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The Impact of Auction System on Forest Revenue Collection: Mtibwa Forest Plantation, Tanzania

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Abstract

The study was carried out at Mtibwa forest plantation in Morogoro Region, Tanzania to assess the impacts of the auction system on the sales of forest products from Mtibwa forest plantation with reference to revenue collection and profit. Socio-economic survey methods used for data collection were key informants interviews, observation, questionnaire survey and review of secondary data. Data were analyzed using Statistical Package for Social Science and content analysis. The study found that the main species planted in Mtibwa plantation was *Tectona grandis* (95%) while others were alternative species. It was found that the selling systems used initially for selling forest products at Mtibwa plantation were logs auction (sale of harvested teak logs), tender and allocation systems while the current systems are standing teak auction and private agreement. The revenues received from the sales of teak logs from Mtibwa plantation of the 2249 m3 teak volume and price at present value at the inflation rate of 2014, were higher using auction system than the revenues collected using allocation by 482,403,936, tender by 53,361,756. Furthermore, the auction system exceeds private agreement by TZS 305,012,274. It was found further that communities adjacent Mtibwa plantation before the introduction of the teak auction sold individual tree at a price range from 30, 00 to 50,000 without taking into account the tree volume. However, currently, they sale the teak at a price range from 30,000 to 100000 after attending the auction days. Currently, community members became more motivated to plant more teak and increased their tree price after understanding the importance and value of teak trees after attending the auction day. It was further found that 60 % of the respondents need to sale their trees using auction but they cannot do that due to the advertisement costs and lack of knowledge on the auction processes. The study further found that, the auction system was the most profitable system of selling teak from government plantation. In the assumption of the same volume (2249 m3) the profit obtained under allocation was lower than that obtained under the auction system by 481,323,736.00; and the profit obtained under the private agreement was lower than that obtained under the auction system by 308,292,274; while the profit obtained under the tender was lower than the profit obtained under the auction by 61,841,956.00. This indicates that the auction system is the most profitable of all the other systems. However, the system is prone to customers' collusion and local customers fail to engage in business due to limited capital and lack of link to international market because Tanzania teak plantation is not yet certified for the international market. Challenges observed can be avoided by encouraging domestic use of teak, certification of Tanzania forests plantations, increasing the numbers of customers through linking them to various international teak markets rather than depending on the India's market; and encouraging local companies or individuals to form groups or associations and participate in teak business. Furthermore, the study found that, the price of the forest products depends on the market force and not the cost of production. Thus, the study recommends for taking into account the cost of production in the sales of forest products from the plantations and proper recording system, linking local timber traders to international market and supporting community members in selling their products using auction system.

Keywords: Impact of auction system, Forest revenue collection, Mtibwa forest plantation, Tanzania.

Contribution of Study

Currently, Tanzania Government emphasis on the sales of forest products from Government plantations using the auction system. However, no any systematic research was conducted to assess the impacts of auction selling system. This study is the only study investigated the best system of selling forest products from Government forest plantation.

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1. Introduction

Mtibwa plantation was established in 1944 and is currently owned by Tanzania Forest Service (TFS) under the Government notice 269 of 2010. The plantation was gazetted through the Government Notice No 213 of 1944 (URT, 2013). The plantation has about 3,115.6 ha of land; out of this 2068 ha are suitable for teak production. The main species grown include *Tectona grandis* (95%) (Plate 1) followed by *Cedrella odorata* (3%), *Milicia excelsa* and *Khaya anthotheca* (2%) which are grown as alternative species (URT, 2013). The main forest products which are traded in Mtibwa Plantation are logs for timber and building poles within and outside the country. Apart from logs and poles, the plantation also generates some income through sales of teak stumps, and firewood which are either sold or given for free to the nearby villages. The teak seeds are collected freely by Tanzania Tree Seed Agency (TTSA) and the community living adjacent Mtibwa plantation. The current system of selling standing teak from Mtibwa plantation is auction system and private agreement. Auctioning is the public sale of goods or properties to the highest bidder (Chamuya, 2006).

Promotion of sustainable production, utilization and marketing of forest resources to achieve the national social economic objectives as well as the effective protection of indigenous forest resources is the major focus of the Ministry of Natural Resources and Tourism (MNRT) is in implementing the Big Results Now (BRN). However, the current main challenge is the marketing system of forest products from the Government forest plantations to ensure that the income and revenue collected cover the expenses incurred in the management of forest resources and other Government expenses. Tanzania like other countries in Africa set forest charges using market mechanisms or calculations that are based on market information. The main challenge of using market mechanisms is that it only works where there is genuine competition in the market. If there is only a small number of buyers it is easier for the buyers to collude and offer low prices. The Tanzania Government policy statement stipulates that the 70% of forest products need to be sold using auction system and the remaining one 30% through allocation system; however, the current auction system is implemented in hard wood species only, specifically teak. Currently, Tanzania Government under the MNRT put emphasis on the sales of forest products from Government plantation using the auction system, and which was outlined in the 2002 Tanzania Forest Act (URT, 2002). However, there is no any systematic research which was conducted so far to assess the potential and challenges of using the auction marketing system in forest plantations. Thus, the current study was carried out to assess the impacts of the auction system on the sales of forest products from Government forest plantations, with reference to revenue collection. The paper informs policy makers about the best marketing system in selling forests products from government plantations. Furthermore, the paper discusses challenges in the implementation of both the current and the previous marketing systems, and determines revenue collection and profit gains in selling forest products from Government plantations before and after the introduction of the auction system; finally, the paper recommends the best teak selling system.

2. Methodology

2.1. Study Area

Mtibwa plantation is situated at Mvomero district in Morogoro Region. The plantation is about 110 km from Morogoro town along the Morogoro – Dumila –Handeni road, and it (plantation) is located in the slopes of Nguu Mountains, in the eastern side of Mvomero District. The plantation lies between latitude 6^0 -6^0 10'S and longitude 37^0 40' -37^0 45' E (URT, 2013). It is surrounded by four villages namely: Dihinda in the North East, Lusanga in the East, Kunke in the South West and Madizini in the South. The villages surveyed were: Kilimanjaro, Dihinda, kwadoli and Lusanga (URT, 2013). The study was conducted at Mtibwa teak plantation and plantation adjacent communities. The Mtibwa site was selected purposively because the plantation is one among the plantations implementing auction system in selling standing teak.

2.2. Data Collection and Procedures

Data were collected from primary and secondary data sources. Primary data were collected through social economic survey. Socio-economic survey was conducted using key informants discussion, interview with tree out-growers using questionnaire, and observation during auction day. Data collection using household questionnaire were conducted in all the selected villages which were adjacent Mtibwa plantation. Households were selected using snow ball method whereby one tree growers mentioned the next respondent. A total of 30 questionnaires were administered to household heads or spouse to collect quantitative data. However it was difficult to have more than 30 respondents due to having a few numbers of trees out-growers and very few reach the harvesting stage. Respondents for questioners were selected purposively based on ownership of the teak woodlots. Secondary data were obtained through literature review of the previous reports and publications from various central and local government offices (Mtibwa Plantation, Tanzania Forest Service Offices, TFS representatives, MNRT Secretary of Forest Utilization (SFU), private plantation- Kilombero Valley Tak Company (KVTC), customers,

Mtibwa tree out-growers, TAFORI library, and Sokoine University of Agriculture (SUA)). Revenue data were collected from Mtibwa plantation through literature reviews and communication with authorities in the Ministry (MNRT) and from the farm. Advantages and disadvantages of different selling systems data were collected through discussion with key informants in the Ministry, farm and other stakeholders.

2.3. Data Analysis

The teak selling systems in Tanzania plantations operated in different years, Price used were compared after being set at present value. The following formula was used to calculate price at present value: $PV = FV(t)/(1 + r)t$ •where: $FV(t)$ = future value; PV = present value; r = the interest rate and t = time in years after the present. The formula was used to compare price and revenue using different systems in different years. The data were analysed using SPSS and content analysis.

3.The Findings

3.1. General Findings

The study findings show that the main species grown at Mtibwa plantation is *Tectona grandis* (95%), and *Cedrella odorata* (3%), *Milicia excelsa,* and *Khaya anthotheca* (2%), were planted as alternative species. The main customers for the products at Mtibwa plantation are within and outside the country. The major overseas teak customers include India which imports three quarters (74%) of the total trade volume, followed by Thailand which imported 16% and China which imported 10% of the total export in 2005-2014 (SGTRMSD, 2015). The forest products traded in Mtibwa teak plantation include standing logs for timber, building poles, firewood, and teak stumps. The findings reveal further that, the former systems used for selling forest products from Mtibwa plantations were tender and allocation systems. These systems are no longer in use in teak due to their shortcomings mentioned under section 3.3; this is with the exception of the auction system which was resumed recently with some modifications.

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3.2. Teak Selling Systems

The current systems used for selling teak from Mtibwa plantation are cited in the Forest Policy of 1998 and Forest Act of 2002 . The current selling systems, which are in use include auctioning of the standing trees and private agreement systems, whereas the previous selling systems included tender, allocation and auction of the harvested logs. It is known that teak demand is very high as teakwood is a valuable timber which is preferred for its multipurpose use which includes making of quality furniture, doors, decorative veneer and all sorts of constructions. Teakwood has the highest rating due to its timber qualities such as strength, durability and workability. Based on the quality of teak, Tanzania decided to use auction selling system to increase government revenue. For the first time, revenue received was very high but with time the challenges of collusion emerged (Figure 1). According to Jean-Daniel *et al.* (2006) collusion in timber selling is a coalition of bidders who try to circumvent competition in order to obtain timber at a lower cost. The decision need to be made to address the problem so as to realise higher government revenue. The auction system was anticipated to increase profit and revenue collection but the system still has some challenges. The challenges and advantages of implementing different teak selling system are discussed here under.

3.3. Potentials and Challenges of Selling Teak Before and After the İntroduction of Auction System

3.3.1. Previous Systems Used to Sale Teak at Mtibwa Plantation

Tanzania auctioned her plantation teak logs harvested at Longuza and Mtibwa forest plantations between 1989 and 2006, but due to low competition resulting from poor participation of customers the approach was discouraged and replaced by other systems (Nganga, 2011). Customers of harvested trees auction system (logs) compete in buying piles of logs, the plantation manager and team had the ceiling price set administratively. However, in most case tree were sold in the form of logs (after harvesting) where trees were harvested during thinning, over matured tree/ any damages caused by wind/diseases or tree logs cached after been harvested illegally. In Tanzania, sale of harvested logs was mostly implemented by private companies such as Kilombero Valley Teak Company (KVTC). The challenges of selling teak harvested logs from Mtibwa forest plantations through auction system were as follows: there was less competition during auctions due to the participation of a small numbers of customers, inadequate harvesting facilities, and high costs of sale procedure since it involved inventory, harvest of logs and selling procedures. Since the system was found to encourage collusion, it was replaced with allocation system.

Allocation was the system which was initially used in selling teak at Mtibwa plantation. However currently, the Tanzania government sells standing trees using allocation system for softwood and whose price per m^3 is based on different diameter classes. In this case, the manager selects the areas/plots to be harvested and then the

customer writes an application letter to the plantation management. The potential selected customers are given area/plots to harvest. The study findings reveal that the system at Mtibwa plantation operated for a short period of time as it had some elements of biasness on the selection of the potential customers. The customers who happen to miss the allocation were often not satisfied leading to courts issues; sometime plantations were prone to fire incidences or other forms of sabotage induced by resentful unselected customers. Other challenges associated with allocation selling system include large sizes of customers making the customer selection process difficult; the trend was attributed to multiple application by individual customers that is one person applying more than once using different names. To address this problem an application fee of Tanzaniaa Shillings (TZS) 50,000 was introduced to each applicant; however the problem still persisted.

Under allocation systems Tanzanian local customers receive the allocation but they did not export the products instead they resold the products to other local customers especially the Indians due to lack of link with international market. This is also aggravated by the fact that Tanzania forests lack international certification, for that reason most of the customers are from India. These customers export teak from Tanzania to the Indian markets, which then resale the processed products to other countries using India's trade mark. The allocation system in selling teak had poor revenue collection as opposed to other systems; as a result this marketing system was discouraged and replaced by tendering system.Apart from Tanzania, tendering system method is also commonly used in Brazil, Malaysia, Ghana and Cameroon (URT, 2013).

The study findings reveal further that tender price determination method operates in a competitive market structure, whereby commodity prices are determined by the market forces. The system was also implemented in a short period of time before being replaced by public auctioning approach. Tendering pricing mechanism became unpopular because it involved other organizations outside the forestry sector like Tender Board (TB) whose purchasing procedures were known to few foresters. Despite that the tender system was effective in the competitive market structure since it is the highest bidder who purchases the products; the system had a weakness of not reflecting timber production costs as the price was determined by the market forces of demand and supply. The system was found to have a great deal of bureaucracy; it involved a long process including consultation with lawyers and the treasury people to confirm the marketing process. The system was also found to have series of meetings in the bidding process, including the checking of selling procedure, the evaluation committee to check if the criteria were met and finally the Bank guarantee of twenty five percent, which was required by the bidder. The selling system was expensive (Table2) involving tiresome work needing a lot of energy to select the winner. A few customers participated in the business leading to monopolist kind of the business resulting in complains and increased court cases. The tendering was replaced by auction and private agreement selling systems.

3.3.2. Current System Used to Sale Teak from Plantation

The current system of selling forest products from Mtibwa plantation is the auctioning of standing trees as opposed to the auctioning of harvested logs. The sale of standing trees through auctions to buyer is done by the auction committee. Furthermore, the study findings reveal that during the financial year 2012/2013, public auction was used to sell standing teak trees from Mtibwa, Longuza, and Rondo forest plantations. Under public auctioning, buyers express publicly their willingness to pay for the available timber. Unlike allocation whereby the producers are price makers and customers are price takers, in public auctioning approach, the suppliers hand over the task of determining the market price to buyers. This means that public auction works well in a competitive market and is more effective for some valuable timber species like teak. Apart from Tanzania, other countries applying the system of timber auctioning include Romania, Russia, Malaysia, Indonesia, Ghana and Cameroon.

Table-1. Teak Customer at Mtibwa Plantation from 2010 to 2014

Financial Year	Customers
2010/11	Prime Timber, Mridhul,Tanga Teak,Senghani Cielmac (T) Ltd
2011/12	Prime Timber, Mridhul,Tangateak,Senghani Cielmac (T) Ltd
2012/13	Senghani Cielmac (T) Ltd ,Mohamed Entre Prises Tanzania Limited,Mridhul
2013/14	Amirnet Co.Ltd Mridhul Export Ltd ,Jaffery Sain Ltd, Prime Timber

Source: Research data 2014

The study findings also reveal that the auction system allows transparency as the selling is done in the field. It is simple and fast as it needs only two weeks to finalise the selling process. The study findings reveal that the system increases government revenue collection and it (the system) is less costly when compared to tender because it does not involve tender board and the advertisement is done once. More than one company are involved in the business unlike in the tender where one company purchases the teak and some time the company resale the product to other customers at higher prices. Teak auction selling system procedures allow customers to purchase the product without

bureaucracy and it is time saving, unlike other systems which take *longer times* to complete.However the system has the following challenges: Only few giant companies with higher capital (Table 1) can compete and outdo weaker customers; there is a danger of retaining only few giant companies in teak timber business and throw small companies and local customers out of business. Furthermore the findings reveal that from 2010 to 2014 only seven companies participated in teak market and the customers have always been the same every year and they had known each other's strengths and weaknesses leading to collusion tendencies. The study findings reveal further that most of the customers were from the same category (giant companies) and that they monopolised the teak market.

Auctioning can face some challenges if not practiced in a competitive market as few buyers (market cartel) would collude and lower the price as was the case in 2014 at Mtibwa Plantation (Figure 1 and 2). According to Jean-Daniel *et al.* (2006) competition is a key to realizing profit in timber auctions; unfortunately collusion among customers often limits the competition in timber auctions. For example, the main markets for teak from Mtibwa in the world are India and China; for this reason the price depends on the markets of these countries. When the market price falls it becomes disadvantageous to the plantation which has to lowers the price (Figure 1). Figure 1 indicates that the price of teak at first auction was high but with time the price decreased as a result of collusion. This need to be addressed through increasing the number of customers by involving local timber traders and international certification of Tanzania forest plantations.

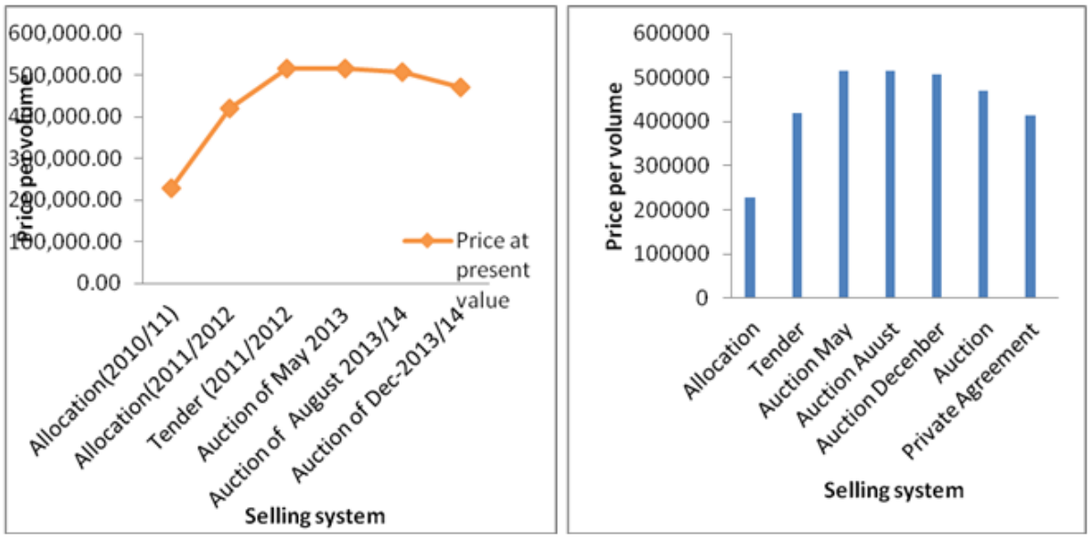

Figure-1 and 2. Price of teak at first auction was high but with time the price was reduced due to collusion effect

Other challenges reported in teak selling system include the plots having the same volume, customer receiving different recovery rate, which might be attributed to over estimation or under estimation of volumes during preselling inventory. The recovery rate difference was probably due to either dishonest practice among staff at farm level or the fact that unqualified staff doing the inventory. Staff have the tendency of colluding with customers during inventory and verification of the recovery rate for compensation. However it was difficult to verify this as the interviewed stakeholders were the staff who would not have reported this easily. The lower recovery rate led to need for compensation. In this case the staff who are not honest can cause loss to the government. It was further found that auctions in the form of logs were more preferred by most customers to avoid the loss in terms of less recovery rates of harvested trees and some time tree heart rot challenge (Plate 1).

Apart from the auction system, the Mtibwa management introduced private agreement system in order to attract more stakeholders including Tanzanians with low capitals. The private agreement is like allocation; however, the private agreement is done just after the auction. In most cases, the system is used to sell small patches of tree plots which cannot be sold using auction. This is unlike what happens in Romania where they use the private agreement system for the tracts which could not be sold in the two auctions (primary and second) (Jean-Daniel *et al.*, 2006). In the Tanzanian private agreement, an individual customer negotiates with the Government forest procurement committee. The advantage of this system is that, it considers small companies/individuals and local customers to participate in the business. However, Tanzanians in most cases fail to participate in the business because of higher capital and lack of links with the international markets. The challenges faced by the system include the following: lack of transparency because the customer can be cheated by the supplier that, other customers /fellow mentioned higher price than you to convince customer to pay at a higher price. The system was expected to attract local customers (Tanzanians) in the business; yes in 2014 three (3) Tanzanian companies appeared and received the allocation but they failed to meet the requirement of the agreement. Therefore, they were not allowed to harvest after failing to

pay on time as per the requirements of the contract. Three instalments payment were planned to favour Tanzanians but they still could not meet the requirement. The main challenge is lack of international market since Tanzania forest plantations lack international certification. As a result, Tanzania's customers resale their allocations to giant companies (Table 2)

Table-2. Summary of advantages and challenges of different systems

System	Challenge	Advantages
Allocation	Many customers leading to difficulties in selection of customers. One person can apply more than once using different names Minimal income Tanzanian local customers receive the allocation but they don't sale or export the products instead they resale to others (Indians) due to lack of link to international market and low capital Customers missed the allocation complains such that they ended up in the courts	Research for price setting
Tender	Long process and bureaucratic selling cost is high, Complains on selected customers leading to court cases Price do not depend on cost of production but market price	No collusion among bidders. The price depend on the prevailing market price
Private agreements	Cheating can occur to the customer during price negotiation so that the customer pay at a higher price,	Cost during selling is low, done just after the auction, Participation of local customers Cost of selling process is low because negotiations team do not move to field Tracts that fail to sell at the auction are sold using private agreement to the firms that expressed interest in plots
Auction standing trees	Customers collusion Tanzania local customers did not participate in the business due to high capital and lack of link to international market	Openness reduce complains among customers Can be done each month since the process is simple Higher earning Selling process is simple and low cost as it involve few government staff and it can be done more than twice per year Community allowed to observe during teak auctioning
Auction logs	Lack of facilities for the logs cutting Expensive and need time, large number of staff and close supervision	Harvest without destruction of the plantations ground Complain of recovery rate of the trees is avoided, actual benefit realised by the government. Complains of customers on tree heart rote is also avoided Avoided cheating to the dishonest staff in standing tree number /cubic meters Transparency/Openness
Communities Sell individual tree regardless of their size	Sale at lower price as they estimate size using eyes (visually) not volume per cubic meter	Sale the tree any time

3.4. Impact of the Revenue Received from Different Selling Systems at Mtibwa Plantation

3.4.1. Impact of the Auction to Revenue

The Mtibwa Teak Plantation is among Government teak plantations, which accrue its revenue from selling teak to different stakeholders inside and outside the country. The teak at Mtibwa plantation of 45 years of age is sold using different systems at different periods since year 2010. The systems which were previous practiced include allocation and tender while auction and private agreements are the systems which are currently in use. The trend shows that 2011/2012 large volumes (35,654m^3) of teak was sold using tender selling system, and the revenue received was 16 billion TZS followed by auction system used in between 2012/2013 of which 13643m^3 were sold and 6 billion TZS were collected. Revenue received from allocation and private agreements were 1,989,055,886 and 888,327,000.00 TZS respectively. It was further found that large revenue was collected in

2012/13 under tender selling system than was the case with other selling systems in other years (Table 3).

Table-3. Revenue collection from 2010/11 up to 2013/14

Financial year	Volume harvested (M^3)	Price per M^3	Total revenue	Price at present value	System used
2010/11	10511	189236	1,989,055,886	227,302.15	Allocation
2011/12	5899	370730	2,186,937,769	418,913.41	Allocation
2011/12	35654	466600	16,636,143,465	515943.8454	Tender
2012/13	12646	484647	6,128,846,050	547636.0859	Auction of May 2013
2013/14	385	508383	195,715,992	574457.0301	Auction Aug. 2013
2013/14	612	469820	287,529,699	530,882	Auction of Dec-2013
2014/2015	2249	415,250.00	888,327,000	415,250	Private agreement 2014

Source: Mtibwa Financial report 2010/2014

Table 4 indicates that the revenue (TZS 16,636,156,400) received from tender selling system was higher than the revenue collected using other systems because large volumes of the teak were sold during that year

Table-4. Average volume, price and revenue per system

Volume	Price	Revenue	Price at present value	Revenue at present value revenue
8,205	279,983	2,297,260,515	336,304	2,759,374,320
35,654	466,600	16,636,156,400	527,244	18,798,357,576
4,547.66667	487,617	2,217,519,579	550,992	2,505,727,954
2,247	415,250	933,066,750	415,250	933,066,750

The revenues received from the sales of forest products from Mtibwa plantation taking into account the sale of the same volume and price at present value at an inflation rate of 2014 (6.3) were found to be higher for the auction system than the revenues received through allocation, tender, and private agreement by TZS 482,403,936; 53,361,756 and 305,012,274 respectively (Table 4). The tender and auction had higher revenue. However, tender selling system had higher selling cost, bureaucracy during selling procedures and lack of transparency making auction system to be the best system of selling teak at Mtibwa plantation.

Table-4. Difference of revenue per selling system in consideration of the same volume sold and price at present value

Price perm3	Revenue (with assumption of the same volume (2247m3)	Difference of revenue from auction to other selling system	Selling system
336304	755675088	482,403,936	Allocation
527244	1184717268	53,361,756	Tender
550992	1238079024	0	Auction
415250	933066750	305,012,274	Private agreement

Secondary data from Mtibwa plantation and discussions with different stakeholders reveal that the selling of standing teak trees using auction system increase income/revenue to the government. However, there is no specific formula for the price setting which is currently in use because the price depends on the market force. It was further revealed that the revenue collected by plantation managers are accounted as follows: Tanzania Forest Funds (TaFF) 3%, District council 5%, Vat 18% of 22-28% LMD/m3 (Table 4). Management cost per area was among the challenges encountered in the plantation management. Inadequate funds for plantation management forces Mtibwa plantation to do slashing instead of total weeding. It was also revealed that the cost of production was not usually considered when selling teak trees because in most casesall the sales depend on the market forces. Despite the fact that the cost of production is very high, for instance, normally slashing is done 4 times a year at a cost of about 208,000/= per ha, and pruning at a cost of about 26,000/= , the plantations receive **o**nly 10% of the total sales of the trees; this is the percentage which goes back to the manager's office for the management of the plantation. This problem has led to poor quality of the teak product, which in turn reduces the revenue realised during the sales of the trees.

3.4.2. Impact of Auction to Price

One of the most difficult but most important aspects of marketing the product effectively is setting the price correctly to ensure that it meets the expenses incurred. According to Michael Marn and Robert Rosiello (1992) the fastest and most effective way for a company to realize maximum profit is to get the pricing right. In teak, the pricing varies depending on the quality of teak and the selling system used at a certain period of time. Before using the auction method, the price was set administratively using a committee in

teak after considering different aspects. The price set for selling teak using allocation tender and private agreements was relatively lower than the prices set for selling the product using auction system; this was due to stakeholders' competition in setting the prices which in most cases exceeded the ceiling price. For instance in 2014, one m^3 was sold for up to TZS 508,343.

With regards to the price at the present value the study found that allocation selling system offers the price which was lower than the price offered by auction selling system by 214,688 TZS; tender selling system offered lower price than that offered by the auction system by 23,748 TZS; and the private agreement offered lower price than that offered by the auction system by 135,742 TZS. These differences indicate that allocation system offered the lowest price than that offered by all the other systems. Thus, the best system in contributing to Government revenue collection is the auction, followed by the tender system, the private agreement, and lastly is the allocation system. It was further revealed that the standing tree auction system started in 2013/14 and the first auction started with higher prices at the beginning but with time the collusion tendencies emerged. Addressing customers' collusion in the auction system requires an increase of the number of local customers through linking them with international and national teak market as well as building capacity of local timber traders through training. The findings in Table 3 indicate further that, large volume of teak was sold under tender system where the price was too low; this caused a big loss to government revenues. According to TEAKNET (2015) in the world market, teak fetches between $ 307 and $ 885 per m^3 based on quality, lengths of logs and the average girth. In Tanzania, the situation is not as good; there is need to revise the price and use auction system in the selling of teak and other trees species in the government plantations.

3.4.3. Teak Price World Wide

Teak (Tectona grandis) is one of the world's premier hardwood timbers, and is famous for its mellow colour, fine rain and durability. Teak has been established throughout tropical Asia, as well as in tropical Africa (including Nigeria, Sierra Leone, the United Republic of Tanzania and Togo) and Latin America. Natural teak is found in countries such as Burma and Thailand. Natural teak is more expensive than plantations teak due to its good quality.

The study revealed that the Mtibwa teak is mostly exported to India and small amount used for domestic purposes. It was revealed that about 80% of teak log exports from Tanzania go to India (ITTO, 2013). The study revealed further that Mtibwa teak exported to India was processed and re-exported from India to other international markets in Europe with Indian trade market because Indian has certified their forest plantations and they are accepted in the international timber markets. The teak demand in India continues to rise and the demand can only be met through imports from other countries (ITTO, 2013). For this reason, Tanzania needs to sell teak at a higher price than it used to do (Table 5).

Table-5. Prices for natural teak and planted teak

Country	Average USD	Average TZS
Burma (Natural teak)-export price	4,256.33	6,384,500.00
Planted teak (domestic market)	Average USD	Average TZS
Africa	417.33	626,000.00
Latin America	417.00	625,500.00
Asia	580.33	870,500.00
*Tanzania	317.7394	508,383.00

Source: ITTO (2013) and *Mtibwa plantation reports

In Latin America one cubic meters of teak was worth USD 417.00 (625,500 TZS) in 2013 while in Tanzania it was worth TZS 508,383. Tanzania's teak was sold at a lower price than it was the case in Latin America despite that in 2013 the price selected for the comparison was the highest. The price of teak in Tanzania is still very low as compared to the price of teak in other countries. Table 1 shows a big difference between prices in Tanzania as compared to prices in other countries in Africa, Latin America and Asia. Though, natural (indigenous) teak from Thailand and Burma is more superior to planted teak, Burma has natural teak whose price is very high for instance one cubic meter of processed teak in 2013 was worth 4,256.33 USD which was equivalent to TZS 6,384,500 (Table 2).

3.4.4. Impact of Auction System to Community Adjacent Mtibwa Plantation

Previously there were few villagers living adjacent Mtibwa plantation planted trees; these were especially those who previously worked with Mtibwa plantation. An increase in the number of tree planting out growers came after awareness raising on the importance of teak and other tree planting in 2004/2005 when Mtibwa government plantation started harvesting and selling teak. The number of tree growers increased further when the community members had attended the auction day and realised that the price offered was higher, the community members realised this during teak auctioning since other selling systems were not conducted publically, and did not involve community members. After that

period, community members realised the benefit of teak and majority started planting trees. As consequence result, tree planting practice was adopted by almost all the local people who worked in Mtibwa plantation and those who attended the auction day. The situation is changing with time on increasing interest of community in tree planting in the Village around Mtibwa plantation including Kilimanjaro, Madizini, Lusanga, Kunke and Dihindi. Currently, district staffs also encourage people to plant trees in their homesteads and woodlots. They own an average 3-4 ha of teak.

Previously, before the introduction of auction selling system majority of community members around Mtibwa plantation used to sell their teak at a price ranging from 30,000 to 50,000 Tanzania shillings (TZS) per tree regardless of the cubic metres. After the introduction of auction of Mtimbwa teak plantation people realised that they had been selling their products at lower prices. Currently, people sell their product at a price ranging from 30 to100,000 per tree. An increase of income from the sales of forest products from their woodlots improved livelihood of community members. Community members were found to be cutting their trees for sale at a very premature stage instead of the recommended harvest age due to dire need for cash. Similar finding was reported by Nganga (2011). The study findings revealed further that, community members sell their trees at the age ranging from 10 to 20 years. Private companies such as Kilombero Valley Teak Company (KVTC) started harvesting teak at the age between 20 and 25 years of age (KVTC, 2015). The KVTC sell processed timber and logs taking into account the volume of the tree. Preliminary results of the study conducted by Laswai and Mbwambo (2015) showed that trees at the age of 30 to 32 years can be sold to avoid teak heart rot problem. The teak heart rot is the main challenge at Mtibwa plantation especially for the over matured teak (Plate 1).

Plate-1. Rotted heart of teak harvested by the customer from Mtibwa plantation

Apart from the increase of the price after realization of value of teak during auction, villagers around Mtibwa plantation were given tree branches left in the farm for firewood just after harvest from plots sold through auction system with (free) or without any payment (plate 2). However, following procurement procedures branches cannot be resold after the auction that is why some times the people were given these tree branches for free. Apart from poles and fire wood provided by the plantation, the plantation manager provides cash to carter for social services in the villages adjacent Mtibwa plantation. The study findings reveal further that Mtibwa plantation provided cash to the communities in the nearby villages for the construction of the toilet at the market place, dispensary, and schools classrooms. From the plantations, villagers also collect pasture for their livestock, teak seeds and can set their bee hives inside the plantation. Communities' bee hives in the plantation protect plantation against wild fire, illegal harvest and any other destruction practices because the villagers become stakeholders in maintaining the plantation. Maintaining the plantation has contributes to improved microclimate, reduced climate change effects and increased rainfall.

Plate-2. Community receive firewood from Mtibwa plantation just after customers harvested logs

3.4.5. Increased Government Revenue and Community Poverty Reduction

In addition to an increase in the government revenue through the selling of teak using auction system, the government also increases revenue when customers purchase trees from communities' woodlots through transportation tax from Mtibwa to other areas. Villagers get employment from plantations during production and harvesting time. Income realised by smallholder farmers from forestry business including the sales of forest products contributes substantially to an increased income at the household level. The main traded forest products by communities adjacent Mtibwa plantations include fuel wood, charcoal, construction wood (such as poles and posts) and sawn wood. Fifty three 53 % of the respondents plant trees for timber business while 36.7 do the same for poles purpose. Fuel wood is obtained during pruning (Annex 1). Thus majority of the respondents were found to plant teak for timber and house construction poles.

The results indicate further that more than 60% of tree out-growers adjacent Mtibwa plantations need to sell their products using auction system (Table 1), but they are constrained with higher costs of advertisement. The tree out growers requested for the government support in advertising their products when government plantations are in the advertisement process. Discussion with key informants in the Ministry level revealed that it is possible to support communities to advertise their forest products through Government plantations but there is need for the Government plantations to sign contracts with the out growers so as to make the latter meet standards of good quality trees and keep the trees till the auction day. The respondents also cited the need for training on group formation and selection of best seeds/seedlings.

3.5. Cost Benefit Analysis

In obtaining cost benefit analysis of selling systems of teak logs, operation costs need to be estimated including the salaries/wages, seed purchase, land preparation, fire protection and selling process. The cost of production varies according to the area and tree species. Activities during the selling processes include advertisement, evaluation and tender board. The private agreement selling costs include the costs of negotiation meeting and advertisement while the allocation system involves the costs of evaluation. The advertisement was done once in the auction system and private agreement and twice in the tender system. The advertisement in all systems was in three newsletters which cost almost 1,333,400 TZS per newsletter (Annex 1)

Table-6. Profit of the teak from different selling system with assumption of the same volume (2249m3)

Revenue (TZS)	Total cost of production	Profit at volume	Difference against Auction
755675088	145,961,000.00	609,714,088.00	481,323,736.00
1184717268	155,521,400.00	1,029,195,868.00	61,841,956.00
1238079024	147,041,200.00	1,091,037,824.00	0.00
933066750	150,321,200.00	782,745,550.00	308,292,274.00

Source: Research data

The findings in Table 6 indicate that the profit obtained under allocation system is lower than that realised in the auction system by 481,323,736.00. And the profit realised in the private agreement is lower than that realised in the auction at 308,292,274 TZS, and the profits realised in the tender system is lower than that realised in the auction system by 61,841,956.00 (TZS). The findings indicate further that the auction system is the most profitable of all other systems (Table 6). In addition to the profit, the auction system is the best system of all other selling systems due to the following reasons: it allows transparency, it involves different stakeholder in the auction day including community members, it is simple as it can be conducted twice per month and it is profitable as it allows competition among customers.

4. Recommendation on the Best Method of Selling Forest Products from Forest Plantations

Despite that the auction system is the best of all other systems, the system is entangled with challenges such as collusion among customers because it involves few competitors leading to reduced revenue and profit. The specific aspects that will ensure Tanzania is successful in the implementation of the auction system include:

- The establishment of a team comprising lawyers, researchers, farm managers and private companies in search for international teak market information before setting the auction price. Using market information will increase the government revenue and Tanzanian small timber traders will be linked to the international teak markets which will reduce collusion due to increased number of customers. The government also needs to support small timber traders through training to increase their understanding of the international market of forest products, and this will in turn reduce collusion during auction exercise. In addition, the Tanzania forest plantations need to be certified for international timber market

- The study recommends for the formation of strong associations of tree growers and capacitates them through training and link them with financial institutions for the loan support; these will help them to participate in the teak business. The involvement of Tanzania's companies will increase government revenues and the competition during auction exercise and hence reduce the customers' collusion problem since smallholder customers association or groups will compete with giant/Indians companies in teak business.
- The government needs to set teak price taking into account the cost of production to realise more profits. Despite that collusion can occur during auction, if the government sets the price taking into account the cost of production profit will still be realised.
  - In fact the auction selling system advantages outweigh the disadvantages especially when our plantations are certified and international market information reach Tanzanian customers. Value addition before selling the teak will increase profit. The study recommends that the sales of teak and other trees be done using auctions and private agreements (for few trees which are left after the auction). Whenever possible community members especially those who are in need of using auction selling system need to be supported in terms of training, credit or loan and advertisement procedures
  - The study recommends for the use of auction and private agreements systems in selling forest products from teak and other trees government plantations. If possible in future the government need to sell harvested logs or processed ones (timber)

5. Conclusion

Standing trees auction system provides good revenue and profits to the Government; also, the system is accepted by stakeholders including customers and communities adjacent Mtibwa plantation. In fact, the advantages of auction selling system outweigh the disadvantages especially when the international market information reach Tanzanian customers; the number of competitors will increase and therefore revenue and benefits will be realised even more. Value addition before the sales of teak will increase government revenue/profit. Tanzania Government needs to sale teak and other trees using auctions and private agreements (for remained few trees after the auction) instead of allocation and tender for more revenue collection and profit making. Nevertheless, the price setting with taking into account the costs of production is paramount. It is known that the demands for hard wood products are higher than the supply. The Tanzanian Government should take advantage of this market to maximize profits through using profitable selling system. The government needs to make efforts to ensure the acquisition of certification for our forests and those local customers are linked with the outside markets to allow competition during the auction exercise. There is need for a review of price of trees based on the cost of production, distance from the production site to the market, and teak demand/supply to increase Government revenue. With the prospect of profit making to achieve BNR targets, the government should use auction system in selling all forest products from government plantations. Longitudinal study needs to be carried out to assess the impacts of selling systems in all government plantations.

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References

Chamuya, N.A., 2006. A Dissertation Submitted in Partial Fulfillment of the Requirement for the Degree of Master of Science in Forestry of Sokoine University of Agriculture. Morogoro, Tanzania.

ITTO, 2013. Tropical timber market report. 17(2). Available from www.itto.int/direct/topics/topics_pdf [Accessed June 2015].

Jean-Daniel, S., R.V. Jeffrey and M. Valy, 2006. Detecting collusion in timber auctions: An application to Romania. World Bank Policy Research Working Paper No. 4105. The Gudian News Paper of Thursday Feb 6, 2014.

KVTC, 2015. Creating value and conserving forests. Kilombero Teak Valley Company Report, 2015.

Laswai, F. and L. Mbwambo, 2015. Wood utilization properties of pinus Patula and Tectona grandis grown in differentforest plantation in Tanzania. Results Presented in Workshop Organised by Tanzania Forest Service (TFS) 24th June, 2015. Dar es salam Tanzania.

Michael Marn, V. and L. Robert Rosiello, 1992. Managing price, gaining profit havard business September–October 1992. Available from https://hbr.org/1992/09/managing-price-gaining-profit/ar/1 [Accessed 6th June 2015].

Nganga, Y.M., 2011. Forest plantation and woodlot in Tanzania. Africa forest forum Working Paper Series, 1(16): 76.

SGTRMSD, 2015. Strengthening global teak resources and markets for sustainable development (SGTRMSD). Summary Report on the Third World Teak Conference Held in Guayaquil, Ecuador, from May 11th to 15th, 2015.

TEAKNET, 2015. Online newsletter for international teak information network. 8(1). Available from www.teaknet.org/newsletterlist [Accessed 20th May 2015].

URT, 2002. The forest Act No. 14 of 2002. Ministry of natural resources and tourism, Dar es Salaam. Tanzania: Government Printer.

URT, 2013. United republic of Tanzania Mtibwa forest plntation management plan 2008-2013. Tanzania: Ministry of Natural Resources and Tourism, Dar es salaam.

Annex-1

Item	Allocation	Tender	Auction	Private agreement	Remarks
Advertisement	-	8000400	4000200	4000200	(1,333,400*3news letter) (Under tender is twice
Evaluation	4200000	3560000	1280000(	4560000	Evaluation team 4 days, 7 staff chair person 200000, DSA manager 180,000 150,000 for 7 staff Allocation while (100,000 *5 days*7 member) for tender
Tender board	-	2200000	-		Number of issues in meeting were considered
Facilitation	200000	200000	200000	200000	(Tea and lunch)Estimated
Selling cost	4,400,000.00	13,960,400.00	5,480,200.00	8,760,200.00	Negotiation team 4 days, 7 staff chair person 200000, DSA manager 180,000 150,000 for 7 staff for private agreement
Cost of Production	516,915,000.00	2,246,202,000.00	286,503,000.02	141,687,000.00	Auction 7 staff, DSA 80000 X 3 days (travel and report compilation)
Item	Cost of Production	Allocation	Tender	Auction	Private agreement
*Production cost per m3 63,000 TZS					

Data SOURCE: (Personal Communication by procurement officer MNRT). *(Nganga, 2011)

Annex-2

	Minimum	Maximum	Mean
age of household head	29.00	85.00	54.5
household size	3.00	13.00	6.5
Before Auction price	30,000	50,000	40,000
Price per tree after auction	30,000.00	100000.00	47,727.3

Tree planted	Percent
Teak	73.3
Cedrella	16.7
Teak and Cedrella	10.0
Total (N=30)	100.0
Traded product	
Timber	57
Poles	43
Criteria of selling price	
Tree volume	10.0
Size of tree visual	90.0
Total	100.0
Selling system	
Individual trees	30
don't know	10
Auction	60
Total	100.0