TRANSFORMING TANZANIA'S CHARCOAL SECTOR PROJECT

TECHNICAL REPORT 5

Identification of the most profitable value chain options for sustainable charcoal producers in Kilosa District

Consultancy Report

By

Dominico B Kilemo and John N. Jeckoniah

21st August, 2014

Introduction

The Sustainable Charcoal Project is a partnership project between the Tanzania Forest Conservation Group (TFCG) and the Tanzania Community Forestry Network (MJUMITA). The project is financed by the Swiss Agency for Development and Cooperation (SDC). The goal of the 'Sustainable Charcoal Project' (Component 1 of the overall project 'Transforming Tanzania's Charcoal Sector') is to establish 'Commercially viable value chains for legal, sustainably sourced charcoal'. The project aims to improve climate change adaptation and mitigation; to enhance environmental sustainability and to leverage returns on biomass resources; thereby delivering sustainable development to Tanzania and its people. The project is currently being implemented in 8 villages in Kilosa District. The project began implementation in 2012 and is expected to run for a period of six years. Based on a market survey in 2012, and building on lessons learned from previous initiatives aimed at improving the sustainability of charcoal production, the project is piloting a charcoal value chain model that aims to incentivize communities to sustainably manage their forest for charcoal production. As such the project is interested in identifying value chains that maximize the profit to the forest-owners (the communities) and to the producers. The consultancy built on the lessons learned from the sale of sustainably produced charcoal by participating villages and from previous research commissioned by the project. Therefore , TFCG contracted a team of consultants from SUA lead by Dominico B Kilemo to undertake the assignment. This work built on the findings of Camco and TaTEDO whereby some additional information has been collected and will contribute in bridging the identified gaps and thus complementing previous studies

Objectives and scope of the consultancy

Main objective

To identify the most profitable value chain options for producers of sustainable charcoal in eight villages in Kilosa District.

Specific objectives

- To identify the most profitable market for each project village
- To examine the profitability of the different markets including price differences at the wholesale and retail stage.
- To evaluate the costs associated with pursuing different value chains to access different markets

- To examine costs and barriers for producers to engage further along the value chain

- To assess the profitability to village-level traders if they were in place to aggregate charcoal supplies with a view of selling to larger traders

- To examine other market dynamics that should be considered in selecting the optimal value chain for producers and for communities.

- To evaluate the capital and skills that would be required in order for producers of sustainable charcoal to engage in other stages of the value chain and to estimate the profitability to producers of doing so

- To evaluate a business case for village-level traders in terms of the net benefit to the producers and to the proposed traders

- To identify and describe the village-specific attributes that will affect the selection of different value chains for different villages (i.e. what factors will determine which market is optimal for producers in different villages)

- collect original data on the price of charcoal at different stages of the value chain and costs incurred along the value chain, with a view to enriching and extending the current dataset. At a minimum this will include data on prices, costs and market volume along different value chains from producers in Kilosa to consumers in Mikumi, Kilosa, Morogoro, Ruaha-Kilombero and Dar es Salaam including value chains involving third party transporters, wholesalers and retailers.

- To provide evidence- based recommendations for charcoal producers in different villages as to which value chain will generate the greatest profit for them based on current market conditions. Amongst other things, the study will consider both costs and benefits associated with pursuing different value chains. The study will also document seasonal variations in the different value chains.

.

Study Approach and Methodology

The consultant used a combination of participatory methods with a view to collate all the required information. Important stakeholders were involved in the study. The different roles played by different stakeholders and actors in the chain were identified and they were requested to participate in the study. The methodology included (i) desk review of relevant materials (ii) interviews and (iii) focus group discussions. We reviewed a number of documents from the project which included the project document, market study by CAMCO, Life Cycle Assessment (LCA) report by Quantis, Advocay Strategy, Forest Management Plans of village forest reserves and Baseline Assessment study by TaTEDO. Interviews were conducted with wholesalers and retailers in the Mikumi, Mikumi-Ruaha, Morogoro and Dar es Salaam markets. A short questionnaire was used to collect information from charcoal whole seller and retailers in the above mentioned towns. Fifty (50) respondents, of which 25 were charcoal wholesalers and 25 were charcoal retailers, were involved in the study. Two focus group discussions were held, one with producers and the other with VNRCs members in each project village namely Dodoma Isanga, Nyali, Kigunga, Ulaya Mbuyuni, Ulaya Kibaoni, Kisanga, Ihombwe and Msimba. In each village 15 producers participated in the producers' FGD while 5 village leaders namely , the village chairperson, village executive officer and VNRC leaders(chairperson, secretary and treasurer) participated in a leaders' FGD.

Results and Discussion

Characteristics of sustainable charcoal producers and village-level traders in Kilosa

Charcoal making and marketing is among the income generating activities in most of the villages surveyed. However, charcoal making is mostly done as a supplementary source of income over crop farming. Our findings indicate that agriculture is the main livelihood activity in the 8 project villages. Both men and women are involved in the production with men taking the lead . Looking at the trade-offs between farming and charcoal making, it was found that farmers will spend more time in farming than in charcoal production. Findings from FGDs revealed that charcoal production is extensively done during farming off-season and very occasionally during the farming season. This also suggests that almost in all project villages there are no dedicated charcoal producers who operate throughout the year. The majority of farmers engage in charcoal production only when contracted by the licensed traders from either Morogoro or Dar es Salaam.

Our findings also indicate that there are no village- level traders in all project villages except in Msimba village. These are dedicated traders; in particular youth who purchase locally produced charcoal and sell it along the Morogoro-Iringa highway. Their customers are travellers who buy 1-3 bags, sometimes 3-5 bags. This group of value chain actors found travellers as a market niche to concentrate on and they seem to make a profit from this. Interestingly, the charcoal producers are not interested in taking this role. They contend that bulking charcoal along the road waiting for customers is time consuming and implies that one has to stop other activities and concentrate on charcoal selling only. Therefore, the producers sell their charcoal to the dedicated village traders who can dedicate their time waiting for customers. It is the impatience and lack of organisation of producers which makes them sell charcoal to village local traders at a price that is lower than what they would get if they sell to the customers directly

Profitability Analysis of charcoal value chain participants

Profitability analysis undertaken in the course of this study demonstrated a wide range of gross margins that charcoal producers are earning at different times and in different markets where charcoal from Kilosa is sold. Charcoal producers in Kilosa District, as it is in many other rural areas do all the activities using their own labour. Hence, it is usually difficult for them to understand the profit margin that they realize out of the charcoal making and selling. In this study, the analysis included all direct and indirect costs which reflected the labour costs that are usually overlooked. In order to capture the actual cost that they incur in charcoal production, a detailed discussion was made in a focus group discussion with charcoal makers. The costs were mainly labour cost including the working tools such as axes and pangas whose cost is negligible if compared with the volume of the work they will perform and the duration of time they will be used. One panga can be used to cut down hundreds of trees over the period of 5 years. In Tanzania rural setting, a farm labourer normally comes with a working tool such as a hand hoe, panga and an axe . Therefore, the labour cost normally includes the working tool. In estimating how much it would cost to perform a given activity in kiln preparation, the producers considered factors such as the efforts required, the number of people required to perform the task and how long it would take. The number of people depended on the magnitude of the task. When many people are involved the task would take lesser time to finish while if few people are involved it would take a bit longer. However, in all cases the cost per activity remained the same. For example, to fell 10 trees required to make a 20-bag kiln, it would cost about TZS, 30,000 (3000/tree). Whether the activity is done by one person or more, the cost will still be the same, the difference will be in the duration of the time taken to accomplish the task. Tree felling cost was valued lesser than chopping logs into smaller pieces. On an average, falling one tree cost between TZS 200 0- 4000

while cutting into smaller pieces costs between TZS.3000 - 5000/tree. Charcoal makers were asked to identify and detail all the processes and procedures involved in charcoal making. Every procedure and steps were converted into a cost item per activity and producers were requested to state the amount of money one would be paid for doing that activity. In every cost item, after the detailed and open discussion three levels of cost was arrived at: lowest, average and maximum cost per every cost item. In order to establish unit cost used to produce one bag of charcoal, producers were requested to base all their costs estimates on the size of the kiln made such as 15, 20 or 30 bag- kiln. Therefore all the costs were per kiln. We then divided the estimated cost per activity by the number of bags per kiln so as to get a unit cost per bag. Despite producers being able to estimate minimum, average and maximum costs for each activity, it was further noted that such costs vary with season. For example costs estimates were higher during rainy season as compared to dry season. Later in the discussion, producers were also requested to mention the charcoal selling prices at different period of the year. It was also found that charcoal producers know all the production costs, the approach was to ask them prices of which they will be willing to do any particular activity in the process of charcoal making.

Profitability analysis for traders (retailers and wholesalers) mainly focused on cost incurred to obtain charcoal from suppliers or producers and other related costs involved before selling to final consumers. Seasonality of supply of charcoal only affected their gross profit margins. The analysis made for the activities involved in charcoal production helped the consultants to have the accurate comparison of returns. The analysis revealed that selling prices vary over the year; therefore, the highest, the average and the lowest prices have been taken to reflect the times in the year when charcoal producers sell their charcoal to different market outlets. However, during FGD producers were surprised to find that they sometimes make loses when they sell their charcoal at certain prices. This is due to the fact that they don't estimate and quantify the costs involved in the charcoal making process and also because they do it using their own or family labour that is usually not paid for. During focus group discussions charcoal producers in all project villages revealed that the improved charcoal making process advocated by TFCG has potential to increase their profit. They further reported that the amount of charcoal harvested were relatively higher using improved kiln making technique as compared to the old methods in which used bigger volume of logs and charcoal produced were very little.

Generally, it has been established that charcoal makers selling their charcoal during off farming season (June-November) make some losses of up to 34% of the gross profit. However, those who sell their charcoal during farming/rainy seasons (i.e. selling in November up to March) they get gross profit margins of up to 57.35% using improved charcoal making practices. At this time of the year the

cost of production are also higher due to shortage of labour as it is also farming season and the rainy conditions make the process difficult and expensive hence the cost for each activities also goes up. However, this is the period of the year when also the prices of the charcoal are highest due to low supply and poor conditions or the roads which limit many charcoal buyers to access some of the villages. Profitability varies across villages and seasons of production; this is due to changes in labour cost. Findings from this study revealed that all SME traders including wholesalers and retailers have positive gross margins. This is because they drive the charcoal sub sector and set selling price (always higher than buying price). The study also found that whole sellers in Morogoro town receive higher profit margin as compared to Dar es Salaam, Mikumi and Ruaha towns whereas, retailers in Mikumi town received highest gross profit than other markets. This implies that if charcoal producers are facilitated to sell their charcoal to these market segments they will increase their profit and income derived from charcoal business. However, charcoal makers are constrained by many factors that hinder them to access lucrative markets. The gross margins established set the basis for the advice of specific village business cases in which each particular village can use to increase charcoal producers' profit margins.

Profitability of producers in different market segments under TFCG sustainable charcoal value chain model

As discussed in previous sections, the Kilosa sustainable charcoal producers are unable to sell their charcoal in local markets of Kilosa, Mikumi and Ruaha due to high production cost involved and low prices in these markets; thus causing producers to make losses. The 14,400 royalty per 90kg-bag adds a cost burden to producers that making a total production cost to go high. Moreover, most of the producers are contracted by licensed large traders to produce charcoal and sell it at very low prices as the VNRC royalty is paid by large traders. The results of the proposed model indicate that Morogoro offers the producers higher profits than Dar es Salaam and village level market segment appears to offer the lowest profit.

	Morogoro		Dar es Salaam		Village level sales	
Village	**AGPB**	**SGM**	**AGPB**	**SGM**	**AGPB**	**SGM**
Dodoma Isanga	11,400	**25.33**	11,400	**22.80**	3,850	12.83
Nyali	12,450	27.67	12,200	24.4	5,350	17.83
Kigunga	**14,900**	**33.11**	**14,900**	**29.8**	7,350	24.5
Ulaya Mbuyuni	13,233	29.41	13,233	26.47	5,683.33	18.94
Ulaya Kibaoni	13,317	29.41	13,067	26.13	6,266.67	20.89
Ihombwe	12,900	28.67	12,650	25.3	5,850	19.5
Kisanga	12,217	**27.15**	12,217	**24.43**	4,666.67	15.56
Msimba	12,800	28.44	12,550	25.1	5,750	19.17

AGPB = Average gross profit per bag

SGM = Simplified Gross Margin

Costs and barriers for producers to engage further along the value chain

The costs of doing business at wholesale and retail levels differ.. Moreover, these costs vary across the villages. While wholesaling will be feasible for Dodoma Isanga, Nyali, Kigunga, Ulaya Kibaoni and Ulaya Mbuyuni, Ihombwe and Kisanga villages if they sell to Ruaha, Morogoro and Dar es Salam markets; retailing will practically be impossible. Alternatively, wholesaling may involve producers bulking/aggregating charcoal in the village and sell it to wholesalers(big buyers) from either Dares Salaam, Morogoro, Mikumi or Ruaha. Selling to distant markets implies that producers have to bear the transportation costs and other fees related to charcoal transport while selling to big buyers in the village reduces the costs and is likely to offer the producers a reasonable profit margin if they control the price.

Apart from the costs, there is a number of barriers that seem to hamper efforts of producers to engage further in the value chain. These include regulatory system based-barriers , market-based barriers and operational barriers. These barriers were mentioned during FGDs with producers as well as during interviews with retailers and wholesalers. Therefore, if the producer would like to take roles of wholesaling and retailing will face the same barriers faced by wholesalers and retailers at present. Procedures for obtaining all the necessary documents required for doing charcoal business seem to impede producers to engage further in the value chain. The registration fee now stands at Tsh.265,000 per annum, the charcoal yard fee(the yard certificate would not be necessary if the producers will be supplying charcoal to wholesalers in Morogoro, Mikumi, Ruaha or Dar es Salaam who already own the yards) also costs Tsh.265,000 per annum. These fees appear to be very high to individual producers as they can't afford. Another barrier that seemingly may disincentivise producers is the Ths.14,400 fee per bag (for all village except Msimba which charges Tsh.5000). Although this is a legal requirement, the fee is relatively too high for producers. While the fee seems to positively impact the VNRC and contribute to village development, it puts producers in a difficult situation. Since most of the licensed traders who come to the village to buy charcoal have no problem with paying the fee, the VNRC finds it to be fine. But it affects the barging power of producers as the trader uses 14,400 fee (cost)as an excuse for

buying charcoal from producers at low price. Since the producers don't pay this fee, they just have to accept the price set by the buyer

Capital and skills required for producers to take downstream roles in the value chain

Basic marketing skills will be needed for the producers to succeed in other roles of the value chain. Moreover a starting capital will be necessary to enable producers to take wholesale role in the value chain.. The initial capital required would involve the charcoal business registration fee of Tsh.265,000 and a yard fee of 265,000 making a total of Tsh 530,000. This is a fixed annual cost the producers have to consider. The other capital costs would include transportation of charcoal to the identified markets such as Morogoro and Dar es Salaam. Moreover, the storage facility costs(both rent and TFS yard fee) is another capital cost to be considered. On average, for a producer to be able to make charcoal and transport it to either Dar es Salaam or Morogoro a starting capital of Tsh.1,000,000 can suffice, notwithstanding the transport cost and production fee of Ths.14,400 per 70-90kg-bag which can be post-paid under special arrangements though this is subject to discussion among the parties involved.

Key factors to be considered by forest-owning communities and sustainable charcoal producers in selecting value chain options

Apparently, under the sustainable charcoal production and marketing settings, the forest-owning communities benefit more than charcoal producers. The VNRCs collect revenues mostly from large buyers who unhesitatingly pay the royalty of 14,400 per bag. This implies that for the forest-owning communities to increase revenue collection, they must put concerted efforts to attract as many large buyers as possible. Depending on producers and village-village level traders to pay for this fee seems to lead into problems as some are unwilling to pay for that. This was evident in Msimba village in which the producers are unwilling to pay the VNRC fee and suggest the fee to be paid by traders who sell charcoal along the highway. On the other hand, traders urge that paying the VNRC fee would add a cost burden to their business as they are already paying other fees to the Mikumi Township council.

The sustainable charcoal producers ought to consider their production costs, comparing market prices in different market channels before they decide where to sell their charcoal. As
discussed in the previous sections, the sustainable charcoal producers have limited options when it comes where to sell their charcoal and at what price. The licensed trader is their immediate market option at village level and they are compelled to accept the price set by the trader as they have no other options.

Village specific factors determining the choice of optimal market for charcoal producers

The choice of optimal market for charcoal producers in each village is determined by the geographical location (accessibility of the village), the number and frequency of large buyers in the village, production costs and sale prices in different market channels and season; and proximity to town/urban centres. With the exception of Dodoma Isanga and Msimba village, all project villages are accessible throughout the year(accessibility refers to the ability of the lorries to reach the charcoal production sites for easy loading) . Dodoma Isanga village has a very poor road, passable with difficulties during the dry season and completely impassable during the wet season. This suggests that bulking charcoal and transporting it to distant markets become very difficult. The lorry owners are likely to reject plying their vehicles to the village as they would not want to take risks. This in turn translates into high transport
costs and lower prices of charcoal in the village. Although the Msimba village is along the highway, the charcoal production sites are inaccessible due to very rough terrain. Therefore, most feasible market options for producers will be selling their charcoal along the highway.

An optimal value chain option should be able to provide producers with good returns. Selling charcoal at the production sites may be profitable only if the producers gain control over the price. Proximity to urban centres which are one of the target markets also determines where to sell charcoal as it has cost implication notably the transport costs. Producers from Dodoma Isanga village spend the least on transport when accessing the Kilosa market. Msimba village also has the added advantage that it is on the highway, thus cutting down transport costs to the market/sales point.

Other market dynamics to be considered in selecting the optimal value chain for producers and for communities.

Like Kilosa market, the Morogoro, Ruaha, Mikumi and Dar es Salaam markets all are supplied with charcoal from several sources. The majority of charcoal sold in those markets are illegally produced and transported. High supplies of charcoal in the market implies that the price is likely to drop assuming other market conditions remain constant. The number of actors in the charcoal value chain increase on a daily basis. It is always beneficial if the producers could focus in the markets that have a high demand for charcoal. Producers will also have to take into account the seasonal price fluctuation in which high prices are expected during wet season and low prices in dry season.

Conclusion and Recommendations

The producers of Kilosa sustainable charcoal carry dual responsibility of charcoal making and farming between which they have to make trade-offs. They have not significantly benefited from the charcoal value chain yet. The sector is controlled by licensed big traders who set the price which the producers tend to accept. Profitability of the value chain actors varies across villages, seasons of the year , level of engagement in the chain and market segments. The sustainably produced charcoal which involves abiding to all legal requirements of the charcoal business competes with illegally produced charcoal in the market, at times it becomes less competitive due to high production costs . Referring back to the questions raised in the ToR the following conclusions can be drawn:

Where is the most profitable market for each village?

Our findings indicate that most of producers in all project villages sell their charcoal at the production sites whereby prices are low and set by big traders. Considering the legal requirements of the sustainable charcoal which involves payment of Tsh 14,400 royalty per bag and charcoal prices in Kilosa , Mikumi and Ruaha, producers make losses if they sell charcoal in these markets as the production costs exceed the market price. The average charcoal prices in Kilosa, Mikumi and Ruaha markets are 16,000, 18,000 and 25,000 respectively. The lower prices of charcoal in these market are attributed to the presence of other charcoal from different sources most of which is produced unsustainably and illegally. Therefore, the most profitable markets are distant markets notably Morogoro and Dar es Salaam where the average price of charcoal is Tsh 45,000 and 50,000 respectively. Selling charcoal in such markets will enable the sustainable charcoal producers to get a comfortable profit margin. For example, the producers from Dodoma Isanga will make the SGM of 29.33% and 26.4% in Morogoro and Dar es Salaam respectively; and an average of gross profit per bag of Tsh.13,200 in both markets. This is envisaged to improve the livelihoods of producers.

How great is the difference in the profitability of the different markets including price differences at the wholesale and retail stage?

Considering the three market segments namely Village level, Morogoro and Dar es Salaam; the producers from the 8 villages will make the most profit if they sell charcoal to the Morogoro market. This is because the charcoal prices in Morogoro are high and the transport cost is low thus enabling the producers to make an average gross profit per bag ranging from 12,200 to 14,900 and the SGM of

between 24.4% and 33.11%. The profitability in the Dar es Salam market is lower than that of Morgoro and selling at village level reduces further their profitability.

The profitability of different markets surveyed differs at wholesale and retail stages. Our findings suggest that the Mikumi wholesalers get a gross margin of between 8.57% and 28.33% The average wholesale price of charcoal in Mikumi is 18,000. Retailers in Mikumi receive a gross margin of between 41.67% and 46.43%. The retail price of tin of charcoal ranges between 600 and 3000(depending on tin size which ranges between a 1-litre tin to 3-Litre tin). The Ruaha wholesalers make a gross margin of 2% and 32.40%. The average wholesale price in Ruaha is 25,000. Retailers in Ruaha receive a gross margin of between 16.67 % and 34.33%. The average retail price of tin of charcoal in Ruaha ranges between 600 and 2500 depending on the size of the tin. In Morogoro, the average wholesale price is 45,000 per bag which gives the wholesalers a gross margin of between 38.57% and 61.67% . Retailers make a gross margin of between 19.71% and 50.60% whose average retail price is 2500 per 8-Kg tin. The average wholesale price of charcoal in Dar es Salaam is 50,000 per bag , gross margin analysis of wholesalers indicate that they receive a gross margin of between 14.17% and 45.56% per bag. The Dar es Salaam retailers obtain a gross margin of between 15.71% and 42.50%. The retail price ranges between 1000 to 3000 per tin (depending on the size of the tin)

What are the costs associated with pursuing different value chains to access the different markets?

In addition to the production cost, other costs associated with pursuing different value chains include transport and labour costs related to loading and offloading of the charcoal bags. If sorting, re-grading and re-packaging is involved, such costs should also be considered. Other costs would include charcoal business registration, TFS/VNRC royalty and transit pass.

What would be the costs and other barriers for producers to engage further along the value chain?

The costs for Kilosa producers to engage further along the value chain include the trade-offs between farming and charcoal production; and the costs of doing business at wholesale and retail levels. The most important cost to be incurred by producers if they want to engage further in the value chain are business formalization costs, production costs ,and transportation costs for reaching profitable markets. Apart from the costs, there is a number of barriers that seem to hamper efforts of producers to engage further in the value chain. These include regulatory system based-barriers, market-based barriers and operational barriers. Procedures for obtaining all the necessary documents required for doing charcoal business seem to impede producers to engage further in the value chain. The

registration fee now stands at Tsh.265,000 per annum, the yard fee[1] also costs Tsh.265,000 per annum. These fees appear to be very high to individual producers as they can't afford. A key barrier in reaching profitable markets notably Morogoro and Dar es Salaam is the transport cost. The average transport cost per bag to Morogoro is 6, 875 (500,000-600,000 per big lorry –carrying 80 bags) while that of Dar es salaam is 11,875(900,000-1,000,0000 per big lorry-carrying 80 bags). The transport cost to Dar es Salam is almost twice of that of Morogoro

Would it be more profitable (considering costs and revenues) to producers if village-level traders were in place to aggregate charcoal supplies with a view to selling to larger traders?

At present, there are no village-level-traders except in Msimba village. However, the producers can be facilitated to become traders(through associations) whereby they can aggregate charcoal and sell it to large traders from Dar es Salaam and Morogoro. Considering the transport cost to be incurred by big traders , the village-level traders can sell charcoal (after factoring in all costs including the VNRC royalty) at the price ranging between 27,000 and 33,000. This price range looks feasible to the traders from Morogoro and Dar es Salaam. Nevertheless, the profitability analysis shows that selling charcoal at village level, at that price range will not give the village-level-traders a sound profit margin.

What other market dynamics should be considered in selecting the optimal value chain for producers and for the communities in general?

Like Kilosa market, the Morogoro, Ruaha, Mikumi and Dar es Salaam markets all are supplied with charcoal from several sources. The majority of charcoal sold in those markets are illegally produced and transported. High supplies of charcoal in the market imply that the price is likely to drop assuming other market conditions remain constant. The number of actors in the charcoal value chain increase on a daily basis. It will be beneficial if the producers could focus in the markets that have a high demand for charcoal. Producers will also have to take into account the seasonal price fluctuation in which high prices are expected during wet season and low prices in dry season. These dynamics should be observed on a daily basis so as to device a marketing strategy that will ensure profitability.

In order to improve the livelihoods of charcoal producers through the charcoal value chain, this study proposes a number of recommendations which are divided into two, namely general recommendations and villages specific recommendations

---

[1] The yard certificate would not be necessary if the producers will be supplying charcoal to wholesalers in Morogoro, Mikumi, Ruaha or Dar es Salaam who already own the yards.

5.1 General recommendations

Overall, the following are recommended for enabling sustainable charcoal producers to realize sound profit margin in the charcoal value chain:

- There is a need for TFCG to continue mobilizing producers to subscribe into improved kiln technologies and organize charcoal producers to access markets. Such efforts may include facilitating charcoal producers in the village to do bulking for collective marketing by charcoal producers. Moreover, they can be facilitated to get charcoal making licence where they will be producing and selling to visiting traders or transport to lucrative markets instead of being just like casual labourers for charcoal traders. Through their groups they may be organized for bulking and collective marketing sites.

- In order to create linkages between sustainable charcoal producers and key players along the value chains, producers will have to visit the identified profitable markets and make contacts with transporters, wholesalers and retailers. This will enable them to collect as many market information as possible, understand the costs involved, market their charcoal and establishment market networks. The visits can be done by representatives of producer groups/associations. A clear understanding of the costs of selling charcoal at various markets will assist producers to estimate their profits thus able to choose an optimal value chain option.

- While we agree with TFCG that the Tsh.14,400 per bag (Tsh.160 per Kg) –fee payable to VNRC should continue to be instituted, it is important to note that the fee adds an extra cost to the legally and sustainably produced charcoal thus making the production cost to exceed the market price, in particular Mikumi and Kilosa markets. It is therefore recommended that more marketing efforts have to be committed in villages to ensure that the charcoal is sold to distant markets which offer profit to producers; failure of which will make producers to depend solely on big traders who can afford the fee and contract the former to produce charcoal and buy at a price that is decided by the latter. If this goes unresolved, it will jeopardize the livelihoods of producers.

- As discussed in our findings, most of producers lack the entrepreneurship skills and undertake charcoal making as a supplementary livelihood activity thus don't give it enough attention . TFCG as a service provider in the value chain, will be required to provide training on entrepreneurship and business management so as to raise the producers' level of commitment in charcoal business. The current state of affairs suggests that it will require some extra efforts for the producers to take other roles which offer good profit margins in the value chain.

- In order to remove the capital barrier, producers through associations should be facilitated to establish microfinance schemes that will ensure a constant availability of funds that will enable producers to scale up their production and advance to higher levels of the value chain. Because the producers can't afford to pay the costs involved in formalizing the charcoal business and other costs related to selling charcoal to distant markets. The microfinance schemes will assist in funding such costs through credits which will be paid under established terms and conditions.

- Producers through associations should agree on the size of bags which they can accept from traders. This will contain the cheating practice done by traders who bring oversized bags. Although VNRCs make sample checking of the weight of the bags of charcoal packaged by traders, cheating is still happening. This can be further be mitigated if the producers can bulk charcoal, package it using their own bags and sell to the big trader.

- If producers become village-level-traders and decide to bulk charcoal and sell it to large traders from Morogoro and Dar es Salaam, it is recommended that an average price of Tsh.30,000 per bag should be used. The minimum price would be 27,000 while maximum would be 33,000. Charging more than these prices may discourage large traders. Notwithstanding, profitability analysis shows that selling charcoal at village level offers a lower profit margin than Morogoro and Dar es Salaam markets

Village specific recommendations

Dodoma Isanga

- Increase production and enrol as many producers as possible into the training on improved kiln technology
- Issue charcoal harvesting licensing documents to VNRC as soon as possible
- More marketing effort is needed to attract large buyers from Morogoro and Dar es Salaam
- Distant profitable markets notably, Morogoro and Dar es Salaam should be main focus of the producers
- Encourage charcoal production during wet season as producers can potentially make a gross profit margin of up to 51%

Nyali
- Issue charcoal harvesting documents so that the VNRC can start collecting the Tsh.14,400 per 70-90kg -bag royalty.
- Morogoro and Dar es Salaam markets appear to be suitable for Nyali village .The Kilosa market appear to be profitable at present , but producers will switch to other markets once the village receives licensing documents whereby, the producers will be required to pay the 14,400 royalty as they make loses if they to Kilosa market
- Enrol more charcoal producers into the scheme so as to attract large buyers

Kigunga

- Build on the existing networking between producers and large buyers to assist producers increase profit margin.
- Issue licensing documents to formalize the production and enable VNRC collect revenues as per TFS approved guidelines

Ulaya Mbuyuni
- Place more focus on large buyers and distant markets , local markets provide no incentive for producers as the production costs exceed the market price.

Ulaya Kibaoni
- More project intervention is needed, as it appears there are some resistance to the project
- Enrol more producers into sustainable charcoal production scheme
- Potential markets for Ulaya Kibaoni include Mikumi, Ruaha, Morogoro and Dar es Salaam

Kisanga
- Issue licensing documents to formalize the production and enable VNRC collect revenues as per TFS approved guidelines
- Facilitate producers to access distant markets notably Mikumi, Ruaha, Morogoro and Dar es Salaam.
- Create market links so as to attract big traders to buy charcoal sustainably produced in the village

Ihombwe
- Enable producers to access distant markets which offers good price and thus increasing their profit margin
- Continue with the established market links between producers and traders . However, the producers need to be more organized so as have a collective voice in determining the price of charcoal in order to reduce the dominance of traders in price setting.

Msimba
- Designate charcoal selling centres along the highway. The centres should be nearby the charcoal harvesting sites(FMUs). The centres will enable producers to bulk charcoal and sell it to big buyers. This is envisaged not only to curtail illegal harvesting practices, but also to give producers an advantage as their profit will increase.

- Deliberate efforts should be made to reach distant markets which can offer good prices . Markets such as Iringa, Ruaha, Morogoro and Dar es Salaam if fully utilized can potentially benefit the producers

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF BOXES

1. Introduction

The Sustainable Charcoal Project is a partnership project between the Tanzania Forest Conservation Group (TFCG) and the Tanzania Community Forestry Network (MJUMITA). The project is financed by the Swiss Agency for Development and Cooperation (SDC). The goal of the 'Sustainable Charcoal Project' (Component 1 of the overall project 'Transforming Tanzania's Charcoal Sector') is to establish 'Commercially viable value chains for legal, sustainably sourced charcoal'. The project aims to improve climate change adaptation and mitigation; to enhance environmental sustainability and to leverage returns on biomass resources; thereby delivering sustainable development to Tanzania and its people. The project is currently being implemented in 8 villages in Kilosa District. The project began implementation in 2012 and is expected to run for a period of six years.

Based on a market survey in 2012, and building on lessons learned from previous initiatives aimed at improving the sustainability of charcoal production, the project is piloting a charcoal value chain model that aims to incentivize communities to sustainably manage their forest for charcoal production. As such the project is interested in identifying value chains that maximize the profit to the forest-owners (the communities) and to the producers. The consultancy built on the lessons learned from the sale of sustainably produced charcoal by participating villages and from previous research commissioned by the project.

In view of the above, TFCG hired a team of consultants from SUA lead by Dominico B Kilemo. to undertake the assignment. The consultant and his team reviewed relevant information from the project in particular, the baseline study by TaTEDO, market research on sustainable charcoal done by Camco and the Quantis life cycle assessment approach in assessing the environmental impacts along the charcoal value chain from production stage to the consumption stage. while the LCA study provides some general information on the activities and related environmental impacts(emissions) at each stage of the value chain, the market study goes further by proving prices, costs and benefits of various participants of the entire value chain. However, the study made some economic analysis based on the "single-buyer" model assuming that the buyers of Kilosa sustainably produced charcoal will mainly come from Dar es Salaam, a proposal that did not resonate well with TFCG whose aim is to ensure that the charcoal value chain must significantly benefit the rural poor communities who are sustainably producing the charcoal. It was learnt from the CAMCO study that TFCG would like to see as much value of the final charcoal sales price accrue to local producers as possible. Moreover, TFCG wants to reduce supply chain/value chain intermediaries as much as possible so that the producers receive

1

significant profit margin from the sector. The market study failed to provide an economic analysis of various charcoal market channels and to recommend the optimal market channel which is likely to potentially benefit the charcoal producers. This reinforced the need for another study. It is in this context TFCG commissioned a study that aimed at identifying the most profitable value chain options for sustainable charcoal producers. Essentially, this work built on the findings of Camco and TaTEDO whereby some additional information has been collected and will contribute in filling the identified gaps and thus complementing previous studies.

1.1 Objectives and scope of the consultancy

1.2 Main objective

To identify the most profitable value chain options for producers of sustainable charcoal in eight villages in Kilosa District.

1.2.1 Specific objectives

i. To identify the most profitable market for each project village
ii. To examine the profitability of the different markets including price differences at the wholesale and retail stage.
iii. To evaluate the costs associated with pursuing different value chains to access different markets
iv. To examine costs and barriers for producers to engage further along the value chain
v. To assess the profitability to village-level traders if they were in place to aggregate charcoal supplies with a view of selling to larger traders
vi. To examine other market dynamics that should be considered in selecting the optimal value chain for producers and for communities.
vii. To evaluate the capital and skills that would be required in order for producers of sustainable charcoal to engage in other stages of the value chain and to estimate the profitability to producers of doing so
viii. To evaluate a business case for village-level traders in terms of the net benefit to the producers and to the proposed traders
ix. To identify and describe the village-specific attributes that will affect the selection of different value chains for different villages (i.e. what factors will determine which market is optimal for producers in different villages)
x. collect original data on the price of charcoal at different stages of the value chain and costs incurred along the value chain, with a view to enriching and extending the current dataset. At a minimum this will include data on prices, costs and market volume along different value chains from producers in Kilosa to consumers in Mikumi, Kilosa, Morogoro, Ruaha-Kilombero and Dar es Salaam including value chains involving third party transporters, wholesalers and retailers.
xi. To provide evidence- based recommendations for charcoal producers in different villages as to which value chain will generate the greatest profit for them based on current market

conditions. Amongst other things, the study will consider both costs and benefits associated with pursuing different value chains. The study will also document seasonal variations in the different value chains.

2. Background to Sustainable Charcoal

2.1 Global context

Fuelwood is the predominant form of wood energy in rural areas of most developing countries, while charcoal remains a significant energy source in many African, Asian and Latin American urban households. Developing countries account for almost 90 percent of the world's woodfuel (fuelwood and charcoal) consumption and wood is still the primary source of energy for cooking and heating in developing countries (Broadhead, Bahdon and Whiteman, 2001). The increasing population in these countries implies increased production and consumption of charcoal. Due to weak regulatory frameworks in most of developing countries, charcoal is produced unsustainably thus leading to deforestation. This has climate change implication whereby the carbon sequestration capacity of forests is significantly affected and green house gas emissions from charcoal making is increased due to poor technologies with little energy efficiency .

There is no universally agreed definition for 'sustainable' charcoal. A broad definition of **sustainable charcoal** is the harvesting of tree resources, especially in forests and woodlands, but also trees outside the forest, for charcoal (and fuelwood) production and consumption, without compromising the regeneration rate or the biodiversity. Sustainable charcoal is therefore, the application of sound tree management practices coupled with the use of energy efficient technologies contributing to increasing the supply and maintaining the regeneration rate(ASCPF, 2013). This definition can be enriched by other measures of sustainability. For example, according to FAO, 2009 sustainable charcoal production may be assessed from environmental, economic, social and; legal and policy framework perspectives. This suggests that for the charcoal production and trading to qualify "sustainability" they must be legally transacted and be in line with policy directives of a country in which the charcoal value chains exist. FAO contends that the importance and significance of woodfuel production and consumption all over the world particularly among developing countries is huge. The need for a policy framework that will provide sustainability in production and management can no longer be delayed. FAO, 2009 in its report further puts forward three key questions regarding sustainable charcoal policy framework . (i) are countries ready to establish one? (ii) are data and information available? (iii) is there a political will among governments and its citizens so that despite rapid industrialization, a sustainable woodfuel production will continue to be achieved in the years to come? These questions are pertinent and relevant to many developing countries including Tanzania.

2.2 African context

Charcoal constitutes the primary urban fuel in Africa, and is a major source of income and environmental degradation in rural areas. With a lack of alternatives, demand for biomass in Africa is expected to double over the next ten years. Methods of charcoal production in Africa are in urgent need of upgrading (Seboka, 2009). During the traditional process of carbonisation, only around 35% of the wood carbon is fixed in charcoal, while the rest is released into the atmosphere as smoke and non-condensable gases (CO_2, CO, CH_4, etc.). Because most of the energy of the fuelwood is lost in the production process, charcoal users ultimately use much more fuelwood than direct fuelwood users (Seboka, 2009). It is an important component of the energy mix in the majority of urban African households, but fuelwood is the dominant rural cooking fuel and is also used by the service and industrial sectors. About 80%, of the population of Sub Saharan Africa, nearly 700 million people, rely on biomass for cooking, particularly fuelwood in rural areas and charcoal in urban areas (ASCPF, 2013). Charcoal production in Africa poses a big threat as it targets specific preferred species found in natural forests and woodlands, most of which are poorly managed. The result is unsustainable harvesting. In drier areas, where the regenerative capacity is lower, unplanned and unmanaged charcoal production accelerates the processes that lead to desertification. In addition, in most countries in Africa, regulation of charcoal production is uncoordinated and there is little investment to make business more efficient and cost-effective. This makes charcoal extraction unsustainable and contributes to its negative image (Mugo and Ong, 2006).

The charcoal value chain generally operates informally with little control by legal or bureaucratic means. The governance strategies for woodfuel in most African countries are often criticized as being reactive and opportunistic (Laird S. A. *et al.* 2010), with general weaknesses in: inconsistent and poorly coordinated laws; regulation based on a limited understanding of the resource; insufficient consultation with growers, harvesters and chain actors; and ineffective implementation(ASCPF, 2013).

Box 1: Common issues characterizing the charcoal value chain in Africa

Specific analyses aside, a number of common characteristics shall be presented upfront. They apply to most African countries.

Unregulated/illegal setting: Wood harvesting, charcoal burning, transport and trade are in most cases unregulated. However, where legal restrictions apply, they are frequently ignored – due to many countries' lack of legal-regulatory coherence and enforcement capacities.

Corruption is rampant and systemic in many cases, which hinders adequate governance and enforcement. This problem further diminishes the legitimacy of the charcoal business, and leaves many producers vulnerable to economic exploitation.

Inefficient conversion technologies are the logical consequence of the unregulated & insecure setting, clandestine operation and overall capacity deficits.

Charcoal production is poor man's business. Landless, uneducated or otherwise disadvantaged people provide a cheap source of labour. For lack of other options, they can be easily exploited. Poverty forces them to sacrifice long-term considerations (health, livelihood security etc.) for meagre short-term income. The poor are also powerless in the sense that they cannot defend their vital interests vis-a-vis more powerful stakeholders of the charcoal supply chain. They are not organised in most cases, and thus avail of little – if any – bargaining power, and virtually no access to investment capital.

In the public perception, charcoal is discriminated against as "dirty" and economically unattractive. This hinders strategic planning as well as mobilisation of investment capital.
Free access to raw material leads to deforestation and degradation. Adding to the widespread perception that wood-based fuels are "technically backward", this further discredits charcoal as a source of energy.

The charcoal business displays a decidedly oligopolistic structure: Profits are usually concentrated in the hands of a few intermediaries, engaged as transport agents or wholesalers. Furthermore, this setting is heavily biased against women, who often bear the heaviest workloads (wood harvesting/collection, kiln operation, small-scale retailers). Instead of equitable revenue-sharing along the entire value chain, revenue circulates in a loop between traders and consumers – a short-circuit, so to speak. Marginal cash flows to the charcoal burners – and virtually none to those communities, whose forest areas are being depleted in the process.

Charcoal operators are reluctant to formalize their businesses as they cannot perceive the benefits. The reasons are: (i) transaction and other costs of formalization are high and arbitrary; (ii) procedures are complicated and time consuming; (iii) contact with local and central government officials (many of whom are suspected of corruption) is generally frustrating and humiliating.

Source: GIZ https://energypedia.info/images/6/62/Charcoal_supply_chains.pdf

The conversion of wood to charcoal is a decisive factor in the charcoal value chain. Generally, traditional mound kilns are used, resulting in relatively low conversion efficiencies. A skilled charcoal producer will use about 5 tonnes of air-dry wood to produce 1 tonne of lump charcoal

(ASCPF, 2013). A wide range of interventions in many Sub Saharan African countries have tried to overcome this challenge by promoting more efficient kilns, but the adoption rate has been limited. The reason for this is mainly due to the informal, and often illegal, character of charcoal production. Higher material costs, increased labour input, but also lack of knowledge, all represent disincentives for charcoal burners to adapt improved technologies in situations where they are not rewarded with increased prices or where the risk of discovery may require abandoning the site (HEDON. 2010).

According to GIZ, despite the growing scarcity of wood, charcoal generally remains underpriced by more than 20% to 50%, as only the opportunity cost of labour and capital required for charcoal production and transport are reflected. The production price for the raw material wood is often not reflected when wood is exploited from unsustainably managed wooded areas (e.g. open access areas). In addition, dues are ineffectively collected. Undervaluation translates into wasteful and inefficient production and consumption, and creates a formidable disincentive for forest management and tree growing (see box 2)

Box 2: Impacts of underpricing charcoal

As long as charcoal is not sold at a real market price, investments in improved wood-to-charcoal production/conversion are economically not attractive:

- Investment costs for improved kilns (metal chimneys etc.) do not pay off as long as wood remains a free resource. Despite training support, charcoal burners eventually abandon the improved technology. This is the main reason why the improved and highly efficient Casamance kiln has been disseminated for 20 years throughout Africa without success.
- Tree growing approaches stay ineffective, as planting and maintenance costs must be taken into account, when competing with open access resources. Significant subsidies (e.g. Madagascar: 200 to 300 €/ha) are necessary to provide enough incentive. This also holds true for any investments in natural forest management.
- Substitute fuels such as kerosene must be highly subsidized to be competitive, as is the case in a number of countries, such as Senegal and Chad.

Source: GIZ https://energypedia.info/images/6/62/Charcoal_supply_chains.pdf

2.3 The Tanzanian context

Previous studies indicates that over 90% of Tanzanian population depend on fuelwood and charcoal for cooking and heating (CHAPOSA, 2002, Beukering, 2007, BEST, 2014). Miombo woodland accounts for 60-70% of consumed woodfuel (Monela *et al.* 1993). The charcoal sector is viewed to operate in a complex and non-transparent environment thus difficult to track the transactions hence making it difficult to single out specific areas for intervention along the supply and value chains. Lack of clear policy and legal framework on charcoal and inefficient regulatory mechanisms are major constraints causing the Tanzania government to lose revenues from the charcoal sector and face increasing trend of deforestation resulting from unsustainably-produced charcoal (World Bank, 2009, 2010, Malimbwi et al,2007).

Box 3: Key findings of CAG office on the performance of forest sector in revenue collection

- In Tanzania, only 4 %(35) of the forest reserves have prepared Forest Management Plans and the remaining 96% operate without the plans.

- The Ministry has no effective mechanism of controlling the issuance of licenses at district level. It was found some districts have issued harvesting license, transit passes even in the absence of approved Forest Management Plans and annual harvesting plans.

- District Forest Harvesting Committees do not report to MNRT on decisions taken at meetings held to consider applications for harvesting. Therefore, the Ministry lacks key information such as number of people granted licenses in each meeting and volume of logs approved to be harvested etc. Therefore, as a result the Ministry cannot assess whether the goals of controlling harvesting of forest products are reached or the extent of achievement towards reaching sustainable forest harvesting.

- In eight districts visited, it was found that there is inadequate staff. Due to inadequate staff it was found that District Forest Officers (DFOs) are multi tasked and therefore over loaded with works. It is common to find the same office responsible for the issuance of licenses, collection of revenue, hammering timber products, conducting inspections and patrols, and administrative reporting such as attending meetings of district council and other issues which are not technically directly linked to forest management.

- The guidelines on sustainable forest harvesting are not fully followed. The District Forest Harvesting Committees do not hold meetings every four months to discuss the harvesting trend as required by the guidelines. The District Harvesting Committees of some districts which have high potential harvesting such as Sikonge did not meet at all in 2010. Because of this, people who requested for harvesting permits could not be issued with such permits.

- MNRT officials from the HQ do not conduct a periodical monitoring of forest harvesting activities by visiting districts that harvest forests. As a result, MNRT does not know the real situation on the ground regarding forest harvesting.

- DFOs rarely visits the harvesting areas and most of them do not check the harvested logs at source as required by law and guidelines. In most cases, hammer-stamping is done after the harvested logs or timber have been moved to landing sites or sometimes moved to DFO's office.

- The MNRT is not able to determine whether Check Points and Forest Surveillance Units are under- or over-achieving. This is partly due to the fact that the Ministry does not effectively and regularly analyze reports from Check Points and FSUs to determine their performance.

- The stipulated and enforced fines and penalties for the apprehended illegal dealers of the forest products are relatively low. The low fines do not act as deterrent to illegal operators to stop illegal trade in forest products.

Moreover, the current state of affairs suggests that only a few players in the value chain, notably wholesalers/large buyers seem to get a lion share of the value chain profit margin. Rural charcoal producers are still marginalized due to lack of market information, appropriate skills, low capital and subsistence- oriented production.

Box 4: The situation of charcoal producers

The situation of charcoal producers seems to be somewhat paradox: the entire sector depends on them for a continuous supply of charcoal, and yet they are the most disempowered stakeholder in the sector:

- Producers have little knowledge about their rights and obligations regarding the forest resources they rely on.

- They are largely unaware of improved production technologies and lack the means to use them.

- Charcoal producers lack bargaining power vis-à-vis the dealer-transporter-wholesaler networks and they report to be subject to arbitrary rule enforcement acts by district level officials.

- The lack of bargaining power partly stems from the producers' inability to form associations or organized interest groups. Living scattered across rural areas, they lack the means of communication and transportation, they are discouraged by the cumbersome processes of district bureaucracy, and they do not necessarily see the value added of putting effort into a concerted process whose payoff they cannot immediately see.

- As producers generally do not pay any harvesting royalties, fees or taxes at present (this is usually done by the charcoal dealer or transporter, if only sporadically), they have little incentive to support a sustainability-oriented reform agenda that would put a cost the forest resources that are used for charcoal production.

Source: World Bank, 2010

Policy reforms geared towards promoting sustainable charcoal production could potentially transform the charcoal sector in Tanzania thus ensuring environmental, economic and social sustainability. This could increase government's control over revenue collection, reduce deforestation and improve the livelihoods of local communities who are the *de facto* producers of charcoal. The forest policy 1997 and the Forest Act, 2002 provide avenues for communities to benefit from management of forest resources under Participatory Forest Management(PFM), in particular Community Based Forest Management(CBFM) settings. Villages implementing CBFM are empowered to retain 100% of revenues accruing from harvesting of forest products notably timber and charcoal.

There have been some initiatives on sustainable charcoal from non-state actors in Tanzania. For example WWF and Camco Clean Energy Tanzania Ltd with funding from Barclays bank introduced a pilot project "Dar charcoal project" with the aim of incentivizing charcoal producers in Rufiji and Kisarawe to adopt improved kiln technologies and plant trees to restore the degraded forests. The charcoal was marketed in Dar es Salaam and sold at a premium price that was envisaged to motivate producers. However, the project has suffered a stiff resistance from producers and consumers(consumers were not willing to pay the premium price which was relatively higher than the market price of ordinary charcoal) hence failing to achieve the desired output. Nevertheless, the project has generated some key lessons which are of paramount importance to TFCG/MJUMITA who are implementing a similar project in Kilosa district with funding from SDC.

This project works towards ensuring that forest resources are sustainably managed, charcoal production methods abide to improved technologies and producers get access to profitable markets. Having learnt from the Dar charcoal project and from Camco's market research, TFCG is implementing the project cautiously. While the project's initial target was eco-sensitive customers, willing to pay some extra cash to the sustainably produced charcoal, the market research suggests that the so called eco-sensitive customers do not exist and if they do, their number is limited to very few expatriates and some wealthy Tanzanians whose consumption is small and occasional (probably for barbeques only). Therefore, TFCG decided to adopt a value chain model that could operate in the current market conditions with the understanding that the Kilosa sustainable charcoal has the best quality and will attract high customer preference which in turn will increase the profit margin of producers. Apparently, the sustainable charcoal producers have not realised a reasonable profit yet, as the prices at the production sites are still low, mainly controlled by traders from, Ruaha-Mikumi, Dar es Salaam and Morogoro. In this study our team provides an in-depth analysis of the charcoal value chain, focusing on key actors mainly producers, wholesalers and retailers with a view to unveil market-based solutions that could assist producers to overcome dominance of traders in price setting and access the most profitable markets.

3. Approach and Methodology

The consultant used a combination of participatory methods with a view to collate all the required information. Important stakeholders were involved in the study. The different roles played by different stakeholders and actors in the chain were identified and they were requested to participate in the study. The methodology included (i) desk review of relevant materials (ii) interviews and (iii) focus group discussions. We reviewed a number of documents from the project which included the project document, market study by CAMCO, Life Cycle Assessment (LCA) report by Quantis, Advocay Strategy, Forest Management Plans of village forest reserves and Baseline Assessment study by TaTEDO. Interviews were conducted with wholesalers and retailers in the Mikumi, Mikumi-Ruaha, Morogoro and Dar es Salaam markets. A short questionnaire was used to collect information from charcoal whole seller and retailers in the above mentioned towns. Fifty (50) respondents, of which 25 were charcoal whole sellers and 25 were charcoal retailers, were involved in the study. Two focus group discussions were held, one with producers and the other with VNRCs members in each project village namely Dodoma Isanga, Nyali, Kigunga, Ulaya Mbuyuni, Ulaya Kibaoni, Kisanga, Ihombwe and Msimba. In each village 15 producers participated in the producers' FGD while 5 village leaders namely , the village chairperson, village executive officer and VNRC leaders(chairperson, secretary and treasurer) participated in a leaders' FGD. A focus group takes advantage of the interaction between small groups of people. Participants respond to and build on what others in the group have said. It is a synergistic approach that helps in generating more insightful information, and encourages discussion among participants to give more sincere answers. For this study, Focus Group Discussions (FGDs) helped to establish costs involved in making charcoal as well as prevailing levels of awareness on market information about the charcoal, level of profits in existing potential and future markets at different levels such as whole sale and retailers. During the focus group discussion it was revealed that charcoal producers were aware of the selling prices in the different markets where charcoal was sold. However, they did not understand the details of other cost involved in taking their charcoal to those markets.

The FGDs broadly focused on issues related to: costs of production, markets and services that may impinge positively or negatively to producers' profit due to their involvement in charcoal production and sales such as policies, training and access to financial services. Two focused group discussion were conducted in each village; one with charcoal producers only and another with VNRC and representatives of the village government. Such arrangement was made to ensure transparency among charcoal producers especially on policy issues related to charcoal producers who would not feel free to air some comments in presence of their village leaders. Specifically the study collected information on production costs, prices and barriers/constraints

facing producers. The information on costs and prices enabled us to compute Gross Margins (GM) and Simplified Gross Margins (SGM) considering different seasons of the year when charcoal have highest return and explore how producers can capitalize on that opportunity. Important constraints that hinder producers from accessing better markets and get good prices at peak season were also discussed and have enabled our team to come up with recommendations which are focused. Comparisons of gross margins of different segments and points have enabled us to come up with feasible and practical suggestions to help charcoal producers to improve their profit margins.

4. Results and discussions

This subsection present key findings of the study as specified in the terms of reference for this consultancy. It starts by discussing background information and characteristics of different actors

involved in the charcoal production and marketing. The subsection also present findings and discussion on other key deliverables as per terms of reference that guided this study.

4.1 Characteristics of sustainable charcoal producers and village-level traders in kilosa

Charcoal making and marketing is among the income generating activities in most of the villages surveyed. However, charcoal making is mostly done as a supplementary source of income over crop farming. Our findings indicate that agriculture is the main livelihood activity in the 8 project villages. Both men and women are involved in the production with men taking the lead (see appendix 2). Looking at the trade-offs between farming and charcoal making, it was found that farmers will spend more time in farming than in charcoal production. Findings from FGDs revealed that charcoal production is extensively done during farming off-season and very occasionally during the farming season. The costs involved in charcoal making also varies depending on season of production, the costs are higher during rainy/farming season and relatively lower during dry/off-farming seasons. Charcoal production is therefore done to complement farming activities as a means to obtain extra income to the household. This also suggests that almost in all project villages there are no dedicated charcoal producers who operate throughout the year. It was reported in Ihombwe village that there are some dedicated charcoal producers, though it was suspected that such people could be coming from distant places and come to the village to make charcoal and transport it to the markets.

The majority of farmers engage in charcoal production only when contracted by the licensed traders from either Morogoro or Dar es Salaam. In villages where the implementation of TFS tariff scheme have been fully implemented such as Ihombwe and Ulaya Mbuyuni villages; traders pay all the required levies to VNRC and are granted permission to enter into the forest and start charcoal making. The trader then contracts the producers to make charcoal. The producers will then start producing charcoal at their own costs. When charcoal is ready, the trader brings the empty bags of his choice[2] into which the charcoal is packed. The price is set per bag and is controlled by the trader. The producers are at a disadvantage due to the fact that they cannot demand a price that is higher than that proposed by the trader as he/she is the only one to buy the charcoal and it was specifically made for him/her, secondly; the price of a bag of charcoal does not follow the legal standards, normally the traders bring with them oversized bags

---

[2] This was one of big concerns of producers. Although the regulations set a legal baggage of 70-90 Kg, the traders normally bring oversized bags with capacity of carrying 100-140 Kg of charcoal. Since the producers have no empty bags they have to accept the bags brought by the trader. This means the trader gets 2 bags of charcoal at a price of 1 bag. This undermines producers

thus getting a bigger quantity of charcoal at the same price. The inadequate/poor bargaining power by charcoal producers is also partly contributed by their inadequate estimation of the production costs. Charcoal producers use their labour and they hardly estimate its cost to quantify the average production costs before sale. Cost estimation for their labour is only done when one is hired to work on other peoples or traders enterprise and is done on piece meal per activity contracted for.

The other group of producers are those who occasionally make charcoal just to get a few bags (5-10 bags) and sell them to solve a pending problem that requires money. The production usually stops after a problem in question is settled. At present, this kind of producers is very common in all villages except in Ulaya Mbuyuni and Ihombwe. This is because the other villages have not started implementing the TFS tariff scheme due to the delay in acquiring licensing documents. Therefore, a producer doesn't have to pay Tsh.14, 400 fee per bag (70-90Kg) to be able to enter the forest and make charcoal. However, in Msimba village the 14,400 fee policy does not work probably due to absence of big traders from distant markets. The village set a fee of Tsh.5000 per 60-77kg bag (also this seems too expensive to producers, some producers promise to pay it after selling charcoal, but in the end they don't pay). Therefore, the producer has to lodge the application to the VNRC which will discuss the application and approve it after which charcoal production starts. In most cases, the charcoal would either be sold in the village or transported by bicycle to either Mikumi town or Kilosa town. Box 5 presents some details on different reasons used by charcoal producers in selecting different markets. Due to the high supply of charcoal in Kilosa, it may take the producer quite some time before he/she sells the charcoal. At times, the producer (mostly men) moves around with 1 or 2 bags on a bicycle looking for customers to the point that s/he gets so tired that s/he decides to sell the charcoal at a give-away price. A key question to ask is what will happen to the producers if all the villages institute the Tsh.14,400 per -bag -fee -policy. Looking at the current market conditions, where will they sell their charcoal? This is essentially what we tried to figure out in this study.

Box5: Charcoal marketing arrangement in different villages

Currently in Ulaya Kibaoni, Kigunga, Nyali and Dodoma Isanga villages producers don't pay the fee of Tsh 14,400 per bag, only pay a village royalty of Tsh 1000 per bag. In addition charcoal makers in Msimba village also pay to Mikumi Small Town authority a fee of Tsh 2,000 per bag. Secondly these villages easily access the Kilosa and Mikumi markets. Producers from Ulaya Mbuyuni have no incentive to sell charcoal in Kilosa town because after factoring in the 14,400 fee, the cost of charcoal exceeds the market price. For the Mikumi market, it is only producers from Kisanga village who may have some incentive to sell charcoal to this market. However, the road condition from Kisanga to Mikumi makes charcoal transport by bicycle impossible.

charcoal and sell it along the Morogoro-Iringa highway. Their customers are travellers[3] who buy 1-3 bags, sometimes 3-5 bags. This group of value chain actors found travellers as a market niche to concentrate on and they seem to make a profit from this. **Interestingly, the charcoal producers are not interested in taking this role**. They contend that bulking charcoal along the road waiting for customers is time consuming and implies that one has to stop other activities and concentrate on charcoal selling only. Therefore, the producers sell their charcoal to the dedicated village traders who can dedicate their time waiting for customers. It is the impatience and lack of organisation of producers which makes them sell charcoal to village local traders at a price that is lower than what they would get if they sell to the customers directly. A few clever producers don't sell charcoal to traders but rather bulk charcoal along the highway and sell directly to consumers at a high price. This experience came out from a lady who is also a trainer of charcoal producers on improved kiln technologies in Msimba. She produces charcoal sustainably and then transports it to the sales point along the highway.

It was learnt from a FGD in Ulaya Kibaoni that there is a group of village-level traders who seemingly don't subscribe to the concept of sustainable charcoal production, they see it as an added cost burden to their business. Due to the sensitive nature of the matter, our team was unable to probe more details in the same focus group discussion. However, our interpretation was that these traders are engaged in illegal charcoal business. TFCG should deal with this village strategically and carefully so as to ensure that this group of unethical traders don't jeopardize the project intervention

4.2 Characteristics of wholesalers and retailers

The Table1 below summarizes the characteristics of the traders whom we interviewed in different market segments namely Ruaha, Mikumi, Morogoro and Dar es Salaam. Our team failed to get traders in Kilosa town. As previously stated, the Kilosa market is flooded with charcoal from several sources the majority of which are illegal and most sales are done on home-delivery basis. The producers have networks of customers who call them to supply charcoal at their respective homes or business areas (mainly restaurants). The results indicate that the charcoal business is largely done by individuals whose age ranges between 26-33 years. The number of individuals decreases with increase in age. The reason for such observations could be attributed to the fact that individuals of 26-33 age groups are the most energetic with the ability to bear with all the hassles involved in the charcoal business including travelling to charcoal production sites which are located in remote areas.

---

[3] Here a vehicle is our unit of reference. On average, a vehicle with some passengers (except buses) stops at the sale point and buys 2-5 bags of charcoal.

Table 1: Socio-economic characteristics of wholesalers and retailers

SN	Variable	Frequency	Percent
1	**Age of respondent**		
	18-25 years	6	12.0
	26-33 years	14	28.0
	34-41 Years	13	26.0
	42-49 years	10	20.0
	50 years and above	7	14.0
2	**Sex of respondent**		
	Male	26	52.0
	Female	24	48.0
3	**Place of residence**		
	Ruaha	10	20.0
	Mikumi	10	20.0
	Morogoro	21	42.0
	Dar es salaam	9	18.0
4	**Business type**		
	Whole seller	25	50.0
	Retailer	25	50.0
5	**Education level of respondent**		
	Primary school	42	84.0
	Secondary school	4	8.0
	Post secondary school	2	4.0
	No formal education	2	4.0
6	**Experience in charcoal business**		
	<five years	29	58.0
	6-10 years	14	28.0
	More than ten years	7	14.0

This study mapped existing and potential charcoal supply chain; Figure 1 summarizes the this finding detailing the existing and potential future market segments. The map applies to all villages though the specific market channels differ across villages due to accessibility and geographic location of the village. For example Dodoma Isanga village, is not accessible during rainy season, thus unable to get large buyers. The only markets are village based customers who are very few and buy at a very low price; and Kilosa town which has a high supply of charcoal thus translating into low prices. Potentially Dodoma Isanga village can access Dodoma, Morogoro and Dar es Salaam markets

4.2 The actual and potential market channels
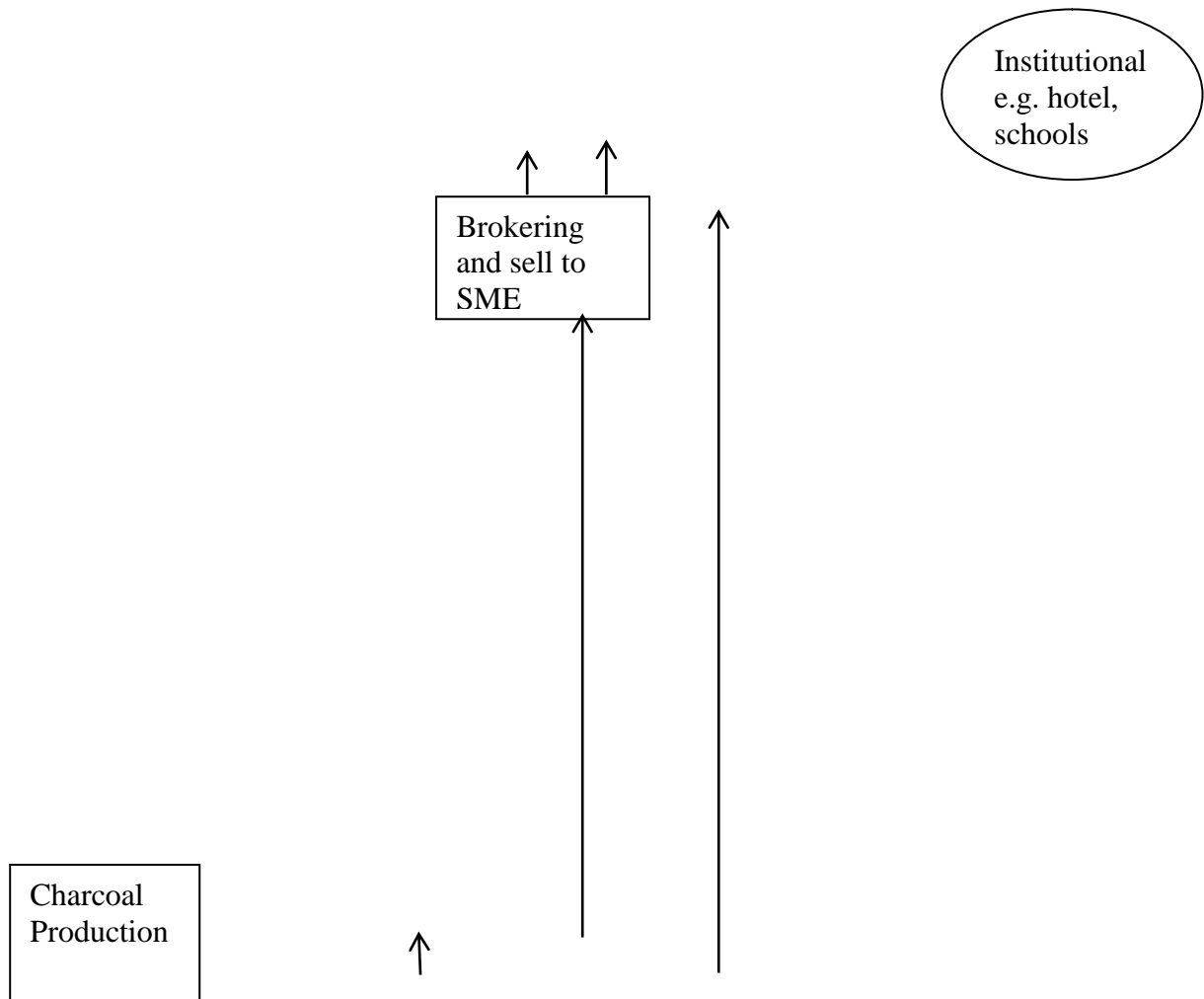
Figure 1: The Value chain map, detailing existing market channels and the potential future markets

KEY
Existing marketing channels: ⟶
Potential future markets: ⟶

Nyali, Kigunga, Ulaya Mbuyuni and Ulaya Kibaoni are accessible throughout the year. The current market channels include village based consumers, Kilosa town and large buyers from Morogoro and Dar es Salaam. In future these villages can potentially widen the market to reach Dodoma which is said to have higher prices of charcoal than Morogoro and Dar es Salaam. Ulaya Kibaoni also accesses the Mikumi and Ruaha markets.

Ihombwe and Kisanga villages are also accessible throughout the year. Kisanga appears to have a relatively high demand of charcoal at village level due to urbanisation taking place. Therefore, the village level market is growing though the prices are low. Due to the long distance from Kisanga to Mikumi town, very few producers are able to ferry their charcoal to Mikumi. The majority depend on large buyers from Mikumi, Ruaha, Morogoro and Dar es Salaam. With village level demand being low and at a low price, Ihombwe village capitalizes on Mikumi market. Geographically the Ihombwe village is close to Mikumi town, hence the producers are able to transport charcoal by bicycle and sell it either to wholesalers or to retailers. Ihombwe has attracted a good number of large buyers from Morogoro, Dar es Salaam and Ruaha. The future markets for Ihombwe and Kisanga villageas would potentially be Iringa municipality.

Msimba village has a competitive advantage as it is seated along the Morogoro-Iringa highway which provides a market opportunity from travellers. However, the village has not utilized other markets that can potentially improve the charcoal value chain in the area. Deliberate efforts have to be committed to attract large buyers from Mikumi, Iringa, Ruaha, Morogoro and Dar es Salaam as well as bulking and selling to traders instead of village local traders who buy it at relatively lower prices.

4.3 Profitability analysis of key participants in the charcoal value chain under different market channels

Profitability analysis undertaken in the course of this study demonstrated a wide range of gross margins that charcoal producers are earning at different times and in different markets where charcoal from Kilosa is sold (See Table 2) .Charcoal producers in Kilosa District, as it is in many other rural areas do all the activities using their own labour. Hence, it is usually difficult for them to understand the profit margin that they realize out of the charcoal making and selling. In this study, the analysis included all direct and indirect costs which reflected the labour costs that are usually overlooked. In order to capture the actual cost that they incur in charcoal production, a detailed discussion was made in a focus group discussion with charcoal makers. The costs were mainly labour cost including the working tools such as axes and pangas whose cost is negligible if compared with the volume of the work they will perform and the duration of time they will be used. One panga can be used to cut down hundreds of trees over the period of 5 years. In Tanzania rural setting, a farm labourer normally comes with a working tool such as a hand hoe, panga and an axe . Therefore, the labour cost normally includes the working tool. In estimating how much it would cost to perform a given activity in kiln preparation, the producers considered

factors such as the efforts required, the number of people required to perform the task and how long it would take. The number of people depended on the magnitude of the task. When many people are involved the task would take lesser time to finish while if few people are involved it would take a bit longer. However, in all cases the cost per activity remained the same. For example, to fall 10 trees required to make a 20-bag kiln, it would cost about TZS, 30,000(3000/tree). Whether the activity is done by one person or more, the cost will still be the same, the difference will be in the duration of the time taken to accomplish the task. Tree falling cost was valued lesser than chopping logs into smaller pieces. On an average, falling one tree cost between TZS 2000- 4000 while cutting into smaller pieces ranges between 3000 and 5000/tree. Charcoal makers were asked to identify and detail all the processes and procedures involved in charcoal making. Every procedure and steps were converted into a cost item per activity and producers were requested to state the amount of money one would be paid for doing that activity. In every cost item, after the detailed and open discussion three levels of cost was arrived at: lowest, average and maximum cost per every cost item. In order to establish unit cost used to produce one bag of charcoal, producers were requested to base all their costs estimates on the size of the kiln made such as 15, 20 or 30 bag- kiln. Despite producers being able to estimate minimum, average and maximum costs for each activity, it was further noted that such costs vary with season. For example costs estimates were higher during rainy season as compared to dry season. Later in the discussion, producers were also requested to mention the charcoal selling prices at different period of the year. It was also found that charcoal producers know all the production costs, the approach was to ask them prices of which they will be willing to do any particular activity in the process of charcoal making.

Box 6: Costs for producers

The costs required to produce charcoal are essentially the labour costs. All charcoal production cost with the exception of transport and VNRC royalty are labour costs. These costs were provided by producers during focus group discussions. They listed all the activities involved in kiln preparation, then made estimate of how much it would cost to perform every activity based on the village labour settings. Every cost for each activity was estimated per kiln. From this figure per kiln, we divided by the number of bags to be produced by a kiln in question so as to obtain the unit cost per bag. A cost estimate was reached after considering the efforts required, time required and the number of people. On average 1 tree can produce 2-3 bags of charcoal depending on the size of the tree. For example, if a producer wants to prepare a 20-bag-kiln, would require 10 trees. Falling down tree costs between 2000-4000 /tree. This take 1 day for 2-3 people, but takes 2 days for 1 person. Cutting logs into smaller pieces costs between 3000-5000/tree and for 10 trees it would take 1.5 days for 3 people and 2.5 -3 days for 1 person. The number of days it would take to accomplish the task will depend on the number of people performing the activity, but the cost of the activity will remain the same. If one person does alone will get all the money, but if there are more than person, the money will have to be divided according to the number of people. The important factor the producer used to estimate the cost was the **efforts required to accomplish the tasks and their willingness to accept compensation (reward) for the labour rendered.** Their experience in farm activities also helped to estimate the labour costs for charcoal production

Box 7: Costs for traders

The costs for traders are essentially the direct costs of sales they incur before charcoal is sold to the final consumers which include purchase of charcoal, labour costs related to loading and offloading, sorting and re-grading. Other costs include the broker who help to source charcoal (for some wholesalers), transportation cost from the producer/supplier to the sales outlet. All the costs have been set per bag for easy analysis. The type of transport used varies across wholesalers and retailers. While some wholesalers use big lorries and small pickups, some wholesalers use motor cycle and bicycle to bring charcoal to their selling centre. Some traders are supplied with charcoal at their selling outlets and normally the purchase price of charcoal includes a transport especially for Mikumi and Ruaha traders were the producers are in their neighbourhood. Thus in the data files, the transport cost is presented as **zero**

For wholesalers who use lorries to transport charcoal, we computed the transport cost by taking the cost per lorry per trip and divide by the number of bags the lorry can carry thus obtaining the cost per bag.

For the purpose of profitability analysis and according to guidelines on how to calculate SGM we did not include the indirect costs such as communication cost and storage costs. These costs are not necessarily incurred before charcoal is sold to the final consumer. Normally the SGM calculation is based on direct cost of sale. It expresses the percentage of sales that accrue to the trader. In the data files, these costs are presented per month and are not included in the total cost per bag and hence not included in the SGM calculations.

Profitability analysis for traders (retailers and wholesalers) mainly focused on cost incurred to get charcoal from suppliers or producers and other related costs involved before selling to final consumers. Seasonality of supply of charcoal only affected their gross profit margins. The analysis made for the activities involved in charcoal production helped the consultants to have the accurate comparison of returns. The analysis revealed that selling prices vary over the year; therefore, the highest, the average and the lowest prices have been taken to reflect the times in the year when charcoal producers sell their charcoal to different market outlets. However, during FGD producers were surprised to find that they sometimes make loses when they sell their charcoal at certain prices. This is due to the fact that they don't estimate and quantify the costs involved in the charcoal making process and also because they do it using their own or family labour that is usually not paid for. During focus group discussions charcoal producers in all project villages revealed that the improved charcoal making process advocated by TFCG has potential to increase their profit. They further reported that the amount of charcoal harvested were relatively higher using improved kiln making technique as compared to the old methods in which used bigger volume of logs and charcoal produced were very little. An FGD participant in Nyali village commented:

...the improved charcoal making process that TFCG has introduced will increase our profit...with the same bundle of logs you get more charcoal than what we used to get in our traditional methods... sometimes we ended with ashes only.... FGD participant Nyali Village

Generally, it has been established that charcoal makers selling their charcoal during off farming season (June-November) make some losses of up to 34% of the gross profit. However, those who sell their charcoal during farming/rainy seasons (i.e. selling in November up to March) they get gross profit margins of up to 57.35% using improved charcoal making practices. At this time of the year the cost of production are also higher due to shortage of labour as it is also farming season and the rainy conditions make the process difficult and expensive hence the cost for each activities also goes up. However, this is the period of the year when also the prices of the charcoal are highest due to low supply and poor conditions or the roads which limit many charcoal buyers to access some of the villages. Profitability varies across villages and seasons of production; this is due to changes in labour cost. Findings from this study revealed that all SME traders including wholesalers and retailers have positive gross margins. This is because they drive the charcoal sub sector and set selling price (always higher than buying price). The study also found that wholesalers in Morogoro town receive higher profit margin as compared to Dar es Salaam, Mikumi and Ruaha towns whereas, retailers in Mikumi town received highest gross profit than other markets. This implies that if charcoal producers are facilitated to sell their charcoal to these market segments they will increase their profit and income derived from charcoal business. However, charcoal makers are constrained by many factors that hinder them to access lucrative markets. Table 2 presents the summary of gross profit margins that farmers and traders receive. The gross margins established set the basis for the advice of specific village business cases in which each particular village can use to increase charcoal producers' profit margins.

Table 2: Summary of gross profit margin analysis for the value chain participants

SN	Village	Sales June – November (SGM %)[4]			Sales November-March (SGM %)		
		SGM at Min production cost	SGM at Average production cost	SGM at Max production cost	SGM at Min production cost	SGM at Average production cost	SGM at Max production cost
1	Producers						
	Dodoma Isanga	2	**-2.00**	-52.00	51.00	**40.00**	24.00
	Nyali	51.67	**38.33**	33.33	57.35	**45.59**	41.18
	Kigunga	9.17	**-6.25**	-34.17	27.33	**15.00**	7.33
	Ulaya Mbuyuni	3.33	**7.92**	-42.92	33.03	**25.76**	11.82
	Ulaya Kibaoni	22.08	**-15.63**	-18.75	22.67	**7.50**	14.33
	Kisanga	-20.8	**-36.7**	-62.5	35.6	**27.1**	13.3
	Ihombwe	7.08	**-6.25**	-19.58	50.44	**43.33**	36.22
	Msimba	20.89	**6.00**	-8.89	40.67	**29.50**	18.33
2	Wholesalers						
	Morogoro				47.6	60.1	10.0
	Dar es Salaam				24.6	30.1	0.7
	Mikumi				16.6	17.6	21.4
	Ruaha				25.4	16.6	13.4
3	Retailers						
	Dar es Salaam				22.6	18.0	15.0
	Morogoro				27.2	30.3	23.4
	Mikumi				48.2	48.2	45.4
	Ruaha				15.7	3.0	-9.6

*negative signs indicate loss (negative gross margins where cost exceeds gross profit)

In this subsection we present village level recommendations based on profitability analysis made and as was presented in Table 2.

Dodoma Isanga Village

Charcoal production in Dodoma Isanga village is done at small scales where a kiln of up to three to five bags is usually made. The average size of the kiln which was the basis for this estimation was a 10 bag kiln (see Appendix 2). The average production cost per bag is Tsh 10,000, other costs before selling to final consumer average at 2,000 and sale prices ranges between 10,000/= and 20,000/= when all other costs are factored in charcoal producers realize the gross profit

---

[4] The gross margin represents the percent of total sales revenue that one retains after incurring the direct costs associated with producing the goods. The higher the percentage, the more one retains on each shilling of sales. Negative sign indicate loss. See appendix 2 for detailed analysis

margins that range from -52% to 51%, implying that they sometimes incur some losses. However, most charcoal producers in the village also transport their charcoal to retailers in nearby town of Kilosa. On the other hand, given the production and other costs as estimated during this study both charcoal producers and the village government are losing to traders who buy charcoal at very low prices and who pay a very small levy (Tshs. 1000 per bag) to village government. Charcoal producers in the village further revealed that, there is huge potential to increase production if they are assisted to identify and access more lucrative market segments.

Kigunga Village

Average kiln size for Kigunga village from which this estimation was based is 15 bags size. The average production cost per bag was found to be 6000 whereas selling prices were in the range of 8,000 and 10,000. When all other costs are factored in (see Appendix 2) charcoal producers in the village realize gross profit ranging from -34.17 % to 15 %. Selling charcoal during dry season was found to lead into losses whereas in wet season producers make some profit. During focus group discussion it was revealed that charcoal producers in the village has established good network with charcoal buyers and many bags of charcoal are being sold out of the village. However, unlike neighbouring village Ulaya Mbuyuni, charcoal sold from Kigunga village does not benefit village government where VNRC charges 14,400/= per bag. The only levy that goes to village government is Tsh 1000/= while in many instances the profit is taken by their neighbouring village who offer charcoal business licence. During this survey it was found that the village have not fully adopted TFCG recommended practices of making and selling charcoal through VNRC. However, when TFCG advocated fee per bag is factored in the production cost will exceed market selling price.

Ulaya Mbuyuni

Ulaya Mbuyuni village is among the village that is effectively practising TFCG's proposed model where traders have to acquire a harvesting licence and pay a village levy (14,400/=) per bag before they engage with the charcoal maker for charcoal making and selling. This study found that the average cost of charcoal making is about 7670/= per bag, while the selling price of charcoal in the village ranges between 8,000/= and 11,000/= (see appendix 2). The gross profit margins are in the range of -21.25 % to 25.76 %) implying that sometimes charcoal producers incur loses. When the VRNC levy (Tsh 14,400) is factored in the gross profit realized by charcoal producers is further reduced . At present, this levy is paid by big buyers from either Morogoro or Dar es Salaam. The village levy charged by VNRC is even higher than actual charcoal price that charcoal maker finally receive. While the village collect a lot of money

received from traders' levy, the same does not transform into increased income which would save as an incentive for the charcoal producer who continues to sell their charcoal at relatively very low prices. In negotiating for price setting traders use the levy paid to the VNRC (Tsh14,400/=) as added cost to their business which is again used to further lower the prices for charcoal producers.

Ulaya Kibaoni

In Ulaya Kibaoni it was revealed that, the demonstration kiln constructed did not yield good results due to poor supervision. Therefore, most of the cost estimates made were more based on the traditional charcoal making practices. The village has not successfully adopted TFCG's recommended model of harvesting fuel wood for charcoal production, a good mixture of traditional charcoal making practices were found in this study. Organisation of the Charcoal producers was also observed to be at relatively very low levels. The average size of the kiln on which the basis for these cost estimates were made is 10 bags. Average production cost for a bag of charcoal was found to be about 7400/= (see Appendix 2). The selling price per bag was between 8,000/= and 10,000/= which enabled charcoal producers to receive the gross profit ranging between -42.92% and 22.67%.

Ihombwe village

Ihombwe village is among the village that is effectively practising TFCG proposed model where traders have to acquire harvesting licence and pay village levy (14,400/=) per bag before they engage the charcoal maker for charcoal making and selling. This study found that the average cost of charcoal making is about 8,000/= per bag (see Appendix 2), the selling price of charcoal in the village ranges between 8,000/= and 15,000/= (especially during rainy season) with all other costs factored in, charcoal producers in Ihombwe village realizes a gross profit margin ranging from-19.58% and 50.44%. However, when VNRC levy is factored in , the gross profit is is totally negative. These findings imply that charcoal producers incur some losses or get little gross profit margins. The village levy charged by VNRC is almost equal or higher than actual charcoal price that charcoal makers finally receive when selling their charcoal n the village. While the village collect a lot of money by charging traders relatively high levy, the same does not transform into incentive for charcoal producer who continue to sell their charcoal at relatively very low prices. Traders use the levy paid to the VNRC (14,400/=) as added to their business which is again used to further lower the prices for charcoal producers, this is mainly due to inadequate bargaining power by the charcoal producers and the presence of a sole buyer who have also claim to have paid some cost in advance before they produce i.e. VNRC levy.

Msimba Village

Msimba Village is the only village that presents a very different charcoal marketing dynamics, it is located along the Tanzania-Zambia highway and most of the charcoal selling is done along the highway road. The average production costs per bag was found to be 7600/= (see Appendix 2) and the selling prices ranges between 15,000/= and 20,000/=, this enables them to get a gross profit margin of -8.89% to 40.67%. However, charcoal production is mostly done in small quantities, there is no bulking and charcoal is also sold in small quantities owing to the abundant market from people who drive along the highway. Msimba village is also the only village among eight villages participating into the project where sizeable amount of charcoal is sold in the village. There are many middle men who buy from charcoal producers they do sorting and repackaging before they sell to customers who are mainly truck drivers. These middle men realizes a net profit of between 2,000/= and 5,000/= per bag. Charcoal producers in Msimba village could increase their profit margin if they are facilitated to organize into designated selling centres[5] where charcoal producers can sell collectively. This will help them to receive high charcoal prices which are currently being enjoyed by local traders in the village, And, in way it will help reduce illegal charcoal making in the village as all charcoal makers will sell from the same of few established centres. There is also a stiff challenge from traditional charcoal producers (who do not use improved charcoal making procedures) from the same village who also sell in the same market. Organising into charcoal marketing group will harmonize charcoal making and selling practices.

Nyali Village

Nyali village is among the village where there is huge potential for charcoal production. The average production costs per bag was found to be 7,000/= (see Appendix2). The selling prices were found to range from 15,000/= and 17,000/=. Such prices enable charcoal producers selling charcoal in the village to earn a gross profit margin ranging from 38.33% up to 57.35 %. Nyali village is among the villages where charcoal producers get better returns of their investment in charcoal business. Nevertheless, charcoal making is still in relatively in small scale. Their gross profit margin can further be improved if they are facilitated to reach more lucrative markets such as Dar es Salaam and Morogoro. Rich experience of collective marketing for Simsim crop in the village may be used for charcoal business.

---

[5] Looking at the geography of the village, it is not effective to have one selling centre, thus a reasonable number of charcoal selling centers can be designated along the high way. Once the sales points are known it will be easy for the VNRC and Mikumi Township council to control illegal producers who also sell charcoal along the highway but clandestinely.

Kisanga Village

Kisanga is among the village in the project which has potential to increase charcoal production. Average production cost for a bag of charcoal was found to be about 7,500/= (see Appendix 2). The selling price per bag was in the range of 8,000/= and 15,000/= with such production costs charcoal producers can realize a gross profit ranging from 2,000/= to 5,400/= per bag . Due to other related costs that charcoal producer in Kisanga village incur the usually get a gross profit ranging from -62.5% to 35.6%. Organisation of the Charcoal producers was observed to be relatively good but they were yet to fully operationalize the TFCG suggested model of production. In order to improve the income of charcoal producers in Kisanga village, there is need to continue sensitizing more charcoal producers to emulate their neighbour Ihombwe village who has fully adopted the recommended model. There is also a need to facilitate charcoal producers to do bulking and do collective marketing to minimize higher transport costs

4.4 Profitability of producers in different market segments under TFCG sustainable charcoal value chain model

As discussed in previous sections, the Kilosa sustainable charcoal producers are unable to sell their charcoal in local markets of Kilosa, Mikumi and Ruaha due to high production cost involved and low prices in these markets; thus causing producers to make losses. The 14,400 royalty per 90kg-bag adds a cost burden to producers that making a total production cost to go high. Moreover, most of the producers are contracted by licensed large traders to produce charcoal and sell it at very low prices as the VNRC royalty is paid by large traders. In this section we present some results from the proposed market segments which are considered profitable to producers. The producers can organize themselves in associations and access Morogoro and Dar es Salaam markets which offer high profit. As shown in the table 3, Morogoro offers the producers higher profits than Dar es Salaam and village level market segment appears to offer the lowest profit(see appendix 3 for more details).

Table 3: Summary of producers' profitability in different market segments

Village	Morogoro		Dar es Salaam		Village level sales	
	AGPB	SGM	AGPB	SGM	AGPB	SGM
Dodoma Isanga	11,400	**25.33**	11,400	**22.80**	3,850	12.83
Nyali	12,450	27.67	12,200	24.4	5,350	17.83
Kigunga	**14,900**	**33.11**	**14,900**	**29.8**	7,350	24.5
Ulaya Mbuyuni	13,233	29.41	13,233	26.47	5,683.33	18.94
Ulaya Kibaoni	13,317	29.41	13,067	26.13	6,266.67	20.89
Ihombwe	12,900	28.67	12,650	25.3	5,850	19.5
Kisanga	12,217	**27.15**	12,217	**24.43**	4,666.67	15.56
Msimba	12,800	28.44	12,550	25.1	5,750	19.17

AGPB = Average gross profit per bag

SGM = Simplified Gross Margin

4.5 Costs and barriers for producers to engage further along the value chain

As previously discussed in 4.1, charcoal business is mostly done as supplementary source of income to households and many charcoal makers actively engage in charcoal making during farming off season. This implies that the producers' priority is farming activities. However if the charcoal producers want to become dedicated producers and would like in future to take other roles in the value chain there are some costs they must consider. These include trade-offs between farming and charcoal production and the costs of doing business at wholesale and retail levels.

Farming and charcoal production trade-offs will put some farmers/charcoal producers in sort of stress thus causing them to make rational decisions, in most cases may involve abandoning one activity at one point in time and concentrate on the other. If a producer decides to carry forward both activities simultaneously with commitment (an approach that is likely to ensure high income to the household), he/she faces an added burden that will require additional labour. This implies, he/she will have to spread the labour costs (both direct and indirect) across farming and charcoal making. Empirical evidence suggests that very few farmers/producers are able to conduct both activities simultaneously due to labour costs involved. This reinforces the reason

why many farmers/producers engage in charcoal production during farming off-season(dry season) and few in farming season (wet season).

The costs of doing business at wholesale and retail levels differ. Moreover, these costs vary across the villages. While wholesaling will be feasible for Dodoma Isanga, Nyali, Kigunga, Ulaya Kibaoni and Ulaya Mbuyuni, Ihombwe and Kisanga villages if they sell to Ruaha, Morogoro and Dar es Salam markets; retailing will practically be impossible. Alternatively, wholesaling may involve producers bulking/aggregating charcoal in the village and sell it to wholesalers(big buyers) from either Dares Salaam, Morogoro, Mikumi or Ruaha. Selling to distant markets implies that producers have to bear the transportation costs and other fees related to charcoal transport while selling to big buyers in the village reduces the costs and is likely to offer the producers a reasonable profit margin if they control the price.

While wholesaling at village level is not feasible due to absence of large buyers[6], retailing seems to work well in Msimba village in which the main charcoal market is the highway. The costs will be limited to production, transportation from the production sites to the sales point and some fee and levies(Tsh 5000 per bag payable to VNRC and Tsh.2000 payable to Mikumi township council). Producers in Msimba village may also consider aggregating charcoal and look for large buyers who could come to the village and buy the aggregated charcoal at a price that give them a comfortable profit margin as the costs will be relatively lower than the costs for transporting it to distant markets .

Apart from the costs, there is a number of barriers that seem to hamper efforts of producers to engage further in the value chain. These include regulatory system based-barriers , market-based barriers and operational barriers. These barriers were mentioned during FGDs with producers as well as during interviews with retailers and wholesalers. Therefore, if the producer would like to take roles of wholesaling and retailing will face the same barriers faced by wholesalers and retailers at present

Table 4 and 5 summarize the barriers. Procedures for obtaining all the necessary documents required for doing charcoal business seem to impede producers to engage further in the value

---

[6] The absence of large buyers in Msimba village is attributed to a rough terrain that makes impossible for lorries to access charcoal production sites thus discouraging the buyers. The terrain of Msimba village is predominantly hilly with rocks and stones causing no vehicle pass through. Normally the producers carry charcoal on their heads from the production sites in small bags, then they repack it into large bags. If the buyer is to obtain charcoal from Msimba village will have to pay more labour costs than in   other villages

chain. The registration fee now stands at Tsh.265,000 per annum, the yard fee[7] also costs Tsh.265,000 per annum. These fees appear to be very high to individual producers as they can't afford. However, if the producers can organise themselves in groups and establish associations in each village, then they can apply for a group licence. This will enable them to produce charcoal and transport it to distant markets which offers good price. But also the producers will be able to produce charcoal without necessarily having to wait for licensed traders from either Morogoro and Dar es Salaam to contract them, they will therefore have power to decide where to sell the charcoal at a price they are comfortable with.

Another barrier that seemingly may disincentivise producers is the Ths.14,400 fee per bag (for all village except Msimba which charges Tsh.5000). Although this is a legal requirement, the fee is relatively too high for producers. While the fee seems to positively impact the VNRC and contribute to village development, it puts producers in a difficult situation. Since most of the licensed traders who come to the village to buy charcoal have no problem with paying the fee, the VNRC finds it to be fine. But it affects the barging power of producers as the trader uses 14,400 fee (cost)as an excuse for buying charcoal from producers at low price. Since the producers don't pay this fee, they just have to accept the price set by the buyer. Furthermore, the fee puts additional costs to the producers thus making the charcoal to be very expensive and unable to compete in the local markets (especially Kilosa and Mikumi markets).

Table 4: Problems encountered by traders in charcoal business

SN	Variable	Frequency	Percent
1	There are complicated procedures on getting licence	24	27.6
2	The unpredictable markets/price fluctuation	16	18.4
3	Transport problem especially during rainy season	13	14.9
4	Unreliable suppliers (those supplied by producers)	16	18.6
5	Poor quality charcoal producers mixes with sand	8	9.2
6	Inadequate start up capital	6	6.9
7	Inadequate marketing skills	4	4.4

Table 5: Barriers encountered by traders in accessing markets

SN	Variable	Frequency	Percent

---

[7] The yard certificate would not be necessary if the producers will be supplying charcoal to wholesalers in Morogoro, Mikumi, Ruaha or Dar es Salaam who already own the yards.

1	Inadequate capital	18	62.1
2	Inadequate market information	3	10.3
3	Transport costs are very high	7	24.1
4	Bureaucratic procedures in getting licences	1	3.4

For the producers to be able to sell charcoal in either Ruaha, Morogoro and Dar es Salaam on wholesale-basis, they will need a space/storage facility/yard for bulking charcoal so that the prospective customers notably retailers and final consumers will be able to access the product. Alternatively, they can sell charcoal to wholesalers with an already established facility.

4.6 Capital and skills required for producers to take downstream roles and associated profitability

While there is no specialized skills required, basic marketing skills will be needed for the producers to succeed in other roles of the value chain. Moreover a starting capital will be necessary to enable producers to take wholesale role in the value chain. The producers of Kilosa sustainable charcoal has the advantage that they already have skills acquired through training on improved kiln technology. Therefore they can produce a good quality charcoal become competitive in the market. The initial capital required would involve the charcoal business registration fee of Tsh.265,000 and a yard fee of 265,000 making a total of Tsh 530,000. This is a fixed annual cost the producers have to consider. The production costs vary across villages and seasons. The majority of producers use family labour to cut down the labour costs. However, looking at the overall welfare of the household, there is an opportunity cost the household has to bear for dedicating some time and labour for charcoal production. The time spend on charcoal production has be costed as it would have been used for other productive activities that improve the family welfare. The other capital costs would include transportation of charcoal to the identified markets such as Morogoro and Dar es Salaam. Moreover, the storage facility costs(both rent and TFS yard fee) is another capital cost to be considered. On average, for a producer to be able to make charcoal and transport it to either Dar es Salaam or Morogoro a starting capital of Tsh.1,000,000 can suffice, notwithstanding the transport cost and production fee of Ths.14,400 per 70-90kg-bag which can be post-paid under special arrangements though this is subject to discussion among the parties involved.

4.7 Key factors to be considered by forest-owning communities and sustainable charcoal producers in selecting value chain options

The forest owning communities are represented by the VNRC which is tasked with the duty of managing the village forest reserves. VNRCs are input suppliers in the charcoal value chain, supplying wood that is then used to make charcoal. Apparently, under the sustainable charcoal production and marketing settings, the forest-owning communities benefit more than charcoal producers. The VNRCs collect revenues mostly from large buyers who unhesitatingly pay the royalty of 14,400 per bag. This implies that for the forest-owning communities to increase revenue collection, they must put concerted efforts to attract as many large buyers as possible. Depending on producers and village-village level traders to pay for this fee seems to lead into problems as some are unwilling to pay for that. This was evident in Msimba village in which the producers are unwilling to pay the VNRC fee and suggest the fee to be paid by traders who sell charcoal along the highway. On the other hand, traders urge that paying the VNRC fee would add a cost burden to their business as they are already paying other fees to the Mikumi Township council.

The sustainable charcoal producers ought to consider their production costs, comparing market prices in different market channels before they decide where to sell their charcoal. As discussed in the previous sections, the sustainable charcoal producers have limited options when it comes where to sell their charcoal and at what price. The licensed trader is their immediate market option at village level and they are compelled to accept the price set by the trader as they have no other options.

4.8 Village specific factors determining the choice of optimal market for charcoal producers

The choice of optimal market for charcoal producers in each village is determined by the geographical location (accessibility of the village), the number and frequency of large buyers in the village, production costs and sale prices in different market channels and season; and proximity to town/urban centres. With the exception of Dodoma Isanga and Msimba village, all project villages are accessible throughout the year[8]. Dodoma Isanga village has a very poor road, passable with difficulties during the dry season and completely impassable during the wet season. This suggests that bulking charcoal and transporting it to distant markets become very

---

[8] Accessibility refers to the ability of the lorries to reach the charcoal production sites for easy loading

difficult. The lorry owners are likely to reject plying their vehicles to the village as they would not want to take risks. This in turn translates into high transport costs and lower prices of charcoal in the village. Although the Msimba village is along the highway, the charcoal production sites are inaccessible due to very rough terrain. Therefore, most feasible market options for producers will be selling their charcoal along the highway.

The number and frequency of large buyers (traders) in the village to bulk and transport charcoal indicate that the producers have the market for their charcoal. However, the decision to sell charcoal to traders must be concertedly done by producers through the established groups/associations. At present, of all 8 villages, Kigunga, Ulaya Mbuyuni and Ihombwe have the largest number of licensed traders mainly from Morogoro and Dar es Salaam.

Production costs and sales price in different seasons and different market segments apply to all villages. An optimal value chain option should be able to provide producers with good returns. Selling charcoal at the production sites may be profitable only if the producers gain control over the price. Proximity to urban centres which are one of the target markets also determines where to sell charcoal as it has cost implication notably the transport costs. Producers from Dodoma Isanga village spend the least on transport when accessing the Kilosa market. Msimba village also has the added advantage that it is on the highway, thus cutting down transport costs to the market/sales point.

4.9 Other market dynamics to be considered in selecting the optimal value chain for producers and for communities.

Like Kilosa market, Morogoro, Ruaha, Mikumi and Dar es Salaam markets all are supplied with charcoal from several sources. The majority of charcoal sold in those markets are illegally produced and transported. High supplies of charcoal in the market implies that the price is likely to drop assuming other market conditions remain constant. The number of actors in the charcoal value chain increase on a daily basis. It is always beneficial if the producers could focus in the markets that have a high demand for charcoal. Producers will also have to take into account the seasonal price fluctuation in which high prices are expected during wet season and low prices in dry season.

5. Conclusion and recommendations

The producers of Kilosa sustainable charcoal carry dual responsibility of charcoal making and farming between which they have to make trade-offs. They have not significantly benefited from the charcoal value chain yet. The sector is controlled by licensed big traders who set the price which the producers tend to accept. Profitability of the value chain actors varies across villages, seasons of the year, level of engagement in the chain and market segments. The sustainably produced charcoal which involves abiding to all legal requirements of the charcoal business competes with illegally produced charcoal in the market, at times it becomes less competitive due to high production costs . Referring back to the questions raised in the ToR the following conclusions can be drawn:

Where is the most profitable market for each village?

Our findings indicate that most of producers in all project villages sell their charcoal at the production sites whereby prices are low and set by big traders. Considering the legal requirements of the sustainable charcoal which involves payment of Tsh 14,400 royalty per bag and charcoal prices in Kilosa , Mikumi and Ruaha, producers make losses if they sell charcoal in these markets as the production costs exceed the market price. The average charcoal prices in Kilosa, Mikumi and Ruaha markets are 16,000, 18,000 and 25,000 respectively. The lower prices of charcoal in these market are attributed to the presence of other charcoal from different sources most of which is produced unsustainably and illegally. Therefore, the most profitable markets are distant markets notably Morogoro and Dar es Salaam where the average price of charcoal is Tsh 45,000 and 50,000 respectively. Selling charcoal in such markets will enable the sustainable charcoal producers to get a comfortable profit margin. For example, the producers from Dodoma Isanga will make the SGM of 29.33% and 26.4% in Morogoro and Dar es Salaam respectively; and an average of gross profit per bag of Tsh.13,200 in both markets. This is envisaged to improve the livelihoods of producers.

How great is the difference in the profitability of the different markets including price differences at the wholesale and retail stage?

Considering the three market segments namely Village level, Morogoro and Dar es Salaam; the producers from the 8 villages will make the most profit if they sell charcoal to the Morogoro market. This is because the charcoal prices in Morogoro are high and the transport cost is low thus enabling the producers to make an average gross profit per bag ranging from 12,200 to 14,900 and the SGM of between 24.4% and 33.11%. The profitability in the Dar es Salam

market is lower than that of Morgoro and selling at village level reduces further their profitability.

The profitability of different markets surveyed differs at wholesale and retail stages. Our findings suggest that the Mikumi wholesalers get a gross margin of between 8.57% and 28.33% The average wholesale price of charcoal in Mikumi is 18,000. Retailers in Mikumi receive a gross margin of between 41.67% and 46.43%. The retail price of tin of charcoal ranges between 600 and 3000(depending on tin size which ranges between a 1-litre tin to 3-Litre tin). The Ruaha wholesalers make a gross margin of 2% and 32.40%. The average wholesale price in Ruaha is 25,000. Retailers in Ruaha receive a gross margin of between 16.67 % and 34.33%. The average retail price of tin of charcoal in Ruaha ranges between 600 and 2500 depending on the size of the tin. In Morogoro, the average wholesale price is 45,000 per bag which gives the wholesalers a gross margin of between 38.57% and 61.67%. Retailers make a gross margin of between 19.71% and 50.60% whose average retail price is 2500 per 8-Kg tin. The average wholesale price of charcoal in Dar es Salaam is 50,000 per bag, gross margin analysis of wholesalers indicate that they receive a gross margin of between 14.17% and 45.56% per bag. The Dar es Salaam retailers obtain a gross margin of between 15.71% and 42.50%. The retail price ranges between 1000 to 3000 per tin(depending on the size of the tin)

What are the costs associated with pursuing different value chains to access the different markets?

In addition to the production cost, other costs associated with pursuing different value chains include transport and labour costs related to loading and offloading of the charcoal bags. If sorting, re-grading and re-packaging is involved, such costs should also be considered. Other costs would include charcoal business registration, TFS/VNRC royalty and transit pass.

What would be the costs and other barriers for producers to engage further along the value chain?

The costs for Kilosa producers to engage further along the value chain include the trade-offs between farming and charcoal production; and the costs of doing business at wholesale and retail levels. The most important cost to be incurred by producers if they want to engage further in the value chain are business formalization costs, production costs ,and transportation costs for reaching profitable markets. Apart from the costs, there is a number of barriers that seem to hamper efforts of producers to engage further in the value chain. These include regulatory system based-barriers, market-based barriers and operational barriers. Procedures for obtaining

all the necessary documents required for doing charcoal business seem to impede producers to engage further in the value chain. The registration fee now stands at Tsh.265,000 per annum, the yard fee[9] also costs Tsh.265,000 per annum. These fees appear to be very high to individual producers as they can't afford. A key barrier in reaching profitable markets notably Morogoro and Dar es Salaam is the transport cost. The average transport cost per bag to Morogoro is 6, 875 (500,000-600,000 per big lorry –carrying 80 bags) while that of Dar es salaam is 11,875(900,000-1,000,0000 per big lorry-carrying 80 bags). The transport cost to Dar es Salam is almost twice of that of Morogoro

Would it be more profitable (considering costs and revenues) to producers if village-level traders were in place to aggregate charcoal supplies with a view to selling to larger traders?

At present, there are no village-level-traders except in Msimba village. However, the producers can be facilitated to become traders(through associations) whereby they can aggregate charcoal and sell it to large traders from Dar es Salaam and Morogoro. Considering the transport cost to be incurred by big traders , the village-level traders can sell charcoal (after factoring in all costs including the VNRC royalty) at the price ranging between 27,000 and 33,000. This price range looks feasible to the traders from Morogoro and Dar es Salaam. Nevertheless, the profitability analysis shows that selling charcoal at village level, at that price range will not give the village-level-traders a sound profit margin.

What other market dynamics should be considered in selecting the optimal value chain for producers and for the communities in general?

Like Kilosa market, the Morogoro, Ruaha, Mikumi and Dar es Salaam markets all are supplied with charcoal from several sources. The majority of charcoal sold in those markets are illegally produced and transported. High supplies of charcoal in the market imply that the price is likely to drop assuming other market conditions remain constant. The number of actors in the charcoal value chain increase on a daily basis. It will be beneficial   if the producers could focus in the markets that have a high demand for charcoal. Producers will also have to take into account the seasonal price fluctuation in which high prices are expected during wet season and low prices in dry season. These dynamics should be observed on a daily basis so as to device a marketing strategy that will ensure profitability.

---

[9] The yard certificate would not be necessary if the producers will be supplying charcoal to wholesalers in Morogoro, Mikumi, Ruaha or Dar es Salaam who already own the yards.

In order to improve the livelihoods of charcoal producers through the charcoal value chain, this study proposes a number of recommendations which are divided into two, namely general recommendations and villages specific recommendations.

5.1 General recommendations

Overall, the following are recommended for enabling sustainable charcoal producers to realize sound profit margin in the charcoal value chain:

- . There is a need for TFCG to continue mobilizing producers to subscribe into improved kiln technologies and organize charcoal producers to access markets. Such efforts may include facilitating charcoal producers in the village to do bulking for collective marketing by charcoal producers. Moreover, they can be facilitated to get charcoal making licence where they will be producing and selling to visiting traders or transport to lucrative markets instead of being just like casual labourers for charcoal traders. Through their groups they may be organized for bulking and collective marketing sites.

- In order to create linkages between sustainable charcoal producers and key players along the value chains, producers will have to visit the identified profitable markets and make contacts with transporters, wholesalers and retailers. This will enable them to collect as many market information as possible, understand the costs involved, market their charcoal and establishment market networks. The visits can be done by representatives of producer groups/associations. A clear understanding of the costs of selling charcoal at various markets will assist producers to estimate their profits thus able to choose an optimal value chain option.

.

- While we agree with TFCG that the Tsh.14,400 per bag(Tsh.160 per Kg) –fee payable to VNRC should continue to be instituted, it is important to note that the fee adds an extra cost to the legally and sustainably produced charcoal thus making the production cost to exceed the market price,   in particular Mikumi and Kilosa markets. It is therefore recommended that more marketing efforts have to be committed in villages to ensure that the charcoal is sold to distant markets which offer profit to producers; failure of which will make producers to depend solely on big traders who can afford the fee and contract

the former to produce charcoal and buy at a price that is decided by the latter. If this goes unresolved, it will jeopardize the livelihoods of producers.

- As discussed in our findings, most of producers lack the entrepreneurship skills and undertake charcoal making as a supplementary livelihood activity thus don't give it enough attention . TFCG as a service provider in the value chain, will be required to provide training on entrepreneurship and business management so as to raise the producers' level of commitment in charcoal business. The current state of affairs suggests that it will require some extra efforts for the producers to take other roles which offer good profit margins in the value chain.

- In order to remove the capital barrier, producers through associations should be facilitated to establish microfinance schemes that will ensure a constant availability of funds that will enable producers to scale up their production and advance to higher levels of the value chain. Because the producers can't afford to pay the costs involved in formalizing the charcoal business and other costs related to selling charcoal to distant markets. The microfinance schemes will assist in funding such costs through credits which will be paid under established terms and conditions.

- Producers through associations should agree on the size of bags which they can accept from traders. This will contain the cheating practice done by traders who bring oversized bags. Although VNRCs make sample checking of the weight of the bags of charcoal packaged by traders, cheating is still happening. This can be further be mitigated if the producers can bulk charcoal, package it using their own bags and sell to the big trader.

- If producers become village-level-traders and decide to bulk charcoal and sell it to large traders from Morogoro and Dar es Salaam , it is recommended that an average price of Tsh.30,000 per bag should be used. The minimum price would be 27,000 while maximum would be 33,000. Charging more than these prices may discourage large traders. Notwithstanding, profitability analysis shows that selling charcoal at village level offers a lower profit margin than Morogoro and Dar es Salaam markets.

5.2 Village specific recommendations

. In this sub section we provide village specific recommendations aimed at improving the situation of sustainable charcoal producers and forest- owning communities. Table 5 summarizes the recommendations.

Village	Key recommendations
Dodoma Isanga	• Increase production and enrol as many producers as possible into the training in improved kiln technology • Issue charcoal harvesting licensing documents to VNRC as soon as possible • More marketing effort is needed to attract large buyers from Morogoro and Dar es Salaam • Distant profitable markets notably, Morogoro and Dar es Salaam should be main focus of the producers • Encourage charcoal production during wet season as producers can potentially make a gross profit margin of up to 51%
Nyali	• Issue charcoal harvesting documents so that the VNRC can start collecting the Tsh.14,400 per 70-90kg -bag royalty. • Morogoro and Dar es Salaam markets appear to be suitable for Nyali village .The Kilosa market appear to be profitable at present , but producers will switch to other markets once the village receives licensing documents whereby, the producers will be required to pay the 14,400 royalty as they make loses if they to Kilosa market • Enrol more charcoal producers into the scheme so as to attract large buyers
Kigunga	• Build on the existing networking between producers and large buyers to assist producers increase profit margin. • Issue licensing documents to formalize the production and enable VNRC collect revenues as per TFS approved guidelines
Ulaya Mbuyuni	• Place more focus on large buyers and distant markets , local markets provide no incentive for producers as the production costs exceed the market price.
Ulaya Kibaoni	• More project intervention is needed, as it appears there are some resistance to the project • Enrol more producers into sustainable charcoal production scheme • Potential markets for Ulaya Kibaoni include Morogoro and Dar es Salaam
Kisanga	• Issue licensing documents to formalize the production and enable VNRC collect revenues as per TFS approved guidelines • Facilitate producers to access distant markets notably Morogoro and Dar es Salaam. • Create market links so as to attract big traders to buy charcoal sustainably produced in the village
Ihombwe	• Enable producers to access distant markets which offers good price and thus increasing their profit

	margin • Continue with the established market links between producers and traders . However, the producers need to be more organized so as have a collective voice in determining the price of charcoal in order to reduce the dominance of traders in price setting.
Msimba	• Designate charcoal selling centres along the highway. The centres should be nearby the charcoal harvesting sites(FMUs). The centres will enable producers to bulk charcoal and sell it to big buyers. This is envisaged not only to curtail illegal harvesting practices, but also to give producers an advantage as their profit will increase. • Deliberate efforts should be made to reach distant markets which can offer good prices . Markets such Morogoro and Dar es Salaam if fully utilized can potentially benefit the producers

Table 6: Summary of village specific recommendations

References

African Sustainable Charcoal Policy Framework, 2013. Available at
http://www.google.co.tz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CCcQFjAB&u
rl=http%3A%2F%2Fwww.worldwewant2015.org%2Ffile%2F424361%2Fdownload%2F461743
&ei=y6_YU4vkL-ma1AXpoYHQDw&usg=AFQjCNGrWd2CYd1fbtZDCEIjdXh5rToKMA

Beukering, P. v., G. Kahyarara, et al. (2007). Optimization of the charcoal chain in
Tanzania. Amsterdam, Institute for Environmental Studies

Biomass Energy Strategy of Tanzania(2014). Available at http://www.euei-
pdf.org/sites/default/files/files/field_pblctn_file/BEST%20Biomass%20Energy%20Strategy%20
Tanzania_Final%20Version%20April%202014.pdf

Broadhead, J.S., Bahdon, J. & Whiteman, A. 2001. *Past trends and future prospects
for the utilisation of wood for energy*. Global Forest Products Outlook Study
Working Paper No. 5. FAO, Rome.

Camco Clean Energy(Tanzania) Limited(2013). Market research for sustainably –produced
charcoal

CHAPOSA. (2002). Charcoal potential in Southern Africa. INCO_DEV: International
cooperation with developing countries (1998-2002).

FAO(2009). Criteria and Indicators for Sustainable Woodfuels: Case studes from Brazil,
Guyana, Nepal, Philippines and Tanzania

GIZ https://energypedia.info/images/6/62/Charcoal_supply_chains.pdf

HEDON. 2010. *Charcoal Production Chain*. Household Energy Network. Available online:
http://www.hedon.info/CEC:CharcoalProductionChain .   London, England, U.K .

Laird, S.A. McLain, R.J. Wynberg, R.P. (Editors). 2010. *The state of NTFP policy and law*. In:
Wild product governance: finding policies that work for non-timber forest products. P. 343–66.
Earthscan, London, England, U.K.

Malimbwi, R. E., E. Zahabu, and B. Mchome (2007). Situation Analysis of Dar es
Salaam Charcoal Sector. Consultancy report submitted to the World Wildlife Federation.
Tanzania Program Office, Dar es Salaam.

Monela, G.C., OKtingáti, A. & Kiwele, P.M. 1993. Socioeconomic aspects of charcoal
consumption and environmental consequences along Dar es Salaam – Morogoro highway,
Tanzania. *Journal of Forest Ecology and Management,* 58: 249-258.

Mugo, F. and Ong, C. 2006. Lessons of eastern Africa's unsustainable charcoal Business

National Audit Office(2012). Performance Audit on management of forest harvesting by the ministry of natural resources and tourism: Report of the Controller and Auditor General of The United Republic of Tanzania

Quantis(2014). Transforming Tanzania's Charcoal Sector : Life Cycle Assessment Component

Seboka, Y(2009). Charcoal production: Opportunities and barriers for improving efficiency and sustainability, in Bio-carbon opportunities in Eastern and Southern Africa. United National Development Programme.

SDC(2011). Transforming Tanzania's Charcoal Sector : Project Document

TaTEDO. Baseline assessment of existing charcoal making methods and efficiencies. Draft report(undated)

World Bank(2010). Enabling Reforms: A stakeholder-based analysis of the political economy of Tanzania's Charcoal sector and the Poverty and Social Impacts of the proposed Reforms.

World Bank(2009).Environmental crisis or Sustainable development opportunity? Transforming the Charcoal sector in Tanzania

Appendix 1: Terms of Reference

Identification of the most profitable value chain options for sustainable charcoal producers in Kilosa

1) Introduction

The Sustainable Charcoal Project is a partnership project between the Tanzania Forest Conservation Group (TFCG) and the Tanzania Community Forestry Network (MJUMITA). The project is financed by the Swiss Agency for Development and Cooperation (SDC).

The goal of the 'Sustainable Charcoal Project' (Component 1 of the overall project 'Transforming Tanzania's Charcoal Sector') is to establish 'Commercially viable value chains for legal, sustainably sourced charcoal'. The project aims to improve climate change adaptation and mitigation; to enhance environmental sustainability and to leverage returns on biomass resources; thereby delivering sustainable development to Tanzania and its people. The project is currently being implemented in 8 villages in Kilosa District. The project began implementation in 2012 and is expected to run for a period of six years.

Based on a market survey in 2012, and building on lessons learned from previous initiatives aimed at improving the sustainability of charcoal production, the project is piloting a charcoal value chain model that aims to incentivize communities to sustainably manage their forest for charcoal production. As such the project is interested in identifying value chains that maximise the profit to the forest-owners (the communities) and to the producers. The consultancy will build on the lessons learned from the sale of sustainably produced charcoal by participating villages and from previous research commissioned by the project.

2) Scope of Work

This consultancy aims to identify value chain options for producers of sustainable charcoal in eight villages in Kilosa District. The consultant will provide evidence-based, village-specific recommendations for charcoal producers as to the value chain that will generate her / him the greatest profit. The consultancy will provide evidence based recommendations for charcoal producers in different villages as to which value chain will generate the greatest profit for them based on current market conditions. Amongst other things, the study will consider both costs and benefits associated with pursuing different value chains. The study will also document seasonal variations in the different value chains.

The study will consider at least five different markets: Kilosa, Morogoro, Mikumi, Dar es Salaam and along the Mikumi-Ifakara road particularly to the settlements associated with the Illovo Sugar Estate.
The consultancy will provide data that will help producers identify:
- Where is the most profitable market for each village?
- How great is the difference in the profitability of the different markets including price differences at the wholesale and retail stage?
- What are the costs associated with pursuing different value chains to access the different markets?
- What would be the costs and other barriers for producers to engage further along the value chain?

- Would it be more profitable (considering costs and revenues) to producers if village-level traders were in place to aggregate charcoal supplies with a view to selling to larger traders?
- What other market dynamics should be considered in selecting the optimal value chain for producers and for the communities in general?

The consultant shall provide additional data on the current and potential value chains for charcoal from the project area building on the market surveys already implemented by the project. For existing charcoal value chains, the consultant will collect original data on the price of charcoal at different stages of the value chain and costs incurred along the value chain, with a view to enriching and extending the current dataset. At a minimum this will include data on prices, costs and market volume along different value chains from producers in Kilosa to consumers in Mikumi, Kilosa, Morogoro, Ruaha-Kilombero and Dar es Salaam including value chains involving third party transporters, wholesalers and retailers.

The Consultant will document the capital and skills that would be required in order for producers of sustainable charcoal to engage in other stages of the value chain and to estimate the profitability to producers of doing so.

The Consultant will evaluate the business case for village-level traders in terms of the net benefit to the producers and to the proposed traders.

The Consultant will identify and describe the village-specific attributes that will affect the selection of different value chains for different villages i.e. what factors will determine which market is optimal for producers in different villages.

For existing value chains, the Consultant will collect original data on seasonal variations in the price of charcoal at different stages of the value chain in the five markets of Mikumi, Ruaha-Mikumi, Kilosa, Morogoro and Dar es Salaam.

3) Expected Outputs of the study:

1. The consultant shall produce one inception report. The inception report will include:

- a review of the relevant data already available on charcoal value chains relevant to the project area, including the data collected by Camco.

- a review of the terms of reference;

- a description of the methodology to be employed in order to collect and analyze the data on the various value chains in order to fulfill the consultancy objectives as outlined above. This will include sample questionnaires; the proposed sampling strategy; and the proposed data analysis tools;

- a work plan including a detailed timeline for implementation and a description of the way in which the work will be implemented.

2. The consultant will produce one consultancy report which will include at a minimum the following sections: Introduction outlining the objectives of the survey; the background to sustainable charcoal; and a review of the literature including a description of the CamCo study as a starting point for this work.

A description of the methods employed including the data collection tools that were used; the sampling strategy and sampling intensity. As an annex, the consultant shall include the questionnaires and list of interviewees.

The results, presented in such a way as to provide a clear description of the different actual and potential value chains including a description of the costs incurred along the value chains; the volumes involved; and the prices paid.

An analysis of the results that answer the questions and issues outlined in the scope of work.

Evidence-based recommendations that provide clear guidance for producers and communities in the eight villages.

A more general analysis of the key factors to be considered by forest-owning communities and sustainable charcoal producers in assessing value chain options.

Evidence-based recommendations on how to create linkages between sustainable charcoal producers and key players along the value chains with a view to assisting producers to access the most profitable value chains.

3. The Consultant shall provide one or more excel files in which all data collected as part of the survey is included.

4. Timescale

The assignment shall be completed by 31st July 2014

.

Appendix 2: Profitability analysis for producers

(i)Dodoma Isanga

	Charcoal preparation costs- Dodoma Isanga)	Unit	Qnty	Unit cost	Amount*
A	**Labour Costs for 10 bag Kiln (90kg bag)**				
	1. Cuting down trees	tree	5	3,000	15,000
	2. Chopping logs int small pieces	tree	5	3,000	15,000
	3. Collecting logs (to the kiln)	tree	5	4,000	20,000
	4. Making the kiln (Arranging Logs)	manday	12	1,667	20,000
	5. Covering the kiln/burning	manday	2	2,500	5,000
	6. Supervision for the kiln	manday	4	1,250	5,000
	7. Offloading	manday	3	6,667	20,000
	Total A				**100,000**
	% of total Cost				**83.33**
B	**Other costs**				
	1. Transport to the village	10	bag	1,000	10,000
	2. Village leavy/royalty	10	bag	1,000	10,000
	Total B				**20,000.00**
	% of total Cost				**16.67**
	Total Cost (A+B)				**120,000.00**
E	Income from charcoal selling				
	1. Low price (June - November)	10.00	bag	10,000	100,000
	2. High price (March-April)	10.00	bag	20,000	200,000
F	**Gross Profit (June - November)**				**(20,000.00)**
	SGM				**(20.00)**
	Gross Profit (March - April)				**80,000.00**
	SGM				**40.00**

*Average of minimum and maximum cost estimates

(ii)Nyali

	Charcoal preparation costs- Nyali village)	Unit	Qnty	Unit cost	Amount*
A	Labour Costs for 20 bag Kiln (90kg bag)				
	1. Cuting down trees	tree	10	1,500	15,000
	2. Chopping logs int small pieces	tree	10	3,000	30,000
	3. Collecting logs (to the kiln)	tree	10	1,750	17,500
	4. Making the kiln (Arranging Logs)	manday	21	952	20,000
	5. Covering the kiln/burning	manday	6	2,917	17,500
	6. Supervision for the kiln	manday	7	2,857	20,000
	7. Offloading	manday	6	3,333	20,000
	Total A				140,000
	% of total Cost				75.68
B	Other costs				
	1. Transport to the village	20	bag	1,250.00	25,000
	2. Village leavy/royalty	20	bag	1,000.00	20,000
	Total B				45,000.00
	% of total Cost				24.32
	Total Cost (A+B)				185,000.00
E	Income from charcoal selling				
	1. Low price (June - November)	20.00	bags	15,000.00	300,000.00
	2. High price (March-April)	20.00	bags	17,000.00	340,000.00
F	Gross Profit (June - November)				115,000
	SGM				38.33
	Gross Profit (March - April)				155,000
	SGM				45.59

*Average of minimum and maximum cost estimates

(iii)Kigunga

	Charcoal preparation costs- Kigunga village)	Unit	Qnty	Unit cost	Amount*
A	Labour Costs for 15 bag Kiln (90kg bag)				
	1. Cuting down trees	Tree	5	2,000	10,000
	2. Chopping logs int small pieces	Tree	5	2,000	10,000
	3. Collecting logs (to the kiln)	Tree	5	3,000	15,000
	4. Making the kiln (Arranging Logs)	Manday	15	1,000	15,000
	5. Covering the kiln/burning	Manday	3	5,000	15,000
	6. Supervision for the kiln	Manday	5	2,000	10,000
	7. Kupakua	Manday	3	5,000	15,000
	Total A				90,000
	% of total Cost				70.59
B	Other costs				

	1. Transport to the village	15	bag	1,500.00	22,500
	2. Village leavy/loyalty	15	bag	1,000.00	15,000
	Total B				**37,500**
	% of total Cost				**29.41**
	Total Cost (A+B)				**127,500**
E	Income from charcoal selling				
	1. Low price (June - November)	15.00	bags	8,000.00	120,000
	2. High price (March-April)	15.00	bags	10,000.00	150,000
F	**Gross Profit (June - November)**				**(7,500.00)**
	SGM				**(6.25)**
	Gross Profit (March - April)				**22,500**
	SGM				**15**

*Average of minimum and maximum cost estimates

(iv)Ulaya Mbuyuni

	Charcoal preparation costs- Ulaya Mbuyuni village)	Unit	Qnty	Unit cost	Amount*
A	**Labour Costs for 15 bag Kiln (90kg bag)**				
	1. Cuting down trees	tree	5	2,800	14,000
	2. Chopping logs int small pieces	tree	5	5,600	28,000
	3. Collecting logs (to the kiln)	tree	5	3,000	15,000
	4. Making the kiln (Arranging Logs)	manday	15	1,000	15,000
	5. Covering the kiln/burning	manday	3	8,000	24,000
	6. Supervision for the kiln	manday	5	1,400	7,000
	7. Offloading the kiln	manday	3	4,000	12,000
	Total A				**115,000**
	% of total Cost				**93.88**
B	**Other costs**				
	1. Loading in the bags	15	bag	500	7,500
	3. Village royalty paid to VNRC	15	bag	0	0
	Total B				**7,500**
	% of total Cost				**6.12**
	Total Cost (A+B)				**122,500**
E	Income from charcoal selling				
	1. Low price (June - November)	15.00	bags	8,000	120,000
	2. High price (March-April)	15.00	bags	11,000	165,000
F	**Gross Profit (June - November)**				**(2,500)**
	SGM				**(2.08)**
	Gross Profit (March - April)				**42,500.0**
	SGM				**25.76**

*Average of minimum and maximum cost estimates

(v) Ulaya Kibaoni

	Charcoal preparation costs- Ulaya Kibaoni village)	Qnty	Unit	Unit cost	Amount*
A	Preparation Cost for 15 bag Kiln (90kg bag)				
	1. Cuting down trees	tree	5	2,000	10,000
	2. Chopping logs int small pieces	tree	5	5,000	25,000
	3. Collecting logs (to the kiln)	tree	5	4,000	20,000
	4. Making the kiln (Arranging Logs)	manday	15	1,000	15,000
	5. Covering the kiln/burning	manday	3	5,000	15,000
	6. Supervision for the kiln	manday	5	3,000	15,000
	7. Offloading	manday	3	3,333	10,000
	Total A				110,000
	% of total Cost				79.28
B	Other costs				
	1. Transport to the village	15	bag	1,250.00	18,750
	2. Village leavy/royalty	15	bag	1,000.00	10,000
	Total B				28,750
	% of total Cost				20.72
	Total Cost (A+B)				138,750.00
E	Income from charcoal selling				
	1. Low price (June - November)	15.00	bags	8,000	120,000
	2. High price (March-April)	15.00	bags	10,000	150,000
F	Gross Profit (June - November)				(18,750)
	SGM				(15.63)
	Gross Profit (March - April)				11,250
	SGM				7.50

*Average of minimum and maximum cost estimates

(vi)Ihombwe

	Charcoal preparation costs- Ihombwe village)	Unit	Qnty	Unit cost	Amount*
A	Labour Costs for 30 bag Kiln (90kg bag)				
	1. Cuting down trees	tree	10	3,000	30,000
	2. Chopping logs int small pieces	tree	10	5,000	50,000
	3. Collecting logs (to the kiln)	tree	10	3,000	30,000
	4. Making the kiln (Arranging Logs)	manday	24	2,083	50,000
	5. Covering the kiln/burning	manday	9	5,556	50,000
	6. Supervision for the kiln	manday	10	2,000	20,000
	7. Offloading the kiln	manday	12	833	10,000
	Total A				240,000

	% of total Cost				94.12
B	Other costs				
	1. Loading in the bags	30	bag	500	15,000
	3. Village royalty paid to VNRC	30	bag	0	0
	Total B				**15,000**
	% of total Cost				6
	Total Cost (A+B)				**255,000**
E	Income from charcoal selling				
	1. Low price (June - November)	30.00	bag	8,000	240,000
	2. High price (March-April)	30.00	bag	15,000	450,000
F	**Gross Profit (June - November)**				**(15,000)**
	SGM				**(6.25)**
	Gross Profit (March - April)				**195,000**
	SGM				**43.33**

*Average of minimum and maximum cost estimates

(vii) Kisanga

	Charcoal preparation costs- Kisanga village)	Unit	Qty	Unit cost	Amount*
A	**Labour Costs for 15 bag Kiln (90kg bag)**				
	1. Cuting down trees	tree	5	2,500	12,500
	2. Chopping logs int small pieces	tree	5	3,000	15,000
	3. Collecting logs (to the kiln)	tree	5	3,000	15,000
	4. Making the kiln (Arranging Logs)	manday	15	1,333	20,000
	5. Covering the kiln/burning	manday	3	5,000	15,000
	6. Supervision for the kiln	manday	5	2,800	14,000
	7. Offloloading	manday	3	6,667	20,000
	Total A				**111,500**
	% of total Cost				68
B	**Other costs**				
	1. Transport to the village	15	bag	2,500	37,500
	2. Village leavy/royalty	15	bag	1,000	15,000
	Total B				**52,500**
	% of total Cost				32
	Total Cost (A+B)				**164,000**
E	Income from charcoal selling				
	1. Low price (June - November)	15.00	bags	8,000	120,000
	2. High price (March-April)	15.00	bags	15,000	225,000
F	**Gross Profit (June - November)**				**(44,000)**
	SGM				**(36.7)**
	Gross Profit (March - April)				**61,000**
	SGM				**27.1**

*Average of minimum and maximum cost estimates
(viii)Msimba

	Charcoal preparation costs- Msimba village)	Unit	Qnty	Unit cost	Amount*
A	**Labour Costs sfor 15bag Kiln (77kg bag)**				
	1. Cuting down trees	tree	5	3,000	15,000
	2. Chopping logs int small pieces	tree	5	6,000	30,000
	3. Collecting logs (to the kiln)	tree	5	2,000	10,000
	4. Making the kiln (Arranging Logs)	manday	15	1,167	17,500
	5. Covering the kiln/burning	manday	3	5,833	17,500
	6. Supervision for the kiln	manday	5	1,500	7,500
	7. Offloading	manday	3	5,500	16,500
	Total A (Cost for per kiln)				**114,000**
	% of total cost				**53.90**
B	**Other costs**				
	1. Transport to the village /selling points	15	Bag	1,500	22,500
	2. Village leavy/royalty	15	Bag	5,000	75,000
	Total B				**97,500**
	% of total cost				**46.10**
	Total Cost (A+B)				**211,500.00**
E	Income from charcoal selling				
	1. Low price (June - November)	15.00	bag	15,000.00	225,000.00
	2. High price (March-April)	15.00	bag	20,000.00	300,000.00
F	**Gross Profit (June - November)**				13,500.00
	SGM				**6.00**
	Gross Profit (March - April)				88,500.00
	SGM				**29.50**

*Average of minimum and maximum cost estimates

Appendix 3: Profitability of producers in different market segments

A: Morogoro Market

Profitability for Dodoma-Isanga producers in Morogoro market

A	Production costs	Qnty	Unit	Unit cost/Price****	AV	Min	Max***
1	Production cost**	10	Bag	10,000	100,000	83,000	127,000
2	Other costs						
	Packaging of charcoal into bags	10	Bag	750	7,500	5,000	10,000
	Transport to charcoal collection point	10	Bag	1,000	10,000	5,000	15,000
	Loading charcoal into the lorry	10	Bag	500	5,000	5,000	5,000
	Transport to Morogoro*	10	Bag	6,875	68,750	62,500	75,000
	VNRC royalty	10	Bag	14,400	144,000	144,000	144,000
	Transit permit*	10	Bag	75	750	750	750
	Offloading charcoal from the lorry	10	Bag	500	5,000	5,000	5,000
3	**Total cost**				**336,000**	**310,250**	**381,750**
B	Sales of charcoal	10	Bag	45000	450,000	400,000	500,000
	Gross Profit	10	Bag	11,400	114,000.00	89,750.00	118,250.00
	SGM				**25.33**	**22.44**	**23.65**

Profitability of Nyali producers in Morogoro market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	20	Bag	7000	140,000	105,000	150,000
2	Other costs						
	Packaging of charcoal into bags	20	Bag	750	15,000	10,000	20,000
	Transport to charcoal collection point	20	Bag	2500		40,000	60,000

		Qnty	Unit		AV	Min	Max
				50,000			
	Loading charcoal into the lorry	20	Bag	450	9000	6000	12000
	Transport to Morogoro	20	Bag	6875	137,500	125,000	150,000
	VNRC royalty	20	Bag	14400	288,000	288,000	288,000
	Transit permit	20	Bag	75	1,500	1,500	1,500
	Offloading charcoal from the lorry	20	Bag	500	10,000	10,000	10,000
3	**Total cost**				**651,000**	**585,500**	**691,500**
B	Sales of charcoal	20	Bag	45,000	900,000	800,000	1,000,000
	Gross Profit	20	Bag	12,450	249,000	214,500	308,500
	SGM				**27.67**	**26.81**	**30.85**

The average gross profit per bag = 12,450

Profitability of Kigunga producers in Morogoro market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost**	15	Bag	6000	90,000.00	79,000.00	116,000.00
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11250	7500	15,000
	Transport to charcoal collection point	15	Bag	1500	22500	15,000	30,000
	Loading charcoal into the lorry	15	Bag	500	7500	7500	7500
	Transport to Morogoro	15	Bag	6875	103,125	93,750	112,500
	VNRC royalty	15	Bag	14400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	500	7,500	7,500	7,500
3	**Total cost**				**451,500**	**427,375**	**498,125**
B	Sales of charcoal	15	Bag	45,000	675,000	600,000	750,000
	Gross Profit	15	Bag	14,900	223,500	172,625	251,875
	SGM				**33.11**	**28.77**	**33.58**

The average gross profit per bag = 14,900

Profitability of Ulaya Mbuyuni producers in Morogoro Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7666.7	115,000	103,000	138,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11250	7500	15,000
	Transport to charcoal collection point	15	Bag	1500	22500	15,000	30,000
	Loading charcoal into the lorry	15	Bag	500	7500	7500	7500
	Transport to Morogoro	15	Bag	6875	103,125	93,750	112,500

	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	500	7,500	7,500	7,500
3	**Total cost**				**476,500**	**451,375**	**527,625**
B	Sales of charcoal	15	Bag	45,000	675,000	600,000	750,000
	Gross Profit	15	Bag	13233	198,500	148,625	222,375
	SGM				**29.41**	**24.77**	**29.65**

The average gross profit per bag = 13,233

Profitability of Ulaya Kibaoni producers in Morogoro Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7333.3	110,000	91,000	139,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11,250	7,500	15,000
	Transport to charcoal collection point	15	Bag	1,250	18,750	15,000	22,500
	Loading charcoal into the lorry	15	Bag	500	7,500	7,500	7,500
	Transport to Morogoro	15	Bag	6,875	103,125	93,750	112,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	500	7,500	7,500	7,500
3	**Total cost**				**475,250**	**439,375**	**521,125**
B	Sales of charcoal	15	Bag	45,000	675,000	600,000	750,000
	Gross Profit	15	Bag	13,317	199,750	160,625	228,875
	SGM				**29.59**	**26.77**	**30.52**

The average gross profit per bag = 13,317

Profitability of Ihombwe producers in Morogoro Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	30	Bag	8,000	240,000	208,000	272,000
2	Other costs						
	Packaging of charcoal into bags	30	Bag	500	15,000	15,000	15,000
	Transport to charcoal collection point	30	Bag	1,250	37,500	30,000	45,000
	Loading charcoal into the lorry	30	Bag	500			

		Qnty	Unit	Unit cost/Price	AV	Min	Max
					15,000	15,000	15,000
	Transport to Morogoro	30	Bag	6,875	206,250	187,500	225,000
	VNRC royalty	30	Bag	14,400	432,000	432,000	432,000
	Transit permit	30	Bag	75	2,250	2,250	2,250
	Offloading charcoal from the lorry	30	Bag	500	15,000	15,000	15,000
3	**Total cost**				**963,000**	**904,750**	**1,021,250**
B	Sales of charcoal	30	Bag	45,000	1,350,000	1,200,000	1,500,000
	Gross Profit	30	Bag	12,900	387,000	295,250	478,750
	SGM				**28.67**	**24.60**	**31.92**

The average gross profit per bag = 12,900

Profitability of Kisanga producers in Morogoro Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7,433.3	111,500	100,000	135,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	1,000	15,000	15,000	15,000
	Transport to charcoal collection point	15	Bag	2,500	37,500	30,000	45,000
	Loading charcoal into the lorry	15	Bag	500	7,500	7,500	7,500
	Transport to Morogoro	15	Bag	6,875	103,125	93,750	112,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	500	7,500	7,500	7,500
3	**Total cost**				**491,750**	**470,875**	**539,625**
B	**Sales of charcoal**	15	Bag	45,000	675,000	600,000	750,000
	Gross Profit	15	Bag	12,217	183,250	129,125	210,375
	SGM				**27.15**	**21.52**	**28.05**

The average gross profit per bag= 12,217

Profitability of Msimba producers in Morogoro Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7600	114,000	88,000	140,000

2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11,250	7500	15,000
	Transport to charcoal collection point	15	Bag	1500	22,500	15,000	30,000
	Loading charcoal into the lorry	15	Bag	500	7500	7500	7500
	Transport to Morogoro	15	Bag	6875	103,125	93,750	112,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	500	7,500	7,500	7,500
3	**Total cost**				**483,000**	**436,375**	**529,625**
B	**Sales of charcoal**	15	Bag	45,000	675,000	600,000	750,000
	Gross Profit	15	Bag	12,800	192,000	163,625	220,375
	SGM				**28.44**	**27.27**	**29.38**

The average gross profit per bag = 12,800

B: Dar es Salaam market

(i)Profitability for Dodoma-Isanga producers in Dar es Salaam market

A	Production costs	Qnty	Unit	Unit cost/Price****	AV	Min	Max
1	Production cost**	10	Bag	10,000	100,000	83,000	127,000
2	Other costs						
	Packaging of charcoal into bags	10	Bag	750	7,500	5,000	10,000
	Transport to charcoal collection point	10	Bag	1,000	10,000	5,000	15,000
	Loading charcoal into the lorry	10	Bag	500	5,000	5,000	5,000
	Transport to Dar es Salaam*	10	Bag	11,875	118,750	112,500	125,000
	VNRC royalty	10	Bag	14,400	144,000	144,000	144,000
	Transit permit*	10	Bag	75	750	750	750
	Offloading charcoal from the lorry	10	Bag	750	7,500	5,000	10,000
3	**Total cost**				**386,000**	**360,250**	**436,750**
B	Sales of charcoal	10	Bag	50,000	500,000	400,000	600,000
	Gross Profit	10	Bag	11,400	114,000	39,750	163,250
	SGM				**22.80**	**9.94**	**27.21**

(ii)Profitability of Nyali producers in Dar es Salam market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	20	Bag	7,000	140,000	105,000	150,000
2	Other costs						
	Packaging of charcoal into bags	20	Bag	750	15,000	10,000	20,000
	Transport to charcoal collection point	20	Bag	2,500	50,000	40,000	60,000
	Loading charcoal into the lorry	20	Bag	450	9,000	6,000	12,000
	Transport to Dar es Salaam	20	Bag	11,875	237,500	225,000	250,000
	VNRC royalty	20	Bag	14,400	288,000	288,000	288,000
	Transit permit	20	Bag	75	1,500	1,500	1,500
	Offloading charcoal from the lorry	20	Bag	750	15,000	10,000	20,000
3	**Total cost**				**756,000**	**685,500**	**801,500**

		Qnty	Unit		AV	Min	Max
B	Sales of charcoal	20	Bag	50,000	1,000,000	800,000	1,200,000
	Gross Profit	20	Bag	12,200	244,000	114,500	398,500
	SGM				**24.40**	**14.31**	**33.21**

Average gross profit per bag = 12,200

(iii)Profitability of Kigunga producers in Dar es Salaam market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost**	15	Bag	6,000	90,000	79,000	116,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11,250	7,500	15,000
	Transport to charcoal collection point	15	Bag	1,500	22,500	15,000	30,000
	Loading charcoal into the lorry	15	Bag	500	7,500	7,500	7,500
	Transport to Dar es Salaam	15	Bag	11,875	178,125	168,750	187,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	750	11,250	7,500	15,000
3	**Total cost**				**526,500**	**502,375**	**573,125**
B	Sales of charcoal	15	Bag	50,000	750,000	600,000	900,000
	Gross Profit	15	Bag	14,900	223,500	97,625	326,875
	SGM				**29.80**	**16.27**	**36.32**

The average gross profit per bag = 14,900

(iv)Profitability of Ulaya Mbuyuni producers in Dar es Salaam Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7666.7	115,000	103,000	138,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11,250	7,500	15,000
	Transport to charcoal collection point	15	Bag	1,500	22,500	15,000	30,000
	Loading charcoal into the lorry	15	Bag	500	7,500	7,500	7,500
	Transport to Dar es Salaam	15	Bag	11,875	178,125	168,750	187,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	750	11,250	7,500	15,000
3	**Total cost**				**551,500**	**526,375**	**610,125**

		Qnty	Unit	Unit cost/Price	AV	Min	Max
B	Sales of charcoal	15	Bag	50,000	750,000	600,000	900,000
	Gross Profit	15	Bag	13,233	198,500	73,625	289,875
	SGM				**26.47**	**12.27**	**32.21**

The average gross profit per bag = 13,233

(v)Profitability of Ulaya Kibaoni producers in Dar es Salaam Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7333.3	110,000	91,000	139,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11,250	7,500	15,000
	Transport to charcoal collection point	15	Bag	1,250	18,750	15,000	22,500
	Loading charcoal into the lorry	15	Bag	500	7,500	7,500	7,500
	Transport to Dar es Salaam	15	Bag	11,875	178,125	168,750	187,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	750	11,250	7,500	15,000
3	**Total cost**				**554,000**	**514,375**	**603,625**
B	Sales of charcoal	15	Bags	50,000	750,000	600,000	900,000
	Gross Profit	15	Bags	13,067	196,000	85,625	296,375
	SGM				**26.13**	**14.27**	**32.93**

The average gross profit per bag = 13,067

(vi)Profitability for Ihombwe producers in Dar es Salaam Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	30	Bag	8,000	240,000	208,000	272,000
2	Other costs						
	Packaging of charcoal into bags	30	Bag	500	15,000	15,000	15,000
	Transport to charcoal collection point	30	Bag	1,250	37,500	30,000	45,000
	Loading charcoal into the lorry	30	Bag	500	15,000	15,000	15,000
	Transport to Dar es Salaam	30	Bag	11,875	356,250	337,500	375,000
	VNRC royalty	30	Bag	14,400	432,000	432,000	432,000
	Transit permit	30	Bag	75	2,250	2,250	2,250
	Offloading charcoal from the lorry	30	Bag	750	22,500	15,000	30,000
3	**Total cost**				**1,120,500**	**1,054,750**	**1,186,250**

		Qnty	Unit		AV	Min	Max
B	Sales of charcoal	30	Bag	50,000	1,500,000	1,200,000	1,800,000
	Gross Profit	30	Bag	12,650	379,500	145,250	613,750
	SGM				**25.30**	**12.10**	**34.10**

The average gross profit per bag = 12,650

(vii)Profitability of Kisanga producers in Dar es Salaam Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7,433.3	111,500	100,000	135,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	1,000	15,000	15,000	15,000
	Transport to charcoal collection point	15	Bag	2,500	37,500	30,000	45,000
	Loading charcoal into the lorry	15	Bag	500	7,500	7,500	7,500
	Transport to Dar es Salaam	15	Bag	11,875	178,125	168,750	187,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	750	11,250	7,500	15,000
3	**Total cost**				**566,750**	**545,875**	**622,125**
B	**Sales of charcoal**	15	Bag	50,000	750,000	600,000	900,000
	Gross Proft	15	Bag	12,217	183,250	54,125	277,875
	SGM				**24.43**	**9.02**	**30.88**

The average gross profit per bag = 12,217

(viii)Profitability of Msimba producers in Dar es Salaam Market

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7,600	114,000	88,000	140,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11,250	7,500	15,000
	Transport to charcoal collection point	15	Bag	1,500	22,500	15,000	30,000
	Loading charcoal into the lorry	15	Bag	500	7,500	7,500	7,500
	Transport to Dar es Salaam	15	Bag	11,875	178,125	168,750	187,500
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	Transit permit	15	Bag	75	1,125	1,125	1,125
	Offloading charcoal from the lorry	15	Bag	750	11,250	7,500	15,000

3	Total cost				561,750	511,375	612,125
B	Sales of charcoal	15	Bag	50,000	750,000	600,000	900,000
	Gross Profit	15	Bag	12,550	188,250	88,625	287,875
	SGM				25.10	14.77	31.99

The average gross profit per bag = 12,550

C: Village level segment

(i) Profitability for Dodoma-Isanga producers at village level under TFCG model

A		Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
	1	Production cost	10	Bag	10,000	100,000	83,000	127,000
	2	Other costs						
		Packaging of charcoal into bags	10	Bag	750	7,500	5,000	10,000
		Transport to charcoal collection point	10	Bag	1,000	10,000	5,000	15,000
		VNRC royalty	10	Bag	14,400	144,000	144,000	144,000
	3	**Total cost**				**261,500**	**237,000**	**296,000**
B		Sales of charcoal*	10	Bag	**30,000**	300,000	270,000	330,000
		Gross Profit	10	Bag	3,850	38,500	33,000	34,000
		SGM				**12.83**	**12.22**	**10.30**

(ii)Profitability for Nyali   producers at village level under TFCG model

A		Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
	1	Production cost	20	Bag	7000	140,000	105,000	150,000
	2	Other costs						
		Packaging of charcoal into bags	20	Bag	750	15,000	10,000	20,000
		Transport to charcoal collection point	20	Bag	2500	50,000	40,000	60,000
		VNRC royalty	20	Bag	14400	288,000	288,000	288,000
	3	**Total cost**				**493,000**	**443,000**	**518,000**
B		Sales of charcoal	20	Bag	**30,000**	600,000	540,000	660,000
		Gross Profit	20	Bag	5350	107,000	97,000	142,000
		SGM				**17.83**	**17.96**	**21.52**

Average gross profit per bag = 3850

(iii)Profitability for Kigunga producers at village level under TFCG model

A		Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
	1	Production cost**	15	Bag	6000	90,000	79,000	116,000
	2	Other costs						
		Packaging of charcoal into bags	15	Bag	750	11250	7500	15,000
		Transport to charcoal collection point	15	Bag	1500	22500	15,000	30,000
		VNRC royalty	15	Bag	14400	216,000	216,000	216,000
	3	**Total cost**				**339,750**	**317,500**	**377,000**
B		Sales of charcoal	15	Bag	30,000	450,000	405,000	495,000
		Gross Profit	15	Bag	7350	110,250	87,500	118,000
		SGM				**24.50**	**21.60**	**23.84**

Average gross profit per bag = 7350

(iv)Profitability for Ulaya Mbuyuni producers at village level under TFCG model

A		Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
	1	Production cost	15	Bag	7666.7	115,000	103,000	138,000
	2	Other costs						
		Packaging of charcoal into bags	15	Bag	750	11250	7500	15,000
		Transport to charcoal collection point	15	Bag	1500	22500	15,000	30,000
		VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	3	**Total cost**				**364,750**	**341,500**	**399,000**
B		Sales of charcoal	15	Bag	30,000	450,000	405,000	495,000
		Gross Profit	15	Bag	5683.33	85,250	63,500	96,000
		SGM				**18.94**	**15.68**	**19.39**

Average gross profit = 5683.33

(v)Profitability for Ulaya Kibaoni   producers at village level under TFCG model

A		Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
	1	Production cost	15	Bag	7333.3	110,000	91,000	139,000
	2	Other costs						
		Packaging of charcoal into bags	15	Bag	750	11,250	7,500	15,000
		Transport to charcoal collection point	15	Bag	1,250	18,750	15,000	22,500
		VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	3	**Total cost**				**356,000**	**329,500**	**392,500**
B		Sales of charcoal	15	Bags	30,000	450,000	405,000	495,000
		Gross Profit	15	Bag	6266.67	94,000	75,500	102,500
		SGM				**20.89**	**18.64**	**20.71**

Average gross profit per bag = 6266.67

(vi) Profitability for Ihombwe producers at village level under TFCG model

A		Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
	1	Production cost	30	Bag	8,000	240,000	208,000	272,000
	2	Other costs						
		Packaging of charcoal into bags	30	Bag	500	15,000	15,000	15,000
		Transport to charcoal collection point	30	Bag	1,250	37,500	30,000	45,000
		VNRC royalty	30	Bag	14,400	432,000	432,000	432,000
	3	**Total cost**				**724,500**	**685,000**	**764,000**
B		Sales of charcoal	30	Bag	30,000	900,000	810,000	990,000
		Gross Profit	30	Bag	5850	175,500	125,000	226,000
		SGM				**19.50**	**15.43**	**22.83**

Average gross profit per bag = 5850

(vii) Profitability for Kisanga producers at village level under TFCG model

A		Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
	1	Production cost	15	Bag	7,433.3	111,500	100,000	135,000
	2	Other costs						
		Packaging of charcoal into bags	15	Bag	1,000	15,000	15,000	15,000
		Transport to charcoal collection point	15	Bag	2,500	37,500	30,000	45,000
		VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
	3	**Total cost**				**380,000**	**361,000**	**411,000**
B		**Sales of charcoal**	15	Bag	30,000	450,000	405,000	495,000
		Gross Profit	15	Bag	4666.67	70,000	44,000	84,000
		SGM				**15.56**	**10.86**	**16.97**

Average gross profit per bag = 4666.67

(viii) Profitability for Msimba producers at village level under TFCG model

A	Production costs	Qnty	Unit	Unit cost/Price	AV	Min	Max
1	Production cost	15	Bag	7600	114,000	88,000	140,000
2	Other costs						
	Packaging of charcoal into bags	15	Bag	750	11,250	7500	15,000
	Transport to charcoal collection point	15	Bag	1500	22,500	15,000	30,000
	VNRC royalty	15	Bag	14,400	216,000	216,000	216,000
3	**Total cost**				**363,750**	**326,500**	**401,000**
B	**Sales of charcoal**	15	Bag	30,000	450,000	405,000	495,000
	Gross Profit	15	Bag	5750	86,250	78,500	94,000
	SGM				**19.17**	**19.38**	**18.99**

Average gross profit per bag = 5750

Appendix 4: Profitability analysis for traders

A: Mikumi
  (i) Wholesaler

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	**Costs of Sale(Direct costs)**					
1	Purchasing charcioal from produer or supplier	1	bag	10,000.00	10,000.00	12,000.00
2	Sorting and grading/re-packaging	1	bag	0.00	0.00	0.00
3	Broker between produer and whole sale trader	1	bag	0.00	0.00	0.00
4	Marketing telephone*	1	month	1,000.00	1,000.00	1,000.00
6	Transport costs from producer/supplier to market	1	bag	**500.00**	**750.00**	**1,000.00**
7	Storage costs*	1	month	80,000.00	80,000.00	80,000.00
	Total cost for A			10,500.00	10,750.00	13,000.00
B	**Sale price of charcoal**	1	**bag**	**14,000.00**	**15,000.00**	**18,000.00**
C	**Gross Profit**			3,500.00	4,250.00	5,000.00
D	**Simplified gross margin**			**25.00**	**28.33**	**27.78**
E	**Comparison of income for producer and wholesaler : Selemani Yalibo: Mikumi town**					

Notes
* Not included in the SGM calculations because it is not a direct cost of sale

The transport cost is based of the cost of transporting a bag of charcoal on a bicycle.

  (ii) Retailer

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	**Costs of Sale**					
1	Purchasing charcioal from whole seller	1	bag	18,000.00	18,000.00	20,000.00
2	Sorting and grading/re-packaging	1	bag	0.00	0.00	0.00
3	Marketing cess	1	bag	0.00	0.00	0.00
4	Telephone calls*	1	month	0.00	0.00	0.00
6	Transport costs from producer/supplier to market	1	bag	**500.00**	**750.00**	**1,000.00**
7	Storage costs*	1	month	0.00	0.00	0.00

				Minimum	Average	Maximum
	Total cost for A			18,500.00	18,750.00	21,000.00
B	**Sale price of charcoal**	1tin@3000x12		**36,000.00**	**36,000.00**	**36,000.00**
C	**Gross Profit**			17,500.00	17,250.00	15,000.00
D	**Simplified gross margin**			**48.61**	**47.92**	**41.67**
E	**Comparison of income for Retailler:Name withheld: Mikumi town**					

Notes

The tin size between 5-8Kgs

* Not included in SGM calculation because it is not the direct cost of sale

Transport cost is based on bicycle cots per bag

B: Ruaha
(i) Wholesaler

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	**Costs of Sale**					
1	Purchasing charcioal from producer or supplier	1	bag	12,000.00	16,000.00	18,000.00
2	Sorting and grading/re-packaging	1	bag	500.00	500.00	500.00
3	Broker between produer and whole sale trader	1	bag	0.00	0.00	0.00
4	Marketing telephone *	1	month	3,000.00	3,000.00	3,000.00
5	Loading and offloading at selling points	1	bag	1,000.00	1,000.00	1,000.00
6	Transport costs from producer/supplier to market	1	bag	**1,000.00**	**1,500.00**	**2,000.00**
7	Storage costs*	1	month	150,000.00	150,000.00	150,000.00
	Total cost for A			14,500.00	19,000.00	21,500.00
B	**Sale price of charcoal**	1	**bag**	**25,000.00**	**25,000.00**	**25,000.00**
C	**Gross Profit**			10,500.00	6,000.00	3,500.00
D	**Simplified gross margin**			**42.00**	**24.00**	**14.00**
E	**Comparison of income forproducer and whole sellers: Mhugumu Shalan, Ruaha town**					

* Not included in the SGM calculations because it is not a direct cost of sale

The transport cost is based on the cost of motor cycle per bag depending on the distance

(ii) Retailer

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	**Costs of Sales**					
1	Purchasing charcioal from whole seller	1	bag	18,000.00	19,000.00	20,000.00
2	Sorting and grading/re-packaging	1	bag	0.00	0.00	0.00
3	Market cess	1	bag	1,200.00	1,200.00	1,200.00
4	Marketing cost: telephone*	1	month	0.00	0.00	0.00
6	Transport costs from producer/supplier to market	1	bag	**500.00**	**750.00**	**1,000.00**
7	Storage costs*	1	bag	0.00	0.00	0.00
	Total cost for A			19,700.00	20,950.00	22,200.00
B	**Sale price of charcoal**	1tin, each 2500 x12		**30,000.00**	**30,000.00**	**30,000.00**
C	**Gross Profit**			10,300.00	9,050.00	7,800.00
D	**Simplified gross margin**			**34.33**	**30.17**	**26.00**
E	**Comparison of income for Retailler: Name withheld : Ruaha town town seller 1**					

The tin size is between 5-8 Kgs

The transport cost is calculated per bicycle or motor cycle
fare

*Not included in the SGM calculations because it is not the direct cost of sale

C: Morogoro

(i)   Wholesaler

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	**Costs of Sale**					
1	Purchasing charcioal from producer or supplier	1	bag	10,000.00	10,000.00	15,000.00
2	Sorting and grading/re-packaging	1	bag	1000	1250	1500
3	Broker between produer and whole sale trader	1	bag	0.00	0.00	0.00
4	Maketing telephone*	1	month	5,000.00	4,500.00	5,000.00
5	Loading and unloading charcoal bags	1	bag	1,000.00	1,000.00	1,000.00
6	Transport costs from producer/supplier to market	1	bag	6,000.00	6,000.00	6,000.00
7	Storage costs*	1	month	60,000.00	60,000.00	60,000.00
	Total cost for A			17,000.00	17,250.00	22,500.00

B	Sale price of charcoal	1	bag	40,000.00	45,000.00	55,000.00
C	Gross Profit			23,000.00	27,750.00	32,500.00
D	Simplified gross margin			57.50	61.67	59.09
E	Comparison of income for wholesaler:Morogoro Town Name: Razack Msangi					

Notes

This trader sources charcoal from villages in Kilosa.
The transport is based on the cost per
big lorry with the capacity of 100bags.
The average cost per trip is 600,000
*Not included in the SGM calculation because it is not the direct cost of sale

There is no broker here because the
wholesaler himself/herself goes to the
villages to harvest and transport
charcoal,

(ii)   Retailer

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	Costs of Sale					
1	Purchasing charcioal from whole seller	1	bag	35,000.00	35,000.00	50,000.00
2	Sorting and grading/re-packaging	1	bag	1,200.00	1,200.00	1,200.00
3	Marketing cess	1	bag	0.00	0.00	0.00
4	Marketing telephone *	1	month	2,000.00	1,500.00	2,000.00
6	Transport costs from producer/supplier to market	1	bag	**5,000.00**	**4,000.00**	**5,000.00**
7	Storage costs*	1	bag	0.00	0.00	0.00
	Total cost for A			41,200.00	40,200.00	56,200.00
B	Sale price of charcoal	1tinx (2500)x28		**70,000.00**	**70,000.00**	**70,000.00**
C	Gross Profit			28,800.00	29,800.00	13,800.00
D	Simplified gross margin			41.14	42.57	19.71
E	Comparison of income for Retailler: Name : Deniza Ezekieli: Morogoro town town seller 3					

Notes
Transport costs is based on motorcycle fare per trip, depending on the distance
The size of the tin is between 5-8kgs

*Not included in the SGM calculation because it is not a direct cost of sale

D: Dar es Salaam
(i) Wholesaler

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	Costs of Sale(Direct costs)					
1	Purchasing charcioal from producer or supplier	1	bag	20,000.00	27,500.00	35,000.00
2	Sorting and grading/re-packaging	1	bag	1000	1250	1500
3	Broker between produer and whole sale trader	1	bag	0.00	0.00	0.00
4	Marketing telephone*	1	month	5,000.00	7,500.00	10,000.00
5	Loading and offloading at selling points	1	bag	500.00	500.00	500.00
6	Transport costs from producer/supplier to market	1	bag	3,000.00	3,250.00	3,500.00
7	Storage costs*	1	month	500,000.00	500,000.00	500,000.00
	Total cost for A			24,500.00	32,500.00	40,500.00
B	Sale price of charcoal	1	bag	45,000.00	50,000.00	55,000.00
C	Gross Profit			20,500.00	17,500.00	14,500.00
D	Simplified gross margin(SGM)			45.56	35.00	26.36
E	Comparison of income for whole seller: Dar city Name: Makonde Mbezi					

Notes

The transport costs were calculated based on the cost for big lorry
with the capacity of carring 120-130 bags per trip from areas adjcent to Dar es Salaam such as Mkuranga, Kisarawe, Ruvu, Vigwaza and Bagamoyo

The average transport cost from such areas to Dar es Salaam is TZS 400,000 per trip.

*Not included in the SGM calcuations because it is not the direct cost of sale

On average this trader sells up 600 bags per month

(ii) Retailer

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	**Costs of Sale(Direct costs)**					
1	Purchasing charcioal from whole seller	1	bag	45,000.00	50,000.00	60,000.00
2	Sorting and grading/re-packaging	1	bag	0.00	0.00	0.00
3	Marketing cess*	1	bag	0.00	0.00	0.00
4	Marketing telephone *	1	Month	20,000.00	25,000.00	25,000.00
6	Transport costs from producer/supplier to market	1	bag	**1,000.00**	**1,500.00**	**2,500.00**
7	Storage costs*	1	bag	0.00	0.00	0.00
	Total cost for A			46,000.00	51,500.00	62,500.00
B	**Sale price of charcoal**	1tinx(2000,2500)x40		**80,000.00**	**90,000.00**	**100,000.00**
C	**Gross Profit**			34,000.00	38,500.00	37,500.00
D	**Simplified gross margin(SGM)**			**42.50**	**42.78**	**37.50**
E	Comparison of income for Retailler: Name : Kibanda cha mkaa:Dar City seller					

Notes

The transport cost is based on motorcycle fare price per trip(from the wholesaler to the retailing point)

SGM calculations are based on direct costs of sale such as purchase of charcoal, sorting &grading and transport
 Other costs such as communication and storage are shown here but not included in the SGM analysis

* Not included in the SGM calculations because it is not a direct cost of sale

The size of the tin ranges between 5-8 Kgs

Appendix 5: Checklist for focus group discussion with producers in project villages

1. How is the concept of sustainable charcoal understood in the area, view on its advantages and disadvantages

2. How big is the business in the area, how many people depend on it, what are the sources of tree for charcoal making, people's views on wood supply sustainability

3. How, where are charcoal sold? What do charcoal buyers look for most (e.g., quantity, quality, etc.)? Any difference in sustainably produced charcoal versus other forms of charcoal served by different market segment?

4. Briefly describe how you prepare the wood for charcoal production? What are the costs involved in all the activities? What is the unit measure/what is produced per month? To include all labour, transport and packages costs

5. The charcoal sector, from charcoal production to charcoal transport to charcoal selling is very "informal" (not organised). What do you think should be done or could be done to organise the entire charcoal sector?

6. How important is charcoal income to you & your family? How can be compared to other IGAs in the village? To what percent does charcoal business contribute to household income?

7. Based on your village conditions, which market(s) do you do think can give producers/traders a high price and profit? Do you have access to that/those market(s)? If not, why?

8. What are the business/market related challenges/problems faced by producers and traders in the village? How do you solve them? How can TFCG and government help?

9. How organised are producers/traders in the village? Is it possible for them to establish an association? If not why

Appendix 6: checklist for focus group discussions with VNRCs

1.What does the term sustainable charcoal mean to you?

2. What is the difference between charcoal produced under traditional methods and that produced using improved technology?

3. Can you please elaborate the whole procedure for charcoal harvesting in the village

4. What are the duties of VNRC?

5. Do you already have the licensing documents for charcoal harvesting? If not, why?

6. What is the producers' reaction towards the Tsh.14,400 royalt per 90kg-bag(or Tsh. 160 per kilo)

7. Where do most traders who come to harvest charcoal in this village come from?

8. So far, how much revenues have you collected from charcoal harvesting royalties?

9. How do you distribute the collected revenues?

10. Which problems do producers face? What have you done to help them?

Appendix 7: Interview checklist for wholesalers

A: Basic Information

Name of respondent .... Sex: 1= Male, 2= Female Age: 1= 18-25, 2= 26-33, 3= 34-41, 4= 42-49, 5= 50-57

A1: How long have you been in this business?.......................

A2: Which problems do you face in this charcoal business...
....
....
..

A3: (a)Where do you mostly source your charcoal?...
....

   (b) On average, how many bags of charcoal do you sell per month?......................

A4: If given more capital, would you still do this business? Yes/NO.....
Why?..

A5. If you were to advise someone to choose a business to invest in, would you advise him/her to do the charcoal business? Yes/No.......,
Why?...

A6 Are there markets that you think are more profitable but you fail to reach them? Mention them and Give reasons why you can't reach them.

B: Profitability analysis

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)
A	**Processing Cost**	1 bag = 90kg				
1	Purchase charcoal from producer					
2	Sorting and grading/packaging	1	bag			
4	Broker between producer and trader	1	bag			
5	Marketing - telephone calls	1	month			

6	Storage costs	1	month			
7	Brokers	1	bag			
8	Loading and off loading	1	bag			
9	Transport from farmers to saler to mkt	1	bag			
	Total Cost					
B	**Sale price of charcoal**	1	**bag**			
C	**Gross Profit**					
D	**Simplified gross margin**					

Appendix 8: Interview checklist for retailers

A: Basic Information

Name of respondent .... Sex: 1= Male, 2= Female Age: 1= 18-25, 2= 26-33, 3= 34-41, 4= 42-49, 5= 50-57

A1: How long have you been in this business?.......................

A2: Which problems do you face in this charcoal business..
....
....
..

A3: (a)Where do you mostly source your charcoal?..
....

   (b) On average, how many bags of charcoal do you sell per month?.....................

A4: If given more capital, would you still do this business? Yes/NO.....
Why?..

A5. If you were to advise someone to choose a businesss to invest in, would you advise him/her to do the charcoal business? Yes/No.......,
Why?..

A6 Are there markets that you think are more profitable but you fail to reach them? Mention them and Give reasons why you can't reach them..
....
....

B: Profitability analysis

No	Description	Qnty	Unit	Minimum (TShs)	Average (TShs)	Maximum (TShs)	
A	Processing Cost	1bag = 90Kg					
1	Purchase charcoal from whole sellers	1	bag				
2	Sorting and grading	1	bag				
4	Packaging	1	bag				
5	Marketing - telephone calls	1	month				
6	Market cess	1	month				
	Total Cost						
B	**Sale price of charcoal**	1	**tin**				
C	**Gross Profit**						
D	**Simplified gross margin**						
	Respondent name:						

Appendix 9 : list of individuals consulted

SN	Name of the respondent/Village	Sex	Activity/position
1	**Dodoma IsangaVillage (FGDs with Charcoal producers) 26.6.2014**		
	Simon Rusahila		Charcoal maker
	SAidi Hamis		Charcoal maker
	Hadija Selemani		Charcoal maker
	Fransisca Sellesius		Charcoal maker
	Zaina Omary		Charcoal maker
	Ally Mkonda		Charcoal maker
	Maulid Ismail		Charcoal maker
	Yona Mtwana		Charcoal maker
	Manilufu Mhagama		Charcoal maker
	Clemence Mazengo		Charcoal maker
	Lucas Msamamba		Charcoal maker
	Herman Eduward		Charcoal maker
	Hamza Kibwana		Charcoal maker
	Daudi Benjamin		Charcoal maker
	Hamis Abiria		Charcoal maker
	Juliana Bruno		Charcoal maker
	Adiriani Kanisa		Charcoal maker
	Mathias Chitemo		Charcoal maker
	Elizabeth Kidundo		Charcoal maker
	Stivini Sadala		Charcoal maker
	Dodoma IsangaVillage (FGDs VNRC& Village leaders) 26.6.2014		
	Aidirian Kanisa	Male	VNRC chairman
	Onesmo F Magota	Male	VEO
	Mathias Chitemo	Male	VNRC member
	Hamis Abiria	Male	VNRC secretary
	Elizabeth Kidundo	Female	VNRC member
	Juliana Bruno	Female	VNRC member
2	**Nyali Village (FGDs) 26.6.2014**		
	Ally Lusanilo	Male	Village chairman
	Anthony Method	Male	Charcoal maker

	Maulid Chiduo	Male	Charcoal maker
	Agripina D. Degewala	Female	VNRC member
	Aziza A. Fumbi	Female	Charcoal maker
	Yorum A. Maliwa	Male	Charcoal maker
	Tausi Hassan	Female	Charcoal maker
	Mohamed Amri	Male	Charcoal maker
	Edward Kilanza	Male	Charcoal maker
	Jackoson Kayuya	Male	Charcoal maker
	Boni Msalaila	Male	Charcoal maker
	Chrispi Msalila	Male	VNRC member
	Yonn Mkwavi	Male	Charcoal maker
	Saidi Waziri	Male	Charcoal maker
	Stanley Y. Yona	Male	Charcoal maker
	Bernadi Damasi	Male	Charcoal maker
	Mohamed Kiduo	Male	Charcoal maker
	Salehe Mohamed	Male	Charcoal maker
	Ramadhani Saidi	Male	Charcoal maker
	Charles Chillamba	Male	Charcoal maker
	Robatim Gogob	Male	Charcoal maker
	Lameck K. Mgogomba	Male	Charcoal maker
3	**Ulaya Mbuyuni Village (FGDs) 27.7.2014**		
	Hamis Mjomba	Male	Village chairman
	Shani Mnanzali	Male	VEO
	Mohamedi Titima	Male	VNRC member
	Abdalahmani Mgawe	Male	VNRC member
	Amos Maloda	Male	Charcoal maker
	Nicola Yange	Male	Charcoal maker
	Andrea Mhehe	Male	Charcoal maker
	Rashidi Kazeula	Male	Charcoal maker
	Fredrick Pujila	Male	Charcoal maker
	Makaranga Deusi	Male	Charcoal maker
	Angel Shirabu	Female	Charcoal maker
4	**Kigunga village (FGD VNRC & Village leaders) 27.6.2014**		
	Salma O. Mwinshehe	Female	Village chairman
	Ismail H. Kindale	Male	VEO
	Habiba Omary	Female	VNRC member
	Mwanaisha Saidi	Female	VNRC member
	Tamsaha Hassani	Male	VNRC member
	Said S. Kisile	Male	VNRC member
	Juma Kisile	Male	VNRC member
	Peter Bahari	Male	VNRC member
	Kigunga village (FGD		

	Charcoal maker) 27.6.2014		
	Aurelia A. Mtimu	Female	Charcoal maker
	Ally Kingunya	Female	Charcoal maker
	Fatuma Hussein	Female	Charcoal maker
	Sikitu Ismail	Female	Charcoal maker
	Lucy Jackson	Female	Charcoal maker
	Semeni Msea	Female	Charcoal maker
	Riden Nkama	Female	Charcoal maker
	Andrea Samwel	Female	Charcoal maker
	Joshua Samson	Female	Charcoal maker
	Joseph Mgunidu	Female	Charcoal maker
	Daniel Mjelwa	Female	Charcoal maker
5	**Ulaya Kibaoni Village (FGDs) 27.7.2014**		
	Joseph Y. Mde		Village chairperson
	Juvens M. Mkanembo		VEO
	Tito Simon		Charcoal maker
	Amos Mapesa		Charcoal maker
	Dickson Tayari		Charcoal maker
	Musafili Mathayo		Charcoal maker
	Asha Malangisa		Charcoal maker
	John Ally		Charcoal maker
	Hamis Abdala		Charcoal maker
	Paul Lubenza		Charcoal maker
6	**Kisanga Village (FGD Charcoal maker) 28.6.2014**		
	Mazinge Juma	Male	Charcoal maker
	Ramadhani Miraba	Male	Charcoal maker
	Alfonce Selemani	Male	Charcoal maker
	Salumu Mazbula	Male	Charcoal maker
	Hamis Mnyalila	Male	Charcoal maker
	Lidia Swarehe Masangu	Female	Charcoal maker
	Edward Mohamed Maguza	Male	Charcoal maker
	Melchior Mohhamed Maguza	Male	Charcoal maker
	Kisanga Village (FGD VNRC &village leaders) 28.6.2014		
	Juma Mbwalu	Male	Village chairman
	Mariam Kwangu	Female	VNRC Chairman
	Hamis Nyamadyako	Male	Member
	Mariseli Kasonda	Female	VNRC treasurer
	Salehe Maguza	Male	member
	Hamadi Nelemu	Male	VEO
	John Mwagango	Male	WEO
7	**IhombweVillage (FGD**		

	VNRC &village leaders) **28.6.2014**		
	Athumani Madumula	Male	VNRC
	Julius Chamlungu	Male	Ag. VEO
	Enyasi Simon	Male	VNRC
	Venance Makanda	Male	VNRC
	IhombweVillage (FGD **charcoal maker) 28.6.2014**		
	Josephat R. Manyengo	Male	Charcoal maker
	Ally Abdala Tisini	Male	Charcoal maker
	Desdery Gabriel	Male	Charcoal maker
	Abdala Mrisho	Male	Charcoal maker
	Mkwele Pumunda	Male	Charcoal maker
	Ridick Omary	Male	Charcoal maker
	Amos James	Male	Charcoal maker
	Isdory Mkungu	Male	Charcoal maker
	Jeremia Msuliche	Male	Charcoal maker
8	**Msimba Village (FGD** **charcoal maker) 28.6.2014**		
	Petro Mnyionyoga	Male	Charcoal maker
	Manneno Selemani	Male	Charcoal maker
	Bento Mnyamoga	Male	Charcoal maker
	Abdala S. Mandongo	Male	Charcoal maker
	Halima Ramadhani	Male	Charcoal maker
	Stella Makubi	Female	Charcoal maker ToT
	Msimba Village (FGD **VNRC &village leaders)** **28.6.2014**		
	John A. Mhanga	Male	Village chairman
	William Mlelwa	Male	VEO
	All M Mwenegoha	Male	VNRC chairman
	Mohamed Mulenga	Male	VNRC depute chairman
	Yustin H. Nyamoga	Male	VNRC treasurer