tending operations, timber harvesting age, transportation modes, distance from the market, marketing aspects, government regulations and taxations. Further, the governance of value chain in the study areas was examined and issues related to regulations, quality and standard setting are described. The paper recommends that one-size-fits-all approach should not be used to address existing challenges of the value chain. The paper finds it prudent to use location-specific initiatives to improve timber value chain in the study area.

**Key words:** Timber – dynamics – nodes - value chains – inputs - Southern highlands

### INTRODUCTION

Tanzania has been reported to have a rapid global expansion of private forest investments in form of plantations (Constance 2012). Economically, expansion of forest plantations is reported to contribute to national and local economies through supply of raw materials and provision of employment opportunities to the areas where plantations are based. Globally, forests are decreasing and demand for its products is growing rapidly hence private forest plantations have become increasingly important for the continuous timber supply (FAO 2009). Although Tanzania's forest plantations are estimated to be 250,000 hectares, the demand for timber and other wood products is higher than the current supply (Ngaga 2011). With increasing population and urbanization, demand for wood from these plantations will exceed supply by about 2,200,000 m<sup>3</sup> by the year 2030 (Ngaga 2011). This increasing trend on forest plantations implies an increase in pressure on land in areas such as Southern Highlands of Tanzania.

Chamshama *et al.* (2010) noted that although the private forests plantations industry is growing fast to meet increasing demand for wood products, there is a challenge of land shortage and unclear land tenure. Lack of Village Land Use Plans and Land Investment Plans in many Districts is another challenge (Malinga 2011). Insecure land tenure has been reported to be a barrier for potential investors to enter forest plantation (Anne 2012). Small-scale farmers are actively engaged in tree planting for timber production on land which was once used for food production and hence threaten household food security. Similar case has



been reported in Uganda, where investment in tree planting has led to local community's suffering from hunger. Residents lost their gardens and grazing fields to the plantations and poverty and food insecurity increase (Anne 2012).

Although for many years, tree planting was regarded as a right direction for protecting the environment, the on-going rate of converting village land to forest plantation for commercial purposes in the Southern Highlands of Tanzania has raised skepticism on its contribution to communities' livelihoods. Influx of domestic urban-based investors in the Southern Highland of Tanzania is believed to accelerate this transformation. The transformation seems to render opportunity for native local communities' access to and benefits from land. In the Southern Highlands of Tanzania, land conversion into exotic tree plantation occurs through various approaches but simultaneously. These include domestic investors acquiring land through village or district governments and then converting it into timber plantation, domestic investors acquiring land from individual farmer and individual farmers who then convert their own farmlands to trees growing. It has been reported as well that investors rush to buy individual farmers land (Anne 2012). Besides some farmers selling their farm parcels to investors, some farmers who engage themselves into timber growing are reported to sell their tree plantation before harvest period or harvest before maturity due to financial constraints and food insecurity (Indufor 2011). According to Xhabali *et al.* (2015) timber value chain has many participants. Primary participants include tree owners (government or private), processors (sawmills), furniture producers, traders, and exporters. Secondary participants include input providers, market organizer's, transports and logistic, financial institutions, academicians and certification providers.

In Tanzania, many people use wood products such as firewood and charcoal to

sustain livelihoods. According to the present economic forces, most of the people in Tanzania will continue to depend on wood products for a long time to come (Kapinga 2010). It has been reported that Tanzania population increase is projected to take place at 3.1% annually (URT 2012). This will continue to put pressure on the natural and plantations forests, where most timber species are exploited. The demand for forest products is forecasted to double by 2030 to 4.2 million m<sup>3</sup>, creating a significant supply deficit of about 19.5 million m<sup>3</sup> (MNRT2015, Indufor 2011).

Several studies have been conducted on forestry in Tanzania and Southern highlands (Lusambo *et al.* 2016, Pedersen 2017, Wells and Wall 2005, Sawe *et al.* 2014, Asiad 2016, PFP 2016, Lupala *et al.* 2015, Lupala *et al.* 2017). However, these studies concentrated on deforestation, biodiversity, productivity, tree-planting projects related to conservation and climate change mitigation, carbon sequestration, improved variety, and economic importance of forests and forest products. No studies have addressed the dynamics of timber value chain in the Southern highland districts of Makete, Njombe and Mufindi. Therefore, the paper strove to describe the dynamics of the timber value chain in the southern highlands of Tanzania, taking the case of three Districts of Makete, Njombe and Mufindi. Specifically, the study endeavored to identify the key actors of the timber value chain in the Southern highlands, their roles, their functions and interactions in various nodes along the timber value chain.

## LITERATURE REVIEW

According to Kaplinsky and Morris (2002) value chain as the full range of activities which are required to bring a product or service from conception through different phases such as production, delivery to final consumers, and final disposition after use of commodity or services. The main elements of the value chain have been identified as:



a) mapping value chains, the share of various actors in the chain. b) Identification of key buyers of the product or services. c) Identifying the chain governance and the role of institutions and d) upgrading in value chains. Consequently, this approach points out how value chain analysis seeks to characterize performance of activities in the chains and understanding on how value is created and shared among chain participants. In contrast, to Hobbs *et al.* (2000), value chain is one particular form of the supply chain, which refers to the entire vertical chain of activities regardless of how it is organised and functions: from production on the farm, through processing, distribution and retailing to the consumer. Hobbs definition of supply chain and that of Kaplinsky and Morris on value chain share similar aspects. Hobbs *et al.* (ibid) definition of value chains emphasises on the permanence of linkages among chain actors; states the value chain as a vertical alliance or strategic network between several independent business within a supply chain.

Other scholars have viewed value chain analysis in a narrow or broad sense (van den Berg *et al.* 2009) by focusing on a single firm which includes a range of activities from the conception and design stage; the acquisition of inputs; production, marketing and distribution activities; and the performance of after sales services. On the other hand, the broad approach to value chains examines across enterprises at the range of activities performed by various actors to bring a raw material to the final product. Thus, a product starts from the production system of the raw materials used to produce a product; and includes linkages with other actors who performed various activities such as trading, assembling, processing and providing business development services such as credit and market information. In addition, the broad approach also comprises all backward and forward linkages, up to the level in which the raw material produced is linked to the final consumers (van den Berg *et al.* 2009). Thus, the value chain is a new development

which opposes the traditional focus which was narrowed on production only but scrutinizes interactions and synergies among actors and between them and the business and policy environment. Revealing strength and weaknesses identified in value chain analysis helps the actors in developing a shared vision of how chain should perform and identify relationship among the collaborators for improvement of chain performance. However, the concepts of value chain and market analysis have become synonymous by analyzing horizontal on specific actors and the role of policies, institutions and laws in shaping markets. Often, the terms 'supply chain' and 'value chain' are used interchangeably. According to Harland (1996), supply chain is several entities, interconnected for the primary purposes of supply of goods and services required by end customer. Thus, supply chain and value chain both imply entities which are interconnected through transaction of goods and services.

Historical, as a system approach, the value chain concept evolved over time, drawing from different disciplines (da Silva and de Souza Filho 2007). In 1960s the scientific discussions about the vertical integration of production and distribution processes started to emerge. In the mid-1980s, Porter developed the value chain analysis as an instrument for identifying the value of each step in the production process. Two issues were critical at this stage; comparative advantage of firm use at the market, whereby two issues were identified by Parter (a) primary activities, which directly contribute to add value to the production of goods and service and (b) support activities, which have an indirect effect on the final value of the product (van den Berg *et al.* 2009). The primary activities were identified as in-bound logistics, operations, outbound logistics, marketing and sales and services. These activities were aimed at offering the customer a higher level of value than the cost of the activities thereby resulting in a profit margin (Roduner 2004).



In the mid-1990s, Gereffi *et al.* (2005), introduced the framework called “Global Commodity Chain (GCC). The framework utilized value chain to examine the ways in which firms and countries are globally integrated, and to assess the determinants of global income distribution. Although GCC linked production systems, it focuses on the power relations in the coordination which was globally dispersed. Gereffi argued that commodity chains are generally characterized by a leading party or parties that determine the overall character of the chain and established four core elements: (a) input-output structure, (b) territorial (international) structure, (c) institutional framework, and (d) governance structure (Kaplinsky and Morris 2002). The focus was set on governance referring to institutional mechanisms and inter-firm relationships (Fasse *et al.* 2009). Power relation among the chain actors is very relevant and crucial in understanding how entry barriers are created as well as gains and risks are distributed. Ponte (2002) applied the GCC concept in quality assurance procedures to crops such as coffee. However, the GCC framework has been challenged in the sense that the concept of a commodity refers to the markets in which it is produced and sold and not the product itself (Kaplinsky 1998), which means the same product might be a commodity and sometimes not.

The Gereffi’s GCC framework was adopted by Messner (2002) when developing the concept of the “world economic triangle”. Messner’s concept assumes that actors, governance and regulation systems determine the scope of action open to the regions in the global commodity chains. In addition, he identified six critical aspects in an economic triangle as; actor constellations, interests, power structures, situational mind-sets, action orientation and trust. The “world economic triangle” focuses on upgrading entire regions or clusters through their integration into chains. Roduner (2004) noted that the economic triangle theory links horizontal

(cluster development) and vertical approaches (value chain). The global commodity chain concept has also been further developed into the Global Value Chain Concept reflecting a more dynamic view of chain governance (Sturgeon 2008, Gereffi *et al.* 2005).

Hulusjo (2013) analyzed value chains of timber in East Africa and revealed that farmers are engaged in silviculture, traders purchasing trees and make timber. The scale of the business was small and markets are local. However, the analysis did not capture other actors which are farmers’ groups, institutions, NGOs and government.

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## MATERIALS AND METHODS

This study was conducted between March to December 2019 and employed a cross-section design, and mixed research methods for data collection. Firstly, the study conducted the stakeholder’s analysis by identify the main nodes and their actors to



identify value chain, its nodes and actors. Secondly, thirty interviews (both structured and unstructured) were conducted to individual tree growers, who were randomly selected to gather information on their roles, functions, and interaction along the timber value chain. Information such as availability of land, seeds and inputs, timber production, processing and marketing was gathered. After introduction by the District Forest officers, structured and unstructured interviews were also conducted to selected traders and middlemen (to get information regarding timber trade (regulation, rules and taxation). Besides, interaction between growers, middlemen, traders was documented. Interviews were conducted to four groups of trees growers (2 women and 2 men) along the three districts which were covered by the project (Makete, Njombe and Iringa), aimed at collecting their experience on working together in production of seedlings and trees planting. Further, ten seedlings producers which were registered by the District Office, were randomly sampled and interviewed to get their information in seedlings production, availability of inputs, costs incurred and revenue from seedlings production. To supplement information gathered from other sources; five Focus Group Discussion (FGDs) were conducted to the groups of selected tree growers, traders and transporters. FGDs were conducted to validate information from individual farmers. Researchers' direct observation was another method employed to collect information on issues related to forest and village lands.

In addition, interviews were conducted with key informants who were sampled from government officials; forest officers, agricultural officers, community development officers, district trading officers and Tanzania Revenue Authority (TRA) officials. Both quantitative and qualitative data were collected during execution of this study. Information gathered by using these methods includes status of timber value chain, various rules

and regulations and taxation associated. Participation of government officials in facilitation of the chain was also captured.

This study found it reasonable to use chi-squared to further analyse the responses (in Figure 3) with a view to establish responses regarding who benefits from land transactions in the study area. Prior to analysis, the responses were categorised into four groups, namely: (a) *buyers*—with expected frequency,  $f_e$ , of 25% and observed frequency,  $f_o$ , of 48.1%, (b) *sellers*—with expected frequency,  $f_e$ , of 25% and observed frequency,  $f_o$ , of 14.8%, (c) *village government*—with expected frequency,  $f_e$ , of 25% and observed frequency,  $f_o$ , of 14.8%, and (d) *all those involved in the transaction*—with expected frequency,  $f_e$ , of 25% and observed frequency,  $f_o$ , of 22.3%. Then, the chi-squared ( $\chi^2$ ) was computed using the formula:

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} \quad (1)$$

The calculated  $\chi^2$  ( $df = 3$ ,  $n = 120$ ) was compared with the critical value of  $\chi^2$  at  $\alpha = 0.05$  ( $df = 3$ ). This was aimed to establish if there exists statistical evidence to support that the buyers of land in the study area benefit more from land transaction than others. The strength of *preference* was subsequently determined using Cramér's  $V$  (Gravetter and Wallnau, 2004; 2007):

$$V = \sqrt{\frac{\chi^2}{n(df^*)}} \quad (2)$$

Where  $\chi^2$  is chi-squared,  $n$  is the sample size,  $V$  is the effect size,  $df^*$  is a smaller of either  $(R-1)$  or  $(C-1)$ :  $R$  and  $C$  are the number of rows and columns respectively, in the frequency table. According to Cohen's 1988 guidelines (Gravetter and Wallnau 2004, 2007) presented in Table 1, effect size can either be of three types



namely *small effect*, *medium effects* and *large effects*.

**Table 1: Standards for interpreting Cramér's V as proposed by Cohen**

For $df^* = 1$	$0.10 < V < 0.30$	Small effect
	$0.30 < V < 0.50$	Medium effects
	$V > 0.50$	Large effect
For $df^* = 2$	$0.07 < V < 0.21$	Small effect
	$0.21 < V < 0.35$	Medium effects
	$V > 0.35$	Large effect
For $df^* = 3$	$0.06 < V < 0.17$	Small effect
	$0.17 < V < 0.29$	Medium effects
	$V > 0.29$	Large effect

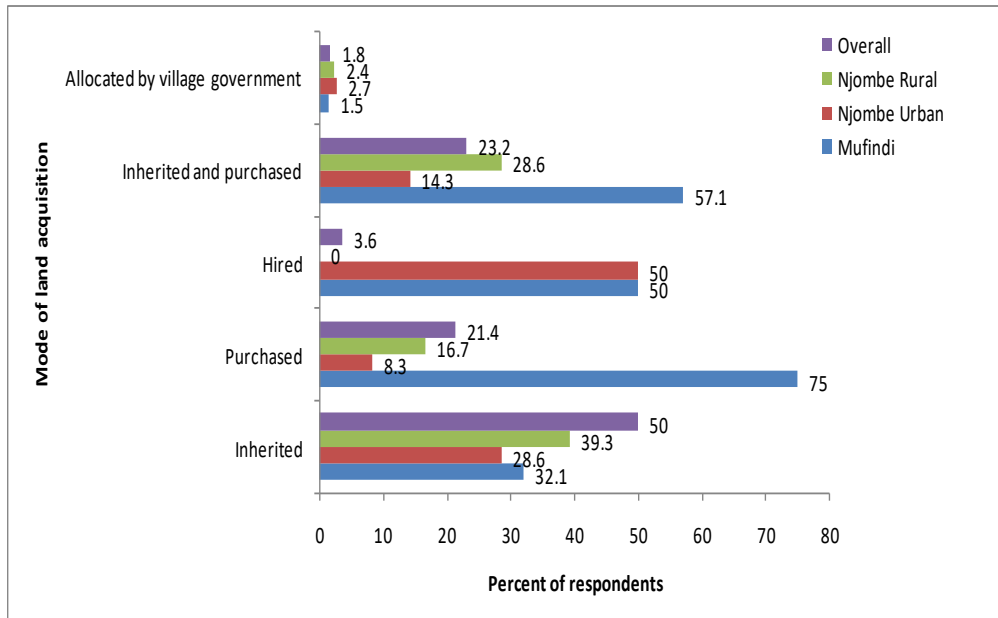
Data analysis employed content analysis technique for qualitative data. Quantitative data analysis was carried out using SPSS and Excel statistical computer programmes, which were sufficient to give the results. Descriptive statistical analysis based mainly on frequencies and percentages. The general purpose of descriptive statistical method is to summarize, organize and simplify a set of scores (Gravetter and Wallnau 2004 2007).

In the present study, the results were summarized using bar charts.

## RESULTS

### Nodes and actors involved in the timber value chain

Timber value chain in Southern Highlands of Tanzania involves various nodes and actors. Some of the nodes are land acquisition, inputs, production, harvesting, processing, transportation and marketing. Various actors are interacting along the nodes to make the chain operational. The first stage along the timber value chain is land, which is used for timber production. Results on land acquisition indicate that majority of the respondents had inherited land through informal institutions (50%,  $n = 200$ ), followed by those who have a mix of inherited and purchasing (23.2%,  $n = 93$ ), then those who purchased land (21.4%,  $n = 86$ ) and those who hired (3.6%,  $n = 15$ ) and village allocation (1.8%,  $n = 8$ ) (Figure 1).



**Figure 1: Mode of land acquisition in the Mufindi and Njombe Districts. Source: FDT (2018)**

Land could be purchased either from individual farmers or village government. Results with key informants revealed that it is the village government that oversees all matters relating to land in the village including supervising smooth transactions

of land between the buyers and the sellers. It was vividly revealed that middlemen play a pivotal role in the land business since they identify where land is available and link the landowners with potential buyers.



Further investigations on the decision making with regard to purchasing land for tree planting showed that both husbands and wives participated in decision making (Figure 2). During FGDs, women groups had a different opinion regarding who decided to acquire land for tree planting. Majority of female participants claimed that they were not involved in decision making regarding purchasing land for tree planting

this could be *arguably*, because women have less financial power compared to men.

Study results further indicated that in land deals there were parties involved who stand to receive some benefit (Figure 3). These included the witnesses, the village government, buyers and sellers. Results through FGD indicated that in most cases buyers benefited more than land sellers.

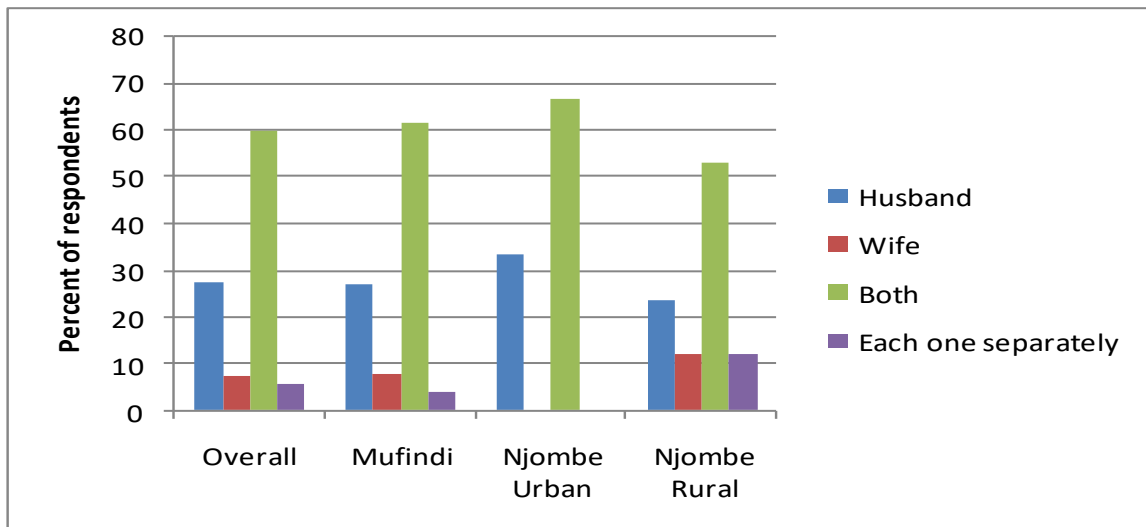


Figure 2: Who decides to acquire land for tree planting in Mufindi, Njombe Urban and rural Districts?

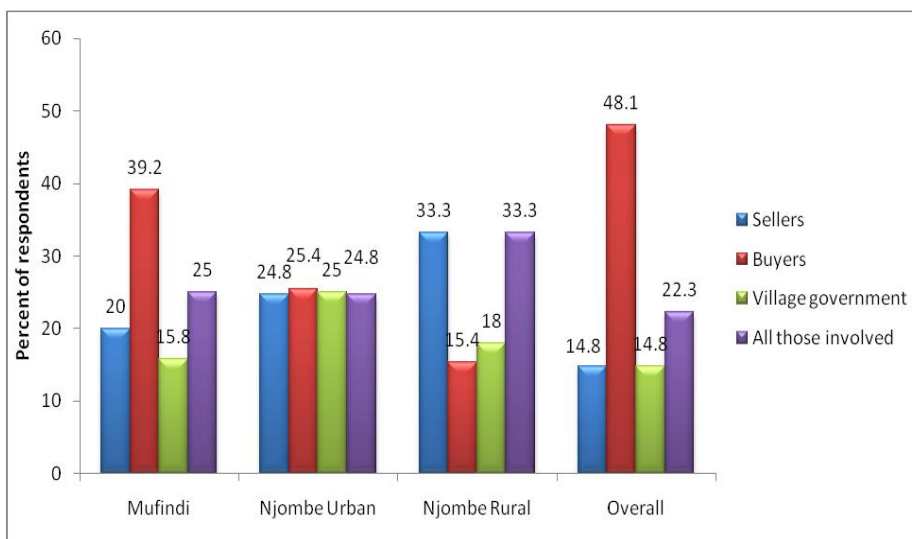


Figure 3: Who benefits from land transaction in Mufindi, Makete and Njombe urban and Rural Districts (Source: FDT 2018)



Informal interviews and observation further found that inputs for timber production (seeds, fertilizers, polythene tubes) were very crucial for the success of the chain. Inputs stockiest have played important role in supplying fertilizers and polythene tubes, watering cans, hoes and other equipment. Other organizations such as Tanzania Tree Seeds Agency (TTSA), Private Forestry Programme (PFP) were noted to play important roles in supplying seeds (both local and improved varieties).

Interviews from seedlings producers, trees growers and District officials reveal that production process starts with sources of seedlings used in planting trees. The study

identified two sources of tree planting materials; seedlings raised in the nurseries and seedlings from natural regeneration in harvested areas. It was reported by the district council's officials in Makete that more than half of current young woodlots come from natural regeneration after the mother trees have been harvested (Plate 1). Some of these seedlings are being used for the establishment of woodlots elsewhere, while some are left to grow in-situ as the next woodlot. To ensure future quality tree seedlings with straight, vigorous, and non-multiple stems invariably selected to remain in the field or for planting elsewhere.



**Plate 1: Regenerants from natural regeneration in harvested areas in Makete District. Source: Malimbwi *et al.* (2010)**

It was observed in Mufindi District that owners of the nurseries are mostly young men, and women are mainly the source of labour during nursery establishment. Tending operations have been observed to use available local labour. However, results on the tree species grown in the study area indicated eucalyptus and pines to be the main species (Figure 4).

The study identified various actors who are involved in tree growing in Southern Highlands of Tanzania. The main tree growers are villagers' institutions like religious organisations, schools, district councils, groups of farmers, NGOs and

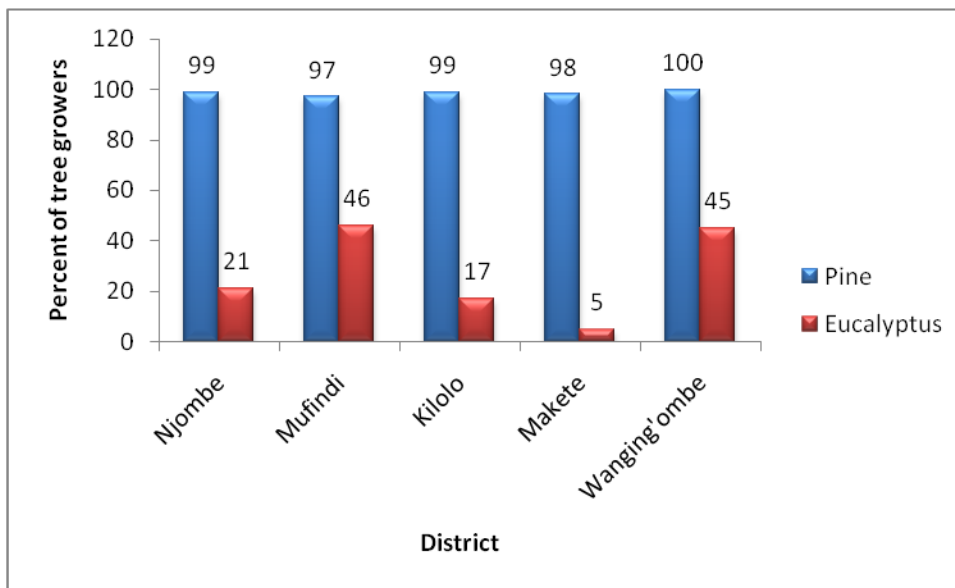
companies. While acreage utilized from production differ from one actor to another, interviews with actors and villagers could not categorize acreages for the timber growers. However, results from key informants' interviews and focus group discussions indicated that a woodlot size range from one to more than 3,000 acres. On one hand, villager's claims that most of the villagers who grow trees fall under small scale (10 acres), whereas district officials claim that middle scale could start from 100 acres; it was difficult to say how many acres will define a large scale.





Results from key informants' interviews and focus group discussions indicated that small holder tree growers harvest timber trees (pines) when they are about 8 years. Harvesting process starts when tree grower wants to sell his/her trees and approach a trader, through the middlemen. On the other hand, when the trees reach about 8 years, a middleman approaches a tree grower and convince him/her to sell the trees. Upon agreement, a trader organize all harvesting processes, where actors involved are saw millers, porters, and saw miller operators. After harvesting, traders hire or use their own cars to transport timber to the market,

either in local markets at Njombe, Makete and/or Makambako towns or to big cities such as Dar es Salaam, Mwanza and Mbeya. The marketing nodes also comprise of actors such as transporters, owners of timber storage facilities, Tanzania Forest Services (TFS), village and district councils. At this node, it was reported that village, district councils and Tanzania Revenue Authority (TRA) collect taxes and issue license to the timber traders. In addition, TFS offers transport permit at a cost. At the consumption node, furniture producers purchase and use timber for making furniture.



**Figure 4: Tree species preference in the studied Districts. Source:** (FDT 2015)

Results in Figure 5 present dynamics in various aspects with regard to tree growing in the study districts. Results indicated that Makete District has highest percentage of unused land. Njombe District has converted greater percentage of agricultural land to tree planting. Following up more on the extent of tree growing in the study districts, results (Figure 6) show that planting efforts

is increasing overtime. Mufindi District seems to be leading in tree planting. Although Njombe town council was established in 2013, the planting effort is on increase. In Njombe district council the trend increased but dropped drastically between 2008 and 2012, before picking up again.

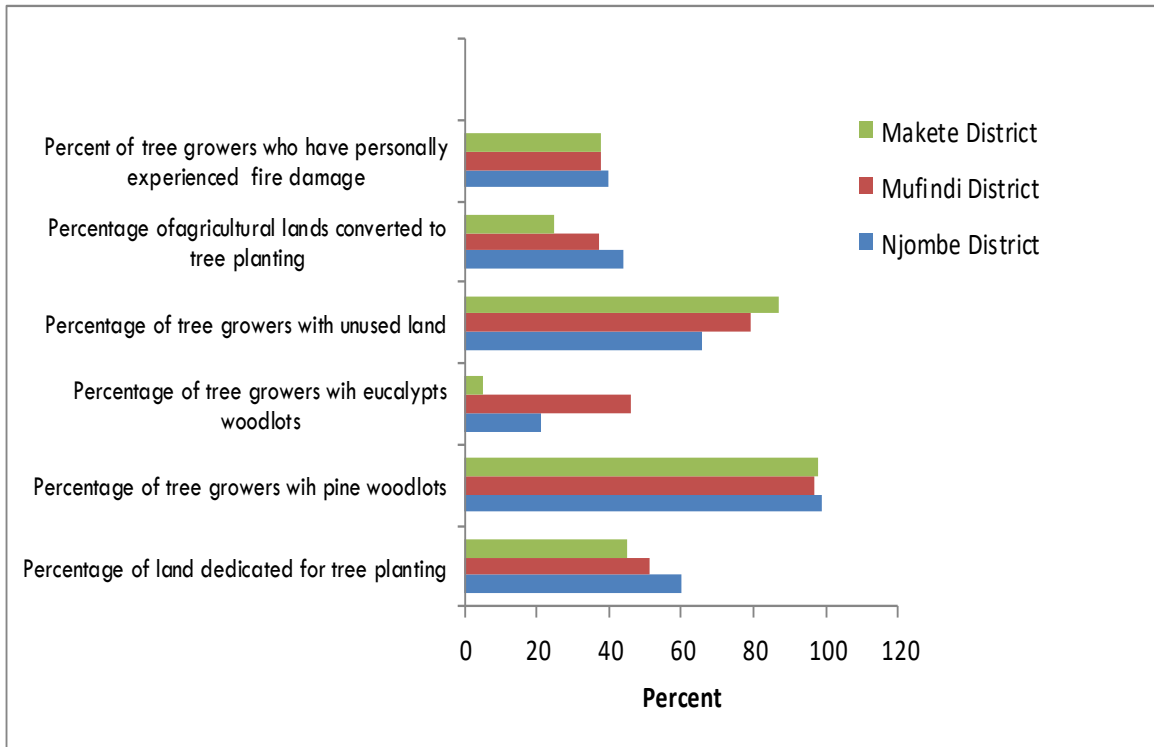


Figure 5: Inter-districts (Makete, Mufindi and Njombe) Tree growing dynamics Source: FDT (2015)

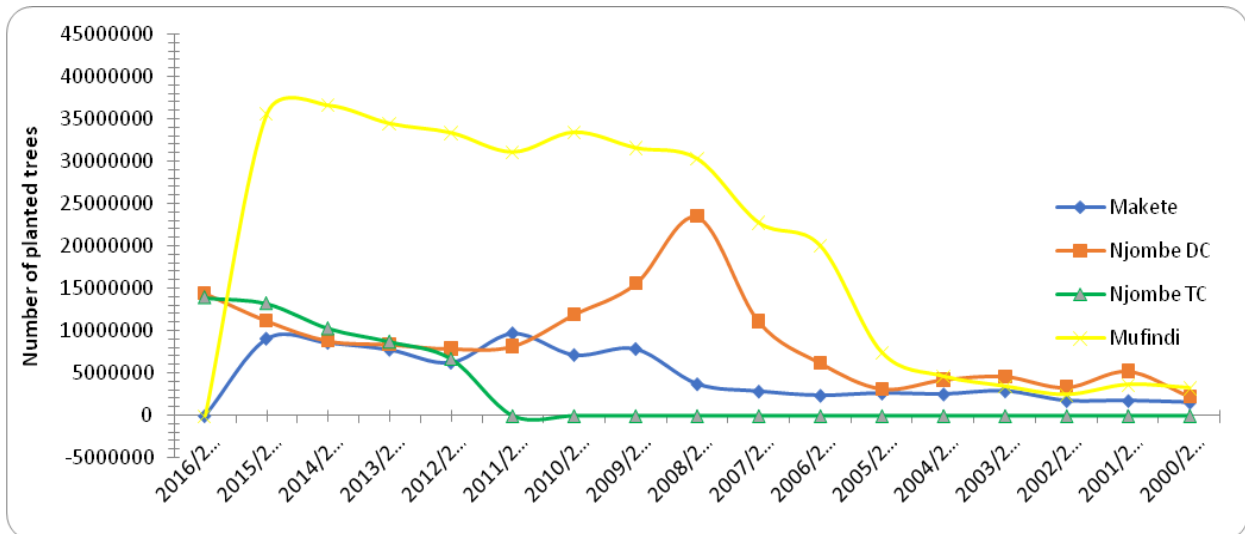


Figure 6: Extent of tree planting in Makete, Mufindi, Njombe Town Council and Njombe District Council. Source: Secondary data from district councils officials.

The chi-squared analysis was undertaken to establish whether or not the responses regarding who benefits from land transactions in the study area were statistically different. Prior to analysis, the responses were categorised into four groups, namely: *buyers, sellers, village government and all those involved in the transaction.* The findings revealed that computed chi-

squared  $\chi^2$  ( $df = 3$ ,  $n = 120$ ) was 29.95, while the critical value of  $\chi^2$  at  $\alpha = 0.05$  ( $df = 3$ ) was 7.81. Thus, there was statistical evidence to support that the buyers of land in the study area benefit more from land transaction than others. The strength of preference was subsequently calculated accordingly and found to be 0.29 suggesting that the effect size of differences in



benefiting from land transaction between buyers and other parties is *small*.

### **Roles of actors and their interactions**

Study investigations on the interaction of actors in the tree districts based on their involvement in the chain identified two main aspects in interaction. The nature of interaction depends on whether the actor is direct or indirect actor. Thus, seedling producers, middlemen, saw millers, transporters and the government were identified as indirect actors because they facilitated the functioning of the value chain. However, the study findings also indicated marketing channel to have influence on the nature of interactions of some of the actors. Three major marketing channels of non-industrial timber were identified: selling of immature trees, selling of mature standing trees and selling sawn timber. Additionally, two end markets for sawn timber were also identified, namely local and urban market. In the local market, the sawn timber was sold directly by farmers or retail traders to village consumers on retail basis. Whereas the urban market consisted transportation of sawn timber from the production areas to the collection centers or direct to the big cities where it was sold by traders to consumers through wholesale or retail outlets. Study results on the interactions of actors in the timber value chain in the Southern highlands are presented hereunder.

#### **Direct actors**

##### *Tree growers*

Tree planting was the main function of the tree growers in the production node of the value chain. From the findings, some of the tree growers (mostly those who are not small scale) interacted with seedlings producers and middlemen. Interaction of tree growers and seedlings producers was through contracting the seedling producers. The contracts were informal based on trust and all operation costs were covered by the tree growers with some additional cash to cater for labour and time used in

undertaking seedling production. However, contract kind of seedlings production was for large scale tree growers and NGOs that aimed at supporting small scale farmers; only business-oriented seedlings producers engaged in this kind of interaction. For example, a key informant from MADEBE company in Kifanya Village mentioned that “*we raise seedlings based on the order (amount required) from our investors whom we plant trees for them; you might find that half of the seedlings produced is for the order and the rest is sold to other customers.*” Seedlings provision was among the support given to the Tree Growers Association (TGA) that were formed by PFP as such PFP was eligible to find agents for seedling production. The common practice to individual small-scale tree growers was either buying seedlings from seedlings producers (@ TZS 100/=) or producing own tree seedlings. Findings from FGDs with tree growers indicated that it was relatively cheaper to produce own seedlings than purchasing due to limited income. Additionally, own seedlings production was used as an alternative source of income from selling of the remained seedlings.

The interaction of tree growers and seedlings producers was observed in Mufindi and Njombe districts where they planted seedlings raised in nurseries different from Makete where regrowth was used by most of the tree growers. However, few tree growers who used nurseries raised seedlings and villagers in Makete commended on the use of seedlings from nurseries to have better chance of producing quality timber. Study results indicated interaction of both small scale and medium tree growers with saw millers and timber traders because most of them opted to sell standing trees due to limited capital to cater for timber processing (Hyman 1983) and limited connection with traders (Jama & Pizarro, 2008) respectively. The price for standing trees ranged from TZS 5,000-10,000 (US\$2.1-4.2) per tree, whereas cost associated with timber selling included the



cost of hiring machines at TZS 1,600,000 (US\$684), labour and transport, and pay various taxes if they want to get access to distant markets. In some cases, where tree growers and traders interacted, tree growers were benefiting more than selling via middlemen who offered lower prices.

#### *Timber Traders*

Study results indicated that timber traders were involved in buying trees from tree growers, processing, transporting and making this product available to urban consumers. Their activities encompassed wholesale on credit basis with the timber traders in the big cities. Findings from in-depth interviews with timber traders indicated that, only transport, loading and off-loading costs were paid before selling of the consignment. The rest of cash was paid after the complete selling of the consignment. The longer the consignment stays, the longer it takes for the traders to enjoy the profit from the business. A trader at Mago village for example, mentioned he/she has not been paid for a consignment for about a year. Further investigations on the reasons for delayed payments indicated a drop in marketing of sawn timber since 2016.

Results further indicated that, most of the traders interviewed in the study sites were also tree growers. When asked why they decided to engage in growing trees, the reasons mentioned were a) they want to maximize profit by operating along the chain from production, in assumption that they can make more profit by planting their own trees. Timber traders interacted with tree growers, middlemen and transporters. Only resident tree growers cum-traders were able to interact with tree growers because they were aware of the farms with mature trees different from the outsiders who had to use middlemen. The study results show that some traders had own transport while others had to work through hired transport. For example, a trader in Mwitikirwa was undertaking timber business in Mwanza, Dar es Salaam and Singida regions. This

trader owns 5 trucks to facilitate transportation of timber in ensuring that he is making a super profit from transport as well. In-depth interviews with timber traders revealed some of the costs associated with sawn timber trading which include; hiring a 7 tons FUSO track that could cost to TZS 200,000 (US\$ 85); loading timber –TZS 150,000 (US\$ 67); offloading –TZS 150,000 (US\$67); paying for transport permit –TZS 100,000 (US\$ 43) and annual license – TZS 261,000 (US 112). Results indicated hired transport is costly. For example, a woman at Kifanya Village, Njombe reported paying up to TZS 2,800,000 (US\$1197) for hiring a truck to Dar es Salaam. She would wish to own trucks in future because having own truck, the transport cost is reduced to half and thus, increase the profit margin. While transportation costs vary from one place to another, costs per permit and licenses are almost similar. However, each route was treated separately in terms of location in which a particular license operates. It was noted that if a trader has a timber business license for transporting timber to Mbeya city, that particular businessperson cannot be permitted to transport and sell timber in other locations for instance Mwanza or Dar es Salaam.

#### *Consumers*

Study results indicate that the big market of sawn timber produced in the Southern highlands of Tanzania is construction industry in big cities, very little is consumed in the production areas. Local consumers consist of small-scale carpentry workshops for furniture making. Furniture are either sold locally or transported to big cities like Dar es Salaam. Further investigations on the use of pine sawn timber indicated timber to be used for furniture.

#### **Indirect actors**

##### *Seedlings producers*

Results show that seedlings producers supplied seedlings to tree growers to be planted in the plantations. Some of these



seedlings producers, reported that seedlings production is an important source of income as they tend to have nurseries which can accommodate about 100,000 seedlings. In this sense, estimated revenue will be  $100,000 \text{ seedlings} \times \text{TZS } 100 = (\text{US}\$0.042) = \text{TZS } 10,000,000 (\text{US}\$ 4,275.3)$ . Other costs involved include seeds, TZS 50,000 (US\$ 21.4) per kilogram (compared to hybrid seeds from South African which costs TZS 3,000,000 (US\$ 1,283); manure costs TZS 10,000 per 7 tons tuck; packing materials 1-kilogram TZS 6,000 (Us\$ 2.6), residues of pine trees at 1,000 per 20-liter bucket. These costs vary based on the size of the tree nursery. Other costs include hiring labor for filling soils in the polyethene tubes, irrigation just to mention a few. It was further revealed that seedlings producers were not specialized in the production of pines seedlings, but experience from working in the nearby government and non-governmental organizations (NGOs) plantations as well as training workshops from the NGOs involved in promoting forestry activities such as PFP. Results also show that, some seedlings producers took advantage of being middle agents where they used to assist tree growers based in urban areas in tendering silvicultural activities ranging from accessing land to tree management activities.

#### *Middle agents*

Middle agents mainly intervened during sale of trees or sawn timber by bringing together tree growers and timber traders. Although most of the middle agents interviewed were themselves tree growers, linking tree growers and traders was also a potential job to them. The findings have indicated the middle agent not to engage themselves in timber business. However, in order to keep themselves linked to the traders, middle agents have developed a mechanism of reinvesting their commission through purchasing more sawn timber than the amount required by the trader such that they owed the traders. The middlemen's

assumption that by the time their money is paid back after selling the consignment the trader will be in need of another consignment hence a continual relationship with traders. Middlemen were rewarded for their service at a fixed rate by traders; an amount of money per sawn timber which was negotiated based on the farm gate price of trees/sawn timber. To maximize the profit, middlemen would thrive during negotiation with growers, to purchase trees at the lowest possible costs, (for example at TZS 5,000-7,000= instead of TZS 10,000/= which a trader offer) so as to maximize their profit.

#### *Saw millers*

Saw millers are important actors in facilitating the non-industrial timber value chain in the SHT. Timber processing is an intermediate stage in the value chain. Saw milling machines were privately owned as such growers, middlemen and traders easily interacted with the owners when in need of timber processing. The Saw millers also interact with chain saw operators who were paid by the saw miller owners.

#### *Transporters*

Transportation consisted in the transfer of logs from plantation to sawmill places as well as from sawmill places to collection points. Mostly, transporters are those with lorries, who hire their tracks to transport timber from production to the market. Ferrying logs from plants to sawmill place was done by men whereas ferrying sawn timber to the collection points where it can be picked by lorries was done by women and children. The later was done through carrying on heads, the practice which is uncommon to men. However, ferrying sawn timber from the processing points varied from one place to another. In areas where the terrain is good, tractors were used more than women and children. Transportation from the collection points to big collection centers to be carried by trucks was done by lorries (canter) and land rovers depending on the terrain.



## **Governance of the timber value chain**

### *Organizations involved in the functioning of the value chain*

The study identified two main types of organisations involved in the facilitating the value chain: government departments and traders' associations. Tanzania Forest Service (TFS) was the main government department involved in the facilitation of the timber value chain. The Ministry of Natural Resources and Tourism (MNRT) is responsible for management of natural resources in the country. Investigations on how the government departments were involved in the timber value chain in the SHT indicated that various departments were involved in the timber value chain at different levels from the local level to the national level. The involvement was through the issuance of timber business licenses, logging permits and passes to traders and collection of taxes. The study further revealed that, all timber traders were supposed to have trade license issued by Tanzania Revenue Authority (TRA). Trade licenses were categorized according to the timber market location. From the study, three routes were mentioned, Mbeya, Mwanza and Dar es Salaam. Traders were required to have trading license for each route if they wanted to market timber in the mentioned markets. Timber trading licenses are renewed every year. On the other hand, logging permits were issued at local level the place where there was much information on the ownership of the trees/planks.

Gates were established in all possible outlets from the districts in ensuring that taxes for the consignment are paid and all other required permits were adhered to by the traders. Tax collections were undertaken at two levels: local government level whereby the Villages Executive Officers (VEO) were responsible for the collection of tax (price per tree/plank). The total amount of money collected was submitted to the district level and twenty percent was given back to the villages for development activities such as construction of

dispensaries and schools. The second level is TRA level whereby TFS was responsible for collecting the tax. This tax is called Transit Pass (TP). TRA certificate was issued for the traders as certification for the involvement in timber business. Focus group discussions with tree growers indicated lack of price differentiations for timber from mature and pre-mature trees. However, findings from in-depth interviews with the government officials responsible for forestry management revealed limited expertise on timber grading at the national level as such there was reported limited involvement of the government in timber quality control.

The study identified tree growers associations that were mainly formed by PFP an NGO that promoted private forestry to farmers. The TGAs were bringing together farmers and facilitated the groups to access land from the village land. PFP also used the TGAs to train tree growers on various silvicultural practices. On the other hand, the study also found out that traders' informal associations gathering the traders operating in the same area. The main advantage reported by members was collective bargaining power to both farmers and wholesaler traders in the city centres.

## **DISCUSSION**

Timber growing in Southern Highlands, particularly Njombe, Makete and Mufindi districts is quite profound, and people do not need sensitisation regarding tree planting. They already know the importance of trees as they contribute highly to the economy of individuals and to the districts at large. From the findings, the timber value chain in the Southern Highland of Tanzania encompasses three stages which are production, marketing and consumption of sawn timber. The production node consisted of small, medium and large-scale tree growers. However, small scale tree growers (the villagers) occupied relatively more woodlots in the Southern Highlands of



Tanzania. In the production node, study findings have indicated land to be a very important factor in tree growing. Increase in tree growing was observed in all the three districts, meaning that there is need for continual allocation of land for tree planting annually. From the findings, Mufindi District is leading in all modes of acquiring land for tree growing, the aspect that have been reflected in the level of tree growing as well. The study argues that, the presence of Sao hill Forest Plantation and Green Resources plantations in Mufindi district moved many people into the rush for tree planting since those people had acquired knowledge and skills through working in the plantations, different from other districts that had no tree plantations (Ngaga 2011, Lusasi *et al.* 2019). However, this increased trend of tree growing might lead into land scarcity for other production activities such as food crops production. According to FDT (2018), a consultancy work undertaken in the Southern Highlands of Tanzania found that some of the villages have exhausted inherited or purchased land as they continue expanding their woodlots. Additionally, the villagers while selling their land to meet their immediate needs they remain poor because land is the most important capital and economic base for farmers. The practice has caused most families to be in conflict when they force to reclaim the sold out land because of the need to continue cultivating for food security. This has resulted into formal transactions of land as such customary regimes are fading. More of those who invest on land would like to have formal land titling as land conflicts is escalating.

On the other hand, the findings have indicated the selling of standing trees as a prominent marketing channel by small scale tree growers. Tree growers were sometimes forced to sell immature trees (less than 8years) in urgent cash needs. This is because the rotation period for trees is much longer than for agricultural crops, farmers

have to wait longer before they earn any income from forestry (Hyman 1983). Farmers' investment in tree planting is considered as an asset (or farmers are banking on trees) as such they can sell trees at any time when needs arise. This means small scale tree growers do not move into the higher nodes of the timber value chain hence not able to generate much profit through value addition (Mbeyale and Lusambo 2018). Additionally, the selling of immature and/or mature trees was made through middle agents because getting information about mature trees and trade partners was a critical issue to both the traders and tree growers respectively. It was difficult to the traders who did not reside in the production areas to identify growers whose trees were mature. Inversely, tree growers did not have any information about potential traders. Middle agents were open minded to know the tree growers with mature trees in case of demand at any time. From the findings, middlemen were not purchasing the trees instead they were linking the tree growers to buyers. Different from the findings by Aoudji *et al.* (2012) that middlemen engaged in trade from time to time. However the earnings by trees growers could have been high through direct transaction with traders the aspect that was hindered by lack of information as pointed out by Jama and Pizarro (2008) that limited market information to farmers limits them to achieve economies of scale in transactions with traders.

It was apparent during the study that there exist inter-district variations regarding issues such as tree species preferences, quality of seedlings, transportation aspects such as transportation distances and means of transportation. In the case of tree species preferences, Makete District preferred planting more than *pinus* than *Eucalyptus*



because tree growers have been using regenerants from *local pines species* that needed limited silvicultural practices compared *improved pinus species*. This indicates that tree growers preferred to grow tree species that do not demand too much investment in terms of finance and labour. Improved pines varieties required issues like tree nurseries establishment which had financial implications (PFP2019). Additionally, the use of improved *pines varieties* also required land clearing the aspect that seemed to be tedious to tree growers as such tree growing using regenerants as the source of seedlings was considered the cheapest means of tree growing in Makete District (FDT 2015). Even though pines were mostly planted, eucalyptus were favoured to its ability to rejuvenate after fire outbreak as well as its early harvesting age for poles depending on the sizes of poles required.

Timber trading has its own dynamics as well. Accessibility and distance from the tree growing area to the market determined the prices for the standing trees; the income to be obtained by the small-scale tree growers. In the three Districts the effect of distance was seen through the cost of transport of timber by casual labours to the collection centers alongside the roads, and later to the district centers for selling or transportation to big cities. All these costs were transferred to tree growers through fetching low prices for their standing trees. Generally, Makete District experienced this challenge due to its relative long distances from the district timber market centres at Makambako and Njombe. In addition, its topography whereby most of its tree growing areas were not reachable by vehicles as such labour was used instead. Additionally, other dynamics were reported along the use of hired and own transport. Traders strived to own their own transport to reduce transaction costs and maintain profit along the timber value chain as well as rendering transport services to the other traders. This indicates that most of timber traders by realizing the profit margins from

transporting timber to distant markets, they can realize the profit more increasingly by using their own transport. It was evident that contingent to decrease in timber prices, most of the traders are found to operate in more than one node (e.g., growing trees, trading, having saw millers and transportation) in order to maximize their profit. Operating in more than one node along the chain is a coping strategy used by traders to survive and increase their profit margins. The timber value dynamics are realized through operating in more than one node along the timber value chain as such the differences in profit margins are realized.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results, it can be reasonably concluded that there exists a considerable variation (dynamics) in the study districts in terms of seedling quality; tending operations; timber harvesting age; transportation modes; modes of land acquisition and decision making in land acquisition; distance from the market; and marketing aspects, government regulations and taxations. Issues regarding the governance of value chain in the study areas and issues related to regulations, quality and standard setting have been fairly addressed by this study. It was revealed that in the land transaction issues, the benefits which buyers of land get is statistically significantly higher than other groups at  $P < 0.05$  and that the difference (*effective size*) is small. It is recommended that since there are variations in timber value chain-related activities, *one-size-fits-all* approach should not be used to address existing challenges of the same. It is prudent to location-specific initiatives to improve timber value chain in the study area.

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