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RESEARCH PAPER

Equity in Distribution of Proceeds from Forest Products from Certified Community-Based Forest Management in Kilwa District, Tanzania

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Abstract Equity in distribution of income from forest products among producers, processors and traders is required for sustaining forests resource use. Despite many studies being undertaken on benefits of certified community forest products, distributional aspects of these benefits to the communities have not been fully examined. Employing a value chain analytical framework, this paper investigates the distribution of proceeds of forest products by assessing net revenue of roundwood equivalent and its shares among actors along the chain. A comparative study was conducted using the Forest Stewardship Council (FSC) certified community forests and non-certified (non-FSC) forests in Kilwa District, Tanzania. Actors from certified forest communities were found to earn higher income than those from non-FSC forests, and experience significantly greater income equity. This finding suggests that forest certification is an important forest management approach in enhancing equity in income distribution among the actors. However, sustainability of equity in income for certified community forests in Kilwa is highly conditional upon the technical and managerial capacities of villagers, and their access to finance and markets of certified forest products. This study provides baseline data for future assessment of income distribution among actors for the various forest management regimes in Tanzania and the African region as a whole.

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Introduction

Before 1980s, local communities in the tropics were perceived as threats to forest resources management efforts with the reason that they had inadequate knowledge and capacity to do so (see Mayers and Bass 2004; Humphries and Kainer 2006). In the early 1980s, forest resources management started to be devolved to communities (Belcher 2005), through community-based forest management (CBFM), and this is expected to continue into the future (Charnley and Poe 2007). The devolution started after realising that local communities are potential managers of forest resources because of indigenous knowledge they have at their disposal about forest resources which help them to develop relevant capacities to manage forest resources responsibly (FAO 2003; Mayers and Bass 2004). Globally, CBFM has been a popular approach in helping local communities to conserve forests and generate income (Arnold 2001; McDermott 2009) because it gives local forest users property rights and powers to manage their forest resources (Maharjan et al. 2009). These property rights exercised by the communities can give them greater flexibility to change their forests production objectives and management patterns by capitalising on opportunities and mitigating challenges (Markopoulos 2003; McDermott 2009).

CBFM initiatives in Tanzania started early in the 1990s (see Babili and Wiersum 2013). The legal framework for forest use in Tanzania is supportive to CBFM initiatives (URT 2002). According to the Forest Policy of 1998, the goal of CBFM is improving forest management and enhancing equity in income distribution among the actors such as villagers, timber traders, and the government, particularly targeting the poor (see URT 1998). However, few examples exist of successful, long-term, sustainable forest management (SFM) initiatives involving communities (e.g. Humphries and Kainer 2006). This is due in part to the limited technical and managerial capacity of villagers which results in difficulties in linking communities with markets (e.g. see Charnley and Poe 2007; Vyamana 2009; McDermott 2013).

The Forest Stewardship Council (FSC) with its forest certification scheme is being promoted by environmental non-governmental organisations (ENGOs) and development partners as a way to recognise and encourage sustainable community-based forest management initiatives, and improve market access for communities' forest products (Cashore et al. 2006; Karmann and Smith 2009). FSC is an international not-for-profit, multi-stakeholder organisation responsible for promoting an environmentally appropriate, socially beneficial, and economically viable management of the world's forests (Karmann and Smith 2009). It is a non-state, voluntary market-based organisation with the purpose of encouraging change in the forest sector by certifying forest operations (forest management certification) and their wood processing enterprises in the value chain (Chain of Custody—'CoC' certification), aiming at linking producers and consumers of forest products that meet an agreed set of environmental and social requirements (Pinto and McDermott

2013). FSC forest management certification focuses not only on ecological aspects of harvesting for timber production; but also includes social and economic standards (Duchelle et al. 2014). The CoC traces the wood through manufacturers and retailers to verify that the line of supply at all stages, including forest harvesting, processing, shipping, manufacturing, transportation and distribution have been maintained thus preventing uncertified products from entering the chain (Klooster 2005; Eden 2009). Theoretically, on one end of the value chain, there is a consumer or retailer who is willing to pay more for a product labeled as environmentally friendly or socially just, and on the other end, an owner or producer who seeks market advantages through use of superior practices (Bass et al. 2001). It is expected that such a mechanism would improve governance of forest products by creating more business value than forest products from non-certified forests (FSC 2007), and hence catalyse changes towards SFM (e.g. see Cashore et al. 2006; Pinto and McDermott 2013; Duchelle et al. 2014). FSC also works toward ensuring that economic as well as social benefits of well managed forests are shared equitably throughout the value chain (FSC 2007).

Globally, FSC certified community forests account for about 3.7 % of total certified area with a total of 6.290 M ha and 110 forest management certificates, with more of certificates in Latin America (FSC 2012b): Mexico, Honduras, Bolivia, Guatemala and Costa Rica (Markopoulos 2003). In Tanzania, there is a total of 82,737 ha of community certified forests (FSC 2012b), under group certificate. Mpingo Conservation and Development Initiatives (MCDI), an ENGO based and operating in Kilwa to promote SFM, is the Group Certificate Manager for this first certificate for community natural forests management in Africa.

FSC has a total of 24,414 organisations certified for CoC in 109 countries globally. Africa has 149 organisations in 16 countries of which two are in Tanzania—Tanwat Ltd and Sandal Wood Industries (SWI) (FSC 2012b)—as forest enterprises with wood processing facilities for value addition along the value chain.

Value chains for forest products include broad networks of actors (shareholders)—including forest owners and managers, producers, processors, government agencies and ENGOs and retailers—with each group holding distinct values and power which ultimately affect the benefits earned and their distribution (Klooster 2006).

Equity is a core goal of the FSC system and is embedded in its governance structures and policies at many levels, including its global strategy and its certification standards (Pinto and McDermott 2012). One of the objectives of certified community forestry initiatives is meeting ethical and social commitments regarding *equity in benefits distribution* among various actors along the chain (Wiersum et al. 2013; Harada 2014). Through social justice, FSC's goal is to enhance an *equitable distribution of benefits* emanating from forest resources to communities (FSC 2007). Studies from certified forest communities and forest companies provide qualitative evidence that FSC operations contribute to community wellbeing and economic stability (e.g. Markopoulos 2003; Humphries and Kainer 2006). Despite FSC's goal of enhancing *equitable distribution of benefits*, its ability to do so, especially to owners and producers of forests and forest products, has been questioned (see Duchelle et al. 2014). Yet equity aspects of benefits from

certified community forests have not been fully examined quantitatively for the various actors (e.g. see Beauchamp and Ingram 2011; Pinto and McDermott 2013). To bridge this knowledge gap, the study carries out a comparative analysis to assess certified village forests (FSC) and non-certified village (non-FSC) forests products income and distribution among various actors in Kilwa District, Tanzania. By using a value chain analysis (VCA) framework, a closer investigation is conducted into the *distribution of proceeds* from forest products through assessing: a) types of costs and benefits of forest products to various actors; b) distribution of benefits among the actors and c) forest resource use governance.

Analytical Framework for Forest Products Value Chain

The framework draws on VCA literature and its application (e.g. see Kaplinsky and Morris 2001; Gereffi et al. 2005; Marshall et al. 2006a, b). The framework allows the identification of actors within chains, the spatial mapping of actors' positions and activities, and a construction of the structure of production. When forest products move from subsistence use to commercialisation, the economic and social livelihoods of producers, processors and traders become interlinked through demand and supply interactions (Ingram and Bongers 2009). In the present study, the focus is on the production, processing and trading of timber as the forest product of choice. FSC villages and Kilwa District Forest Office (KFO) are the forests' owners. The actual timber trade market for Kilwa is dominated by two major buyers, namely Sandal Wood Industries (SWI) of Tanga and Miteja Sawmills of Kilwa. Other buyers include individual and small-scale pit-sawyers who work in both FSC and non-FSC villages forests. The value chain map (see Fig. 1) depicts the transactions of the logs and timber trade from forests' owners and producers to timber traders, timber processor, traders and furniture manufacturers in Kilwa and further trade to different parts of the country and the rest of the world.

Traders are mainly responsible for moving timber and furniture frames[1] from Kilwa to other parts of the country, whereas furniture manufacturers sell directly to Kilwa and Dar es Salaam retailers and consumers. Timber species involved in this VCA are: *Dalbergia melanoxylon* (Mpingo), *Pterocarpus angolensis* (Mninga jangwa), *Bobgunnia madagascariensis* (Msekeseke), *Afzelia quanzensis* (Mkongo), *and Millettia stuhlmannii* (Mpangapanga) with price of US$100/m^3. Others are *Julbernardia globiflora* (Mtondoro) and *Acacia nigrescens* (Msenjele) with price of US$75/m^3 and US$50/m^3, respectively. These prices used for transactions are government floor prices as per Forest Regulations, 2004 as reviewed in 2007.

Marketing channels for forest products are diverse, and in some cases highly complex (Marshall et al. 2006b). The relationship between producers of forest products and the markets they supply range from direct sales to traders to a complex network of processors and traders (Fig. 1). The market arrangements and trade channels of the forest products involve selling of these products through local

[1] These are used for making door and window frames, door tops, tables, beds, cupboards, chairs and shelves in various carpentry, furniture marts or woodworking units.

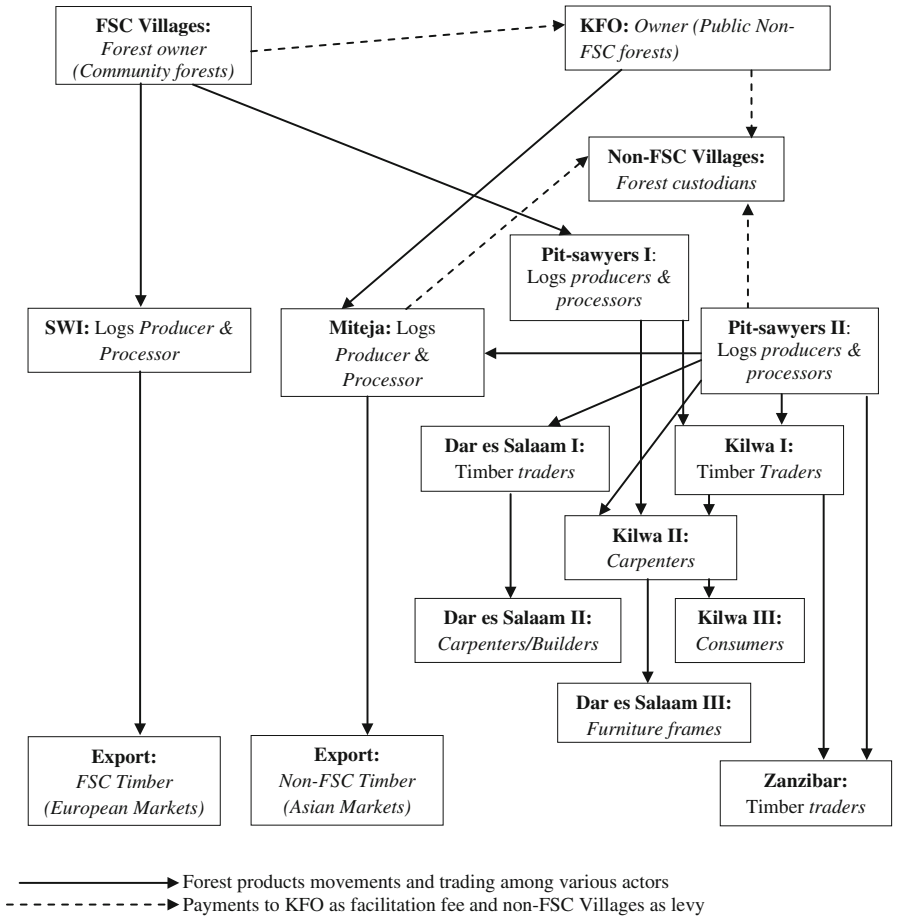

Fig. 1 The forest products trade market and value chains in Kilwa, 2011–2012

market channels in both local urban centers and international markets to the consumers. Ideally, in a value chain, activities are undertaken by various actors performing specific roles in the chain of production, processing and trading whereby producers sell to processors and processors sell to traders who then sell to the final consumers (see Kaplinsky and Morris 2001). In reality, however, this was not the case for Kilwa. Some actors practiced a vertical integration pattern of production and processing along the chain. These are SWI, Miteja and pit-sawyers, everyone operating as a producer and processor (Fig. 1). This type of value chain is predominant in the trading of forest products whereby actors internalise input and output activities within their boundaries to reduce the costs and capture the benefits of coordinated activities (D'Aveni and Ilinitch 1992). Therefore, the real chain is, FSC Villages and KFO as owners, sell standing harvestable trees in their respective forests to Sandal Wood Industries (*SWI*), *Miteja* Sawmill and *Pit-sawyers* as producers and processors of logs. The village authorities in FSC villages issue

harvesting permits to SWI and *pit-sawyers I*. SWI pays the villagers for harvesting the logs. The *KFO* issues harvesting permits to Miteja and *pit-sawyers II* who do their own harvesting, using own teams. The FSC village governments pay 5 % of the revenue from producers to the district as facilitation fee. Pit-sawyers pay US$0.125/plank as levy to the non-FSC village governments as *custodians* of these forests.

SWI and Miteja produce and process logs and sell the timber to traders in European and Asian markets, respectively. *Pit-sawyers II* as producers and processors of logs sell the timber to *Dar es Salaam I* timber traders, *Zanzibar*, *Kilwa I* timber traders and *Kilwa II* processors. *Dar es Salaam I* sell timber to *Dar es Salaam II* processors, whereas *Kilwa I* sell timber to *Kilwa II* processors, *Zanzibar* timber traders and *Dar es Salaam I* timber traders. *Kilwa II* sell their furniture and furniture frames to *Kilwa III* consumers and other carpenters in *Dar es Salaam III*. *Pit-sawyers II* sell logs to Miteja sawmill from non-FSC villages, whereas *pit-sawyers I* as producers and processors sell their timber from FSC villages to *Kilwa I* timber traders and *Kilwa II* processors.

The Study Area

Kilwa is a district located 8°15′–10°00′S and 38°40′–39°40′E in Lindi, Tanzania, with an area of 13,347.50 km^2 (KDC 2008). The population is 190,744, with a density of 14.3 people per km^2 (NBS 2013). The vegetation of Kilwa District is typical of the East Africa Coastal forest and the central African Miombo woodland. Most of the people in Kilwa are reliant on forest resources to meet their daily needs both socially and economically, for example as holy grounds for rituals and recreation, and as energy source from fuelwood and charcoal with estimated annual consumption of 1,600 m^3, and timber for construction of houses and furniture making (see KDC 2008). Four villages were chosen as study sites (see Fig. 2): Kikole and Kisangi villages (certified community forests: FSC) and Mchakama and Likawage villages (non-certified forests: non-FSC).

Research Method

Data Collection

Data were collected between July and September 2012. Mixed methods were used for data collection (following Adatho 2011) employing participatory rural appraisal (PRA) for key informants, and household survey for all actors. Data collection was done by first identifying key informants and all the actors using purposive sampling procedure. Village Councils (VCs) and Village Natural Resource Committees (VNRCs) of the respective villages, as well as individuals and organisations with knowledge about forest management and products were identified as key informants. A total of 40 individuals and organisations connected to the value chain from owners, producers, processors and to various traders were identified as actors.

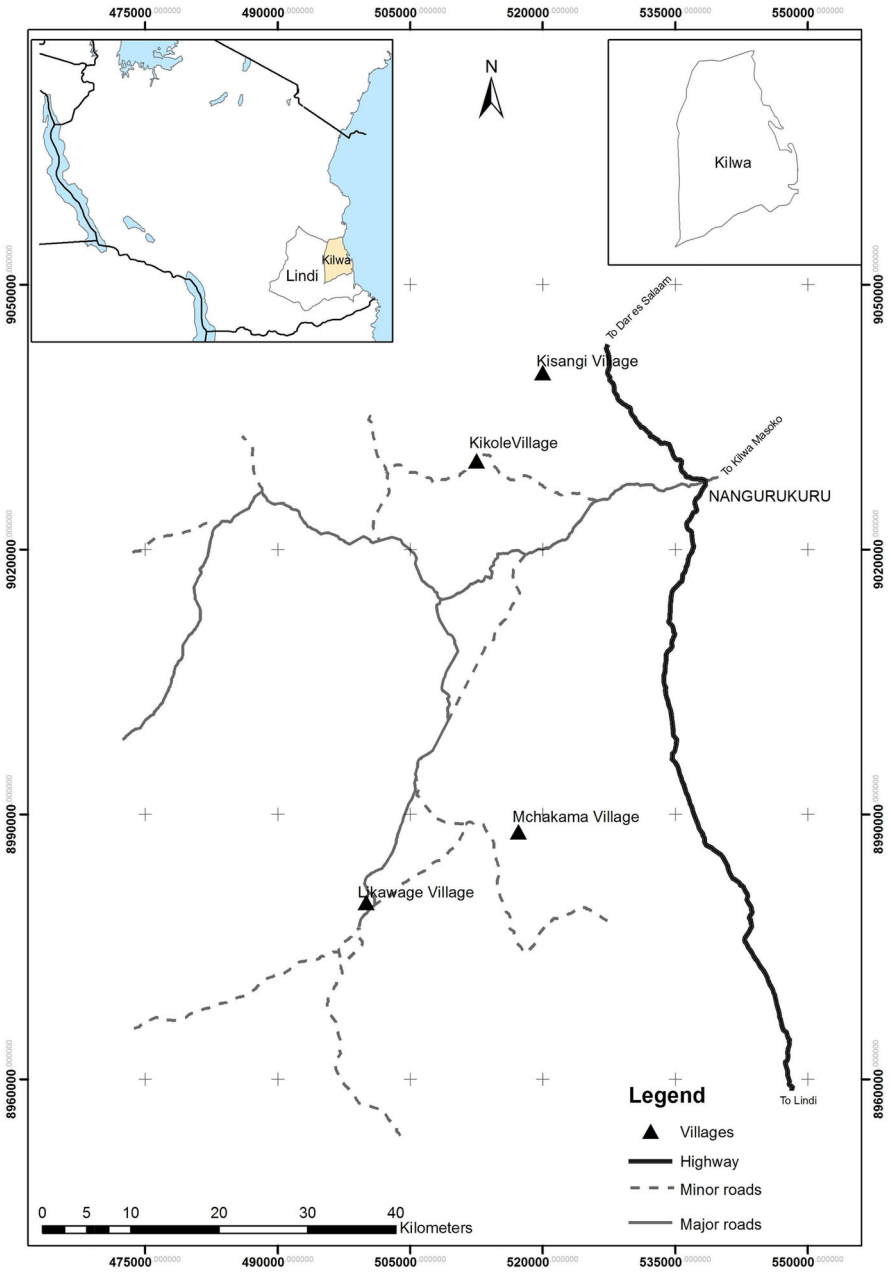

Fig. 2 Map of Kilwa District showing relative location of study villages

The VCs and VNRCs, and individuals and organisations were interviewed using *semi-structured interviews.* They provided data about forest products coming from their respective forests and the activities performed from production to processing

centers, including the actors involved. Individuals and organisations provided data about forest management and products. Data for quantities and prices of forest products were collected from the actors using *structured questionnaires*. In cases where actors could not provide prices, prevailing local market prices were collected. Value chain governance data were also collected from all the actors using *structured questionnaires* about the bylaws regulating their businesses; effectiveness of the bylaws in improving their businesses; and constraints associated to their businesses. Relevant documents such as the *Forest Act 2002* and its Regulations 2004, Forest Policy 1998, Forest Management and Harvesting Plans, and Guidelines for Harvesting in Village Land Forest Reserves 2009 were analysed.

The forest products' cost and revenue estimates equivalent to original roundwood, and value chain governance data, were used to establish the benefits and beneficiaries, and how the benefits are distributed among the actors along the chain to answer our main research question—*Is equity upheld in benefits distribution?* All monetary figures were converted into US$ using real exchange rate of US$ 1 = Tanzanian Shillings 1600 for 2011–2012.

Data Analysis

To investigate how proceeds were distributed along the chain, net revenue of roundwood equivalent (US$/m^3) was calculated for all quantities of logs or timber products for each actor (see Fig. 1). The values of logs or timber products were estimated by using actors' prices and the prevailing local market prices. Labour time for production, processing and trading was valued using the national minimum wage rate of US$1.92/person/day for the industry (from URT 2010). From the given quantities and prices, revenue from logs or timber products for individual actors was calculated to obtain total revenue of roundwood equivalent (US$/m^3). All input costs (equipment, labour; transport, materials, tax and fees, business license, rent, institutional costs) for production, processing and trading of logs or timber products were calculated to derive total cost of roundwood equivalent (US$/m^3). Total cost of roundwood equivalent was deducted from total revenue of roundwood equivalent to obtain net revenue of roundwood equivalent (US$/m^3). Local conversion efficiency rates from field data were used for estimation of revenue of roundwood equivalent.

The variable of interest was referred to as *net revenue of roundwood equivalent (US$/m^3)* as a basic measure of *income* accrued to the various actors, the reference period as *year*, and the economic unit as *individual actor*. Equity in income distribution among the actors along the chain was determined from net revenue of roundwood equivalent earned by each actor. Actors' net revenue of roundwood equivalent was used to show the distribution of income among the various income earners: *owners, producers and processors, processors* and *trad*ers. The *Gini coefficient, G* (e.g. see Farris 2010; Charles-Coll 2011) was used as an *index* i.e. $0 \leq G \leq 1$ to measure equity in income distribution among the actors. An index of 0 represents perfect equity, while a value of 1 implies perfect inequity (Farris 2010). The *Gini coefficient* was calculated directly from individual actor's net revenue of roundwood equivalent data using R statistical program v2.15.3. Value chain

governance data were analysed using statistical package for social science—SPSS v20.

Results

Income from Forest Products and Distribution Among the Actors in Kilwa

The VCA indicates that prices of forest products varied along the chain due to differences in costs associated to production, processing and trading, reflecting what the net revenue of roundwood equivalent earned by the respective actors would be (see Table 1). Among the sawmillers as producers and processors, SWI FSC certified timber earned higher net revenue than non-FSC Miteja. During their operations, the sawmillers paid their workers US$4.38/person/day and US$1.44/person/day wages for SWI and Miteja, respectively. SWI recruited and trained villagers to work for the company, but Miteja did not. Other non-FSC actors were also found to pay wages less than the national minimum wage for the industry of US$1.92/person/day. FSC owners and producers, and processors, earned higher net revenue than non-FSC; however, among the processors, non-FSC actors earned higher net revenue than FSC.

The FSC villages earned higher net revenue than non-FSC villages. FSC villages as owners of the community-based forests earned 95 % of the revenue (about US$86/$m^3$) from the sale of logs to producers and processors, and 5 % was paid to KFO. The 95 % revenue of the FSC villages was spent for forest protection (40 %) and community development projects (55 %) such as water, health and education. MCDI as Group Certificate Manager paid for the certification costs.

Non-FSC villages did not bear any management costs because they do not own the forests, and hence did not carry any activities related to management of the forests, although they are the custodians (see Fig. 1). The non-FSC villages as custodians earned US$0.125/plank (about US$8/m^3) from producers and processors operating in these forests whereby KFO earned 100 % of the revenue (US$100/$m^3$) from sale of logs. However, FSC villages did not receive price premiums, because they sold their logs to producers and processors using government floor prices ranging from US$81 to 100/$m^3$ according to tree species—the same as KFO did in the non-FSC village forests.

With respect to income distribution among the actors, the calculated *Gini coefficient (G)* was 0.6690 and 0.7265 for FSC and non-FSC actors, respectively; with a significant difference of 0.0574 and standard error, SE = 0.0082.

Value Chain Governance Among the Forestry Actors in Kilwa

Forest management was vested into the hands of the respective village governments through the VNRCs. However, the ownership was by village governments and KFO for FSC and non-FSC forests, respectively. The FSC's villages forest governance systems and the institutional arrangements were not similar to non-FSC villages on the ground (see Table 2), although similar in many aspects on papers.

Table 1 Net revenue of roundwood equivalent among the actors in Kilwa, 2011–2012

Actors	Role	Forest management regime	Net revenue roundwood equivalent (US$/m^3)
Kikole	Owner	FSC	98.16
Kisangi	Owner	FSC	80.62
KFO	Owner	Non-FSC	87.18
Likawage	Custodian	Non-FSC	12.09
Mchakama	Custodian	Non-FSC	7.57
Pitsawyer I	Producer and processor	FSC	48.79
Pitsawyer II	Producer and processor	Non-FSC	48.79
Miteja	Producer and processor	Non-FSC	749.01
SWI	Producer and processor	FSC	1,103.76
Kilwa II	Processor	FSC	8.22
Kilwa II	Processor	Non-FSC	8.22
Dar II	Processor	Non-FSC	30.94
Kilwa I	Trader	Non-FSC	7.31
Dar I	Trader	Non-FSC	109.38

The differences of FSC and non-FSC forest governance systems implementation form the counterfactuals for this comparative study. This includes the compliance with bylaws facilitating the harvesting of forest products; who actually influences harvesting and who gets access to resources on the ground differed between FSC and non-FSC actors. The bylaws compliance was higher for FSC actors (65 %) than for non-FSC actors (35 %), with statistical significant difference ($\chi^2 = 45.5$, $p = 0.0000$).

The villages had the mandate legitimately to develop through the *Village Assembly* their own forest bylaws in line with the *Forest Act of 2002*, describing fines and sanctions to transgressors from within and outside their respective villages and enforce them through *VNRC*. FSC villages were effective in forest bylaws enforcement (Table 2). In the non-FSC forests where the KFO is the forest owner, the enforcement of forest bylaws, fines and sanctions were executed by forest officers who live in Kilwa Masoko which is about 75 km away and resource constrained to be efficient, not by the villagers who are the forest managers (custodians) and resource users living adjacent to the forests and who can do effective monitoring. This act made enforcement of the law ineffective. Monitoring and auditing was done by a third party auditor accredited by FSC for FSC forests and there was no audit for non-FSC forests, only enforcement by Surveillance Unit of Tanzania Forest Services, yet it was not effective.

The market arrangements and trade channels of forest products in Kilwa had some constraints. The larger firms (SWI and Miteja) dominated the forest products trading by vertically integrating the production and processing of logs and timber like the pit-sawyers who also worked in these villages. Certified actors reported that they experience high transaction costs including foreign auditors' costs. FSC

Table 2 Implementation of forest governance and institutional arrangements between FSC and non-FSC Villages in Kilwa, 2010–2011

Forest governance systems	FSC	Non-FSC
Village Natural Resource Management Committee (VNRC)	Yes	Yes
Demarcated area of forest on village land	Yes	Yes
District Registers the forests as Village Land Forests	Yes	Yes
Forests gazettement	Yes	No
Undertake Participatory Forest Resource Assessment	Yes	No
Forest management plan which includes harvesting plan	Yes	No
Identify and mark harvestable trees before harvesting	Yes	No
Supervision of harvesting operations	Yes	No
Bylaws that support forest management plan	Yes	No
Bylaws compliance or enforcement	Yes	No
Timber harvesting permit issuance	VNRC	KFO
Transit Passes issuance to allow movement of timber	KFO	KFO
Bylaws monitoring or auditing	Third Party	Surveillance Unit
Access rights	*de jure*	*de facto*

villages' key informants (VCs and VNRCs) reported that, as owners, they not only lack information about the international markets for certified logs, but also they had a problem of lack of processing facilities and skills for value addition of their logs; there was also low customers' preference to certified products due to inadequate forest certification awareness in the country, making no differences in prices for certified forest products from non-certified products domestically. Furthermore, all actors were constrained by low market prices compared to high operating costs which include costly forest products harvesting permits; lack of capital; poor infrastructure including roads, working tools or equipment, economic services such as electricity; and government bureaucracy. Fees were unaffordable by low income earning actors, encouraging corruption and illegal timber businesses to evade paying legal tax and fees. In addition, non-FSC processors preferred to transport semi-processed products in form of furniture frames from Kilwa to other Carpentry and Joinery workshops in Dar es Salaam and other parts of the country. By so doing they evaded paying tax and fees for logs or timber because they only pay for *Transit Pass* and fees for processed products. The market arrangements in determining forest products prices rested on the government who did set floor prices which do not reflect actual market condition, and without consulting stakeholders.

Discussion

Forest certification initiatives promise greater market security and higher prices for forest products to forest owners, managers and timber dealers (e.g. see Markopoulos 2003; Quaedvlieg et al. 2014) as a market incentive and driver of certification (Meijaard et al. 2014). FSC actors (owners) in Kilwa earn higher net revenue on

average than non-FSC actors, but less compared to producers and processors (Miteja and SWI) (Table 1). This finding corroborates the conclusions from qualitative studies that focused on economic effects of forest certification that there are direct economic benefits to owners and producers, but trivial compared to producers and processors (e.g. see Blackman and Rivera 2011; Hajjar 2013; Quaedvlieg et al. 2014).

From a market perspective, certification should lead to a price premiums which could pay for the incremental cost of good stewardship by the owner and producer, and for the certification costs (Meijaard et al. 2014). However, this is contrary to what happens in Kilwa. FSC villages are not receiving any price premiums for their logs. This is attributed to several factors, including: village communities not having direct access to international markets where their forest products fetch price premiums; customers' preference for certified forest products in Tanzania is still low due to inadequate awareness of forest certification; inadequate use of efficient processing facilities for forest products due to lack of capital, resulting in the low levels of value addition; and forest products costs being relatively higher than the prices offered by the market due to floor price setting by the government, leading to owners and producers not obtaining higher prices compared to costs incurred during production, processing and trading of their forest products. Similar finding was reported by Indufor (2011) in a study about timber market and key export markets in Tanzania, and by Blackman and Rivera (2011) from a review of 9 published studies of the effects of forest product certification globally.

The process of value addition to forest products increases income to owners and producers (Quaedvlieg et al. 2014). The fact that Kilwa villages lack value addition facilities leads to income loss compared to producers and processors (Table 1). For certified forest products where little to no price premium exists, it becomes expensive for owners and producers to pay for certification (Eden 2009). That being the case for Kilwa FSC villages, this is a disincentive for them to certify. Although FSC villages could not be enticed to certify more forests because of inadequate forest products price premiums, FSC villages still earn higher net revenue than non-FSC villages along the chain (Table 1). This is attributed to the revenues' sharing arrangements from the various forests because forest certification improves revenue sharing arrangements which contribute to positive social impacts to actors (see Karmann and Smith 2009). This suggests that higher net revenue earned by FSC villages is not only an incentive for them to maintain the certificate; but also for non-FSC villages to set aside their village forest reserves under CBFM and certify them to benefit communities and individuals as a result of forest certification.

Studies by Karmann and Smith (2009) and Pinto and McDermott (2013) identified that social impacts of FSC include material benefits for workers such as employment of local workers with higher wages and improved workers training. The present study shows similar results where SWI (FSC) recruits villagers for work, and train and pay higher wages to them above the national minimum wage compared to non-FSC actors. However, FSC processors (carpenters) earn lower net revenue than non-FSC because the former comply with bylaws governing forest products business (Table 2). The latter pay less than minimum wage of US$1.92/person/day set by the government for the industry; they transport semi-processed

products in the form of furniture frames to evade paying tax for the timber, except fees for the semi-processed products and *Transit Pass*. In this way they maximise income in their businesses than FSC processors.

The traders in Dar es Salaam earn higher net revenue than owners, pit-sawyers and processors along the chain because they receive higher prices for the timber due to high demand in the city. This is evidenced by the FSC villages as small-scale forests owners are not obtaining price premiums from producers of logs, processors and traders (Table 1). Similarly, studies by Rametsteiner and Simula (2003) and Taylor (2005) indicated that forest products business favours large traders more than small-scale forest enterprises. The large price and income differences along the chain reflect the low level of organisation among the actors because powerful actors (mainly wholesalers) influence decisions along the chain (see Schure et al. 2013). This has been the case for Kilwa actors where there are only two main buyers: SWI (FSC) and Miteja (non-FSC). Given that some of FSC incentives including price premiums for logs and timber products are not implemented as well as the high transaction costs (Table 1), forest certification costs remain high to small-scale forest enterprises like the FSC villages in Kilwa.

Certification costs are high particularly for small-scale forest enterprises due to, among other reasons, high costs for foreign auditors; forcing them to depend on external financial support (e.g. see Markopoulos 2003; Hajjar 2013) to meet such costs. Group certification is one of the efforts to reduce these costs in order for small operations not to be excluded from the process (Irvine 2000). Operating in groups like the group certificate for Kilwa villages under MCDI influences the value chain and improves income of owners and producers, strengthens their bargaining power, connects them to wider markets and improves trust (see Purnomo et al. 2014) compared to non-FSC villages. MCDI as the FSC Group Certificate Manager is responsible for providing certification logistical and financial supports to Kilwa FSC villages, including meeting certification costs, searching for markets for them and then the members do their own arrangements with customers for sales of their logs.

Despite that logs for villages in the study did not fetch price premiums during the survey, benefits of FSC have started to manifest in Kilwa. Nanjilinji, one of the FSC villages in Kilwa (not part of the sample) bargained and managed in 2012 to gain higher prices for their logs where they earned US$138/m^3 as against government floor price of US$100/m^3 paid for the same tree species during the survey in 2012. This is a positive move towards realisation of FSC promises of price premiums in the market in Tanzania. Nevertheless, it remains to be seen if current market benefits to these villages will continue, especially if villages will have to pay for all costs of certification themselves without depending on MCDI.

Income from forest products significantly reduces income inequity (see Babulo et al. 2009). However, the net revenue distribution among the actors in Kilwa exhibit higher inequity for both FSC and non-FSC villages than $G = 0.3758$ for Tanzania as reported by the World Bank in 2007 (WB 2007), but FSC actors have lower inequity than non-FSC, and the difference is statistically significant because the difference in G for the two is more than three times the standard error ($G = 0.0574$; $SE = 0.0082$). The difference in income is not due to sampling variability but rather due to the data itself (see Cowell 2011). The higher the value

of *G* means that few actors appropriate a large share of the income. This suggests that forest certification for Kilwa communities with lower *G* value is pro-poor, consistent with the National Forest Policy of 1998 and FSC objectives compared to non-FSC villages. Villages under certified forest management receive higher returns from their forests than those whose forests are not certified. However, this situation could be made better if FSC villages could enjoy the price premiums offered by markets of certified forest products which seem to be enjoyed by SWI at present (Table 1). The fact that villages under FSC forest management have lower inequity is attributed to the assertion that FSC institutions governing forest resources contribute to equity (see Amendola et al. 2013). Moreover, FSC enhances social change and transparent involvement of stakeholders (Karmann and Smith 2009), as a mechanism to ensure equity in benefits and their distribution. This ensures best ways for effective use of forest resources (Table 2) by all actors contrary to non-FSC where there is no such an arrangement, resulting to higher inequity.

The governance systems encompassing forest products chain have an enormous influence on trade and the associated incomes (Belcher 2005). The regulatory framework for forest products use in Tanzania is set by the *Forest Act of 2002* and Forest Policy of 1998, as *legislative governance* structure (see Kaplinsky and Morris 2001) responsible for making the rules. Generally, the framework is noble on papers. However, it is largely not enforced effectively (Table 2) on the ground (e.g. see Hamza and Kimwer 2007; Zahabu et al. 2009) affecting income from forest products and distribution among the actors. FSC Villages enforce the regulatory framework effectively contrary to non-FSC villages (Table 2). In the latter, the enforcement is inconsistent and ineffective. The FSC villages' bylaws in forest resource governance and use form the basis for the rights and access to forest products among actors, and their income and distribution, in contrast to non-FSC villages. It is argued that certification improves local institutions by enhancing owners and producers' social empowerment which results to improved distribution of material assets (net revenue), reduced inequity, having freedom to make economic decisions, and increased self-confidence in one's ability to effect change (e.g. see FSC 2007, 2012a; Quaedvlieg et al. 2014). The present study supports this assertion by showing actors in the FSC chain including villages earn higher net revenue than non-FSC chain (Table 1) and by the lower income inequity exhibited by FSC than non-FSC actors.

Policy Implications

The study has demonstrated that FSC certification in Kilwa has brought about higher net revenue and greater equity from timber products to FSC villages and other actors in the supply chain. This implies that the incorporation of FSC standards into forest management strategies may improve forest management and equity in income from timber products, which may facilitate meeting UN Millennium Development Goals numbers 1 and 7. However, for FSC to realise fully its objectives of achieving equity in benefits distribution to all stakeholders, it is of paramount importance to re-evaluate the auditors' accreditation policy to

accommodate more local accredited auditors. Use of local accredited auditors instead of foreign auditors would reduce certification costs which would be an incentive for more villages to certify their community forests. Moreover, the floor process setting by the government may on one hand protect the forest owners from being faced with unscrupulous traders, but may on the other hand penalise them in the event market price for timber is relatively high. In practice, the floor prices have normally been taken as *de facto* prices regardless of market conditions. Efforts need to be made to sensitise forest owners to bargain for higher prices when the market conditions allow, as a reward for their good forest stewardship.

Conclusion

The study has found that actors from certified forest communities have a more favourable distribution of net revenue of roundwood equivalent than those from non-FSC forests. These findings are consistent with the National Forest Policy of 1998 and the FSC objectives about enhancing equitable income distribution, suggesting that forest certification is an important forest management approach in enhancing equity in income distribution. However, the sustainability of this income and its distribution will depend on how much the communities will continue to earn and become independent in income, and stop depending on external financial support from MCDI for covering certification costs as is the case at present. The policy implication is that FSC national standards development groups improve the certification process for communities, so as to minimise the costs, increase income and improve its distribution.

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