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Final Report

Market Research for Sustainably-Produced Charcoal

climatechangesolutions

Presented to:	Tanzania Forest Conservation Group (TFCG)
Author:	Camco Clean Energy (Tanzania) Limited
Date:	9th June 2013
Reference no.	Market Research for Sustainably-Produced Charcoal
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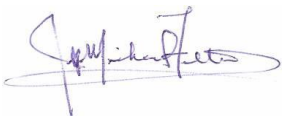
Signature	
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Final Report Submission Letter

9th June 2013

To: Mikael Poulsen, TA

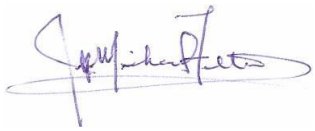
Tanzania Forest Conservation Group and the Swiss Agency for Development and Environment (SDC)
Plot 323, Msasani Village, Old Bagamoyo Road, PO Box 23410
Dar es Salaam, Tanzania

Dear Mr Poulsen,

We, the undersigned, hereby submit our Final Report, based upon our submission of the Draft Final Report on 15th April and the responses, comments and requests for changes made during TFCG's Stakeholders' Workshop in Dar es Salaam 23rd May after our presentation and following discussions on how TFCG wishes to proceed with the Kilosa SCP going forward. The incorporation of the Stakeholders' Workshop comments into the "Final Report" conforms to the Terms of Reference for the "Market Research for Sustainably Produced Charcoal in Tanzania" Study.

It gives us great pleasure to submit this Final Report. Please feel free to contact me or Mike Bess if you have any queries or requests for clarification. We hope you and your colleagues find this final report acceptable and useful in guiding developments with your SCP.

Yours sincerely,



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Acronyms and Abbreviations

Government institutions

DEO	District Environment Officer
DFO	District Forest Officer
FBD	Forestry and Beekeeping Division (of MNRT)
GoT	Government of Tanzania
IRA	Institute of Resource Assessment (University of Dar es Salaam)
LGA	Local Government Authority
MEM	Ministry of Energy and Minerals
MAFC	Ministry of Agriculture, Food Security & Cooperatives
MoF	Ministry of Finance
MLHSD	Ministry of Lands and Human Settlements Development
MNRT	Ministry of Natural Resources and Tourism
NLUPC	National Land Use Planning Commission
NRCS	Natural Resources Committee Secretary (Village-level)
PMO-RALG	Prime Minister's Office – Regional Administration and Local Government
POPC	Planning Commission in President's Office (formerly located in Ministry of Finance and Economic Affairs)
SUA	Sokoine University of Agriculture
TANAPA	Tanzania National Parks
TFS	Tanzania Forest Service
TRA	Tanzania Revenue Authority
VEO	Village Environment Officer
VPO-DoE	Vice President's Office, Division of Environment

Development partners

AfDB	African Development Bank

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AFD	Agence Française de Développement
DANIDA	Danish International development Agency
Dfid	UK Department for International Development
DPG	Development Partner Group
EUEI PDF	European Union Energy Initiative Partnership Dialogue Facility
FAO	United Nations Food and Agriculture Organisation
FINNIDA	Finish International Development Agency
GIZ	German Agency for International Cooperation
NORAD	Norwegian Agency for Development Cooperation
SDC	Swiss Agency for Development and Cooperation
Sida	Swedish International Development Cooperation Agency
EC	European Commission
USAID	United States Agency for International Development
WB	World Bank

NGOs, CBOs, autonomous agencies and private firms

ARTI	Appropriate Rural Technology Institute (http://arti-africa.org)
AWF	Africa Wildlife Fund
CAMARTEC	Centre for Agricultural Mechanisation and Rural Technology
COSTECH	Commission for Science and Technology
CPCT	Cleaner Production Centre of Tanzania
CTI	Confederation of Tanzanian Industries
EABCL	East Africa Briquette Company Ltd.
GRAS	Green Resources A/S (a Norwegian firm with extensive forestry-based operations in Tanzania, including Sao Hill where they are developing a 15MW wood waste cogeneration facility)
KSCL	Kilombero Sugar Company Ltd (and their Kilombero Community Trust-KCT)
MeS	Mkonge Energy Systems Ltd (led by Katani Sisal Ltd, biomass energy company)

MJUMITA	Mtandao wa Jamii wa Usimamizi wa Misitu Tanzania (Tanzania Community Forestry Network)
MPPL	Mufindi Pulp and Paper Ltd (is installing a 35MW cogeneration plant using wood waste)
NDC	National Development Corporation
NPL	Ng'ombeni Power Limited (Mafia Island biomass electricity IPP)
ProBEC	Programme for Basic Energy Conservation in Southern Africa
REA	Rural Energy Agency
SEI	Stockholm Environment Institute
SEDC	Sustainable Energy Development Centre
SIDO	Small Industries Development Organisation
TAREA	Tanzania Renewable Energy Association
TANESCO	Tanzania Electricity Supply Company
TANWAT	Tanganyika Wattle Company (Njombe Region)
TaTEDO	Tanzania Traditional Energy Development and Environment Organisation
TCCIA	Tanzania Chamber of Commerce, Industry and Agriculture
TCP	The Charcoal Project (http://www.charcoalproject.org)
TFC	Tanzania Federation of Cooperatives
TFCG	Tanzania Forest Conservation Group
TNRF	Tanzania Natural Resource Forum (http://www.tnrf.org)
TPC	Tanzania Planters Company (Kilimanjaro Sugar Corporation Ltd)
TPSF	Tanzania Private Sector Foundation
WWF	Worldwide Fund for Nature

Other

BEFS	Bio-energy and Food Security
BEST	Biomass Energy Strategy
CBBS	Climate, Community, Biodiversity Standard
CBF	Community-Based Forestry

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CDM	Clean Development Mechanism
EIA	Environmental Impact Assessment
JFM	Joint Forest Management
MDG	Millennium Development Goals
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania
NAFORMA	National Forestry Resources Monitoring & Assessment
PES	Payment for Environmental Services
PFM	Participatory Forest Management
SCP	Sustainable Charcoal Project (implemented by TFCG/MJUMITA), supported by SDC
VCS	Verified Carbon Standard (www.v-c-s.com)
VLFR	Village Land Forest Reserve

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Introduction

Camco Clean Energy (Tanzania) Ltd was contracted by the Tanzania Forest Conservation Group (TFCG) to undertake "Market Research for Sustainably Produced Charcoal". The starting premise of the work, as set out in the Terms of Reference (TOR) is that:

> ***"An opportunity exists in Tanzania for rural communities to develop sustainably produced charcoal. Sustainable charcoal could reduce rural poverty; could contribute to protecting valuable ecosystem services; and could contribute to a more resilient domestic energy sector."***

This market study is designed to support TFCG, with MJUMITA, to implement the "Sustainable Charcoal Project (SCP)", which is part of the SDC-supported "Transforming Tanzania Charcoal Sector" programme. This programme has two major components:

- "developing markets and supply chains for sustainable charcoal"; and,
- "improving knowledge management and governance" in the charcoal sector.

The current work is intended to support both components, but, more specifically, the first. The "goal" of the "Sustainable Charcoal Project" is to establish "commercially viable value chains for legal, sustainably sourced charcoal" targeting urban markets in Dar es Salaam, Morogoro, Kilosa and Mikumi. This is all intended to develop "a professional and targeted marketing programme...[to] launch sustainably branded charcoal into premium markets and build up strong supply chain linkages between up-scale urban consumers and low income rural suppliers at community level in the Central Corridor".

Furthermore, the project will "introduce communities to the 'market proposition of selling into branded markets for sustainably sourced charcoal, and the conditionalities that this implies.'" That is to say, the project is designed to connect charcoal producers to high-value urban consumers to "formalise" their production, bring them into a commercial market framework, and, in so doing, improve their livelihoods, transform charcoal production into a mainstream economic activity that incentivises them to manage their forestry resource sustainably, thereby improving their overall rural livelihoods.

There are a number of elements to the study intended to:

- identify the “failures” reviewing current and previous similar work aimed at producing and marketing “sustainable charcoal”;
- conduct market research of current and potential markets:
    - identify main markets and consumers
    - map supply chains building upon the 2010 World Bank Dar es Salaam charcoal study;
    - carry out an assessment of how value chains impact upon sustainability of charcoal production;
    - scrutinise governance along the supply chain.
- identify challenges to making sustainable charcoal work and undertake SWOT (strengths, weaknesses, opportunities and threats) that exist for current charcoal production and for sustainable charcoal production from Kilosa;
- profile existing projects including prices, availability and quantities of charcoal (and briquettes) supplied;
- profile who is engaged in certified sustainable charcoal looking at production, transport, marketing and selling, and identify who are the stakeholders, including communities and NGOs;
- identify potential buyers quantities they consume, prices they pay and under what conditions;
- identify the market framework for this to take place in a way that will attract commercial, professional partnership in this process;
- Examine marketing options, including certifying production, branding, packaging of sustainable charcoal.

Camco’s Team prepared an Inception Report which set out an extensive surveying methodology (Attachment 1), with detailed questionnaires (annexes to Attachment 1). The survey work commenced on 11th February in Dar es Salaam, then commenced in Kilosa District and Morogoro on 18th of February, before completing on 25th, while the bulk of the Dar es Salaam survey work was completed by the 28th of February, although several key stakeholder interviews continued until early March.

In all, over 200 questionnaires were completed during interviews with local authorities, charcoal producers, charcoal transporters, charcoal wholesalers and retailers, potential or existing “high-end” supermarkets, petrol stations and large urban stores, and urban household, commercial and institutional charcoal consumers. Over 20 key stakeholders from central government, development partners, NGOs and private firms/associations, were interviewed. This is explained in more detail in Section 1, while detailed sector analysis is set out in Sections 2 and 3.

Executive Summary and Recommendations

Marketing Sustainably-Produced Charcoal

Successful marketing of sustainably-produced charcoal is relatively straightforward. As with successfully marketing of any product, particularly one that is "new" to the marketplace or one that is perceived to be new, it requires as direct a connection between consumers (demand) and producers (supply) as possible.

Table 1: SWOT Analysis of "Traditional" Charcoal Supply & Value Chain

	Strengths	Weaknesses	
Strengths	1. Little/no raw material (wood) cost	1. Weak price negotiating position as more producers enter market	**Weaknesses**
	2. Little/no investment costs	2. Subject to "informal" governance, rules, regulations, controls	
	3. Little/no training, human resource development	3. Subject to "rent seeking"	
	4. Ease to enter/leave - no commitments/contracts	4. No group, company, organisation to back up, to provide support	
Opportunities	1. Potential to increase production short-term to increase income	1. If change without others changing, costs increase. Returns could decrease	**Threats**
	2. Potential to supplement producer livelihoods signficant in short-term as demand increases	2. Overharvesting trees diminishes economic resources	
	3. Potentially, more demand could lead to more buyers, more opportunities to sell	3. Current practices non-sustainable - livehoods threatened in long-term	
		4. Unintended consequences of decreased soil fertility, deteriorating watershed major threats to total rural livelihood with deforestation	
	Opportunities	**Threats**	

There must be a dynamic with continuous feedback from the consumer to supplier. The more intermediaries ("middlemen") there are, the less likely any product, particularly a new one, will succeed in a highly competitive, low margin market like charcoal. Furthermore, the more intermediaries, the more complicated the supply chain and the marketing cycle are.

In the marketplace, the axiom "the consumer is king" is true of any product, whether it is a basic commodity, like charcoal, or a luxury item. One hundred consumers were interviewed in the February surveys. Whether low-income households or "high-end" restaurants, the overwhelming majority proved very astute buyers citing "quantity and quality" (which equals price) as the most important factors for purchasing charcoal.

Consumers want a quality product supplied through channels they know, understand and trust, in quantities they want. The more "familiar" the marketing channels, the more confident consumers are with their suppliers, the more likely the new product will succeed in the marketplace.

Consumers do not understand, and do not accept, variable quality or variable quantity in most products. In an open market with a product that is fairly "non-differentiated", like traditional charcoal, there are so many

suppliers, so much sales competition and the market is so informal, that consumers accept shortages only when there are rains, or when government intervenes (as with banning charcoal for a short period in 2006).

While, they may be forced to accept those kinds of variations in supply, they do not like them and immediately seek to overcome them. With increased competition, consumers incur less of the costs of seasonal variations (rainy season, for example) and expect, and increasingly receive, less variation or fluctuation. It then becomes incumbent upon suppliers to reduce the variations (e.g., with suppliers stocking reserves for the rainy season to prevent disruptions and price fluctuations).

In the case of a product that is differentiated as "better" because of its source (e.g., sustainable charcoal), rather than because of its inherently better qualities (e.g., burns longer, has a better smell, etc.), reliable supplies in terms of quantity and quality are even more essential than selling the "traditional" product into the market, both to break into the market as well as to maintain or increase market share, as the two "Strengths, Weaknesses, Opportunities and Threats (SWOT)" analyses, set out in Tables 1 and 2, show.

Table 2: SWOT Analysis of "Sustainably-Produced" Charcoal Supply & Value Chain

	Strengths	Weaknesses	
Strengths	1. Donor support in early stages	1. No real guidelines on what works & what does not	Weaknesses
	2. New opportunities for trying new products and approach	2. Organisation of, & experience with, supply & value chain not in place	
	3. No or few reputational issues from previous projects or activities	3. As a "formal" sector activity, have to play by all the rules & regulations, which traditional players often circumvent	
		4. All aspects of supply chain are new, no experience at any point along the supply chain with new product, approach	
Opportunities	1. Potentially new markets to tap into	1. Consumers may not be willing to pay sufficient premium to cover costs	Threats
	2. "First mover" status that may enable project to capture opportunities	2. Small player facing major competition which is agile, mobile & able to undercut price, "counterfeit" product, etc.	
	3. Credibility as new player, with investment, to try to influence policy.	3. Difficult to "hold together" entire supply chain	
	4. Initial opportunities to mobilise producers, & potential to take control of focused, niche, supply chain.	4. Providing sufficient value & certainty at each point on the supply & value chain will be difficult.	
	Opportunities	Threats	

If expected or contracted quantity is not provided, or expected quality is compromised, consumers will quickly go elsewhere. Charcoal (at least thus far) has no "brand loyalty" – customers easily and often change suppliers. In urban charcoal, there is so much choice in the marketplace – in the case of charcoal, there is no shortage of supply or suppliers.

A "new" charcoal, one sold on being sourced "sustainably" will start with no brand loyalty either, regardless how it is packaged, certified and branded. Loyalty is built over time where expectations of quality and quantity are met, where trust on supply is developed. It is a process that occurs over time, that requires "patient capital" (i.e. investment and finance from sources who are "patient" to wait and see that confidence

and loyalty develop). Until that brand loyalty is developed, customers will shift to other suppliers if either of those two key elements (quality or quantity) are compromised.

Unlike lpg, which requires special adaptors to use the gas, or electricity, where there is only one supplier (TANESCO), no equipment modification is required at a consumer level to shift from "improved" charcoal back to "traditional" charcoal, and there is no monopoly on supply – the "sustainably-produced charcoal" may have slightly better qualities than traditional charcoal, but not enough difference to make shifting back to traditional charcoal difficult or unpleasant.

In a market with many suppliers, as with charcoal, there is an element of choice, in terms of quality and quantity, at a price. And, as our surveys have shown, and as people who have experience with the charcoal market know, prices vary, not just seasonally, but, depending upon how much charcoal one buys (e.g., bags or "gunias" compared to "debes" or tins).

Consumers know there is much the same kind of price differential as there is with buying most consumer goods – buy a large quantity (e.g., a bag or more) and the price per unit (kilogram) decreases. Buy a smaller quantity, and the price per unit (kg) increases.

Furthermore, there is differentiation in both the physical location one buys charcoal (as with most products), so that buying charcoal in an open-air market, as with buying, say, potatoes, is cheaper per comparable unit, than buying it in a "luxury" market, such as a market in a "high-end" neighbourhood or in a supermarket. Consequently, in Dar es Salaam, for example, the price per bag of charcoal can be 25% cheaper in an open air market than in a major retail "shop" on the same day and within a relatively short distance. It can be 400% higher buying it in a supermarket (where only the wealthy Tanzanians and expatriates buy charcoal, in small quantities for special occasions).

That is primarily an issue of location (or of delivery), not a quality and quantity issue. Our work shows that in Dar es Salaam, a city of five million people, there are only a few "high-end" market areas where that differential exists and only a relatively few customers pay that differential. Those consumers ("high-end" households and commercial establishments) who pay a substantial differential usually are supplementing high-priced electricity and lpg with charcoal (i.e. charcoal is not their major cooking energy source or their only cooking energy source).

The rest, well over 90% of the households in Dar es Salaam, and almost all the restaurants and hotels, use charcoal as their only source of cooking energy and buy their charcoal from suppliers where the price differential between suppliers is small.

Thus, while there are some differentials in the market place, excepting a very small quantity of charcoal (almost all imported from South Africa and the USA), rapidly growing, predominantly small-scale supplier, competition is reducing margins throughout urban areas.[1]

[1] Our survey work, while not statistically significant (because of relatively small sample sizes), serves to verify what has been observed by key stakeholders, such as Dr F Kilahama, key officials in the Tanzania Revenue Authority (TRA) and Tanzania Forest Service (TFS). As urban populations increase and as other cooking energy sources, namely electricity, lpg and kerosene, become scarcer and more expensive, charcoal is becoming an ever "bigger business". With few barriers to entry, the number of players that are entering every link in the supply chain (see Section 2 and Attachment 2), is rapidly increasing. This is driving down

Consumers pay a small premium for charcoal that is delivered. Our surveys show that considerable charcoal is delivered to consumers, both commercial and household. This trend is accelerating as increasing numbers of higher income consumers (whether households or commercial establishments) shift from lpg and electricity to charcoal.[2] They will pay that premium as long as the charcoal is delivered when demanded, in the quantity and at the level of quality they expect.

That differential is paid, but, it is small and it is decreasing as more suppliers (mainly bicycles, motorbikes, "bajajis" ("tuk-tuks") and small vehicles get into the action and delivery becomes more common. As our surveys show, consumers are not willing to pay much of a premium for delivery, demonstrating further, that, in the case of charcoal, it is a "buyer's market", not a seller's market.

Supply and Value Chain Impacts on Sustainable Charcoal

While each "node" (link) along the supply and value chain, from producer to final consumer, is relatively distinct from one another, and while the charcoal market is highly "informal", consumers have considerable choice – there are thousands of suppliers in Dar es Salaam and the numbers are increasing. There are tens of thousands of producers, and while it is increasingly rare that those who sell charcoal to the end user actually purchase it from producers, the market is so active that there is strong, good feedback from consumer to producers.

Our survey work verifies what key observers have noted: the number of large wholesale players (what the World Bank called "dealers-transporters-wholesalers") may have had a dominant role in the sector five years ago (as the World Bank wrote of extensively in both 2009 and in 2010[3]), they currently play an increasingly smaller role.

Again, this should not be surprising. As noted, as informal as the market is, as rapidly as charcoal demand is growing, ever-increasing numbers of players, particularly small players, have entered the business. Whether it be producers themselves, transporters, wholesalers and retailers all say the number of players in each segment of the supply chain has increased.

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margins and levelising price – consumers have more choice for charcoal today, more places to buy it and more ways to obtain it, than ever before.

[2] In 2001, World Bank studies estimated that around 47% of Dar es Salaam households used charcoal as their primary energy source for cooking. By the time of the World Bank surveys of 2007, that had shifted to slightly over 71%. We estimate, from our surveys and from our extensive work with BEST, Dar Charcoal and discussions with other knowledgeable people (footnote 1), that, given the significant rise in electricity prices since 2010 and the rise in lpg prices (and relative scarcities as urban populations grow faster than lpg imports), accompanied by shortages, that today, well over 90% of all Dar es Salaam households, and even more in other urban areas, and as many commercial establishments, no use charcoal as their only source for cooking, while most of the remaining consumers (far less than 10%) use it as their primary source of cooking.

[3] Referred to by the World Bank as "dealers-transporters-wholesalers". Our interviews of suppliers showed none selling to large lorries on any regular basis. Our interviews of transporters, both large and small, showed that none easily fit the World Bank's classification, even though we interviewed more large transporters than small. Wholesalers and retailers interviewed obtained their charcoal from many sources (5 of 9 large Dar es Salaam wholesalers bought from more than one supplier, while 4 out of 5 Morogoro wholesalers bought charcoal from more than one supplier – 3 out of seven retailers in Dar es Salaam bought from the same supplier while none of the 6 retailers in Morogoro and 1 in six in Kilosa bought from the same supplier).

When one looks at consumer charcoal prices today, indeed, charcoal producer prices, have increased relatively little over the past several years. Comparing these prices with those of the World Bank's 2010 report, shows almost no price increase. However, when looking at the prices that "middlemen" receive today, as judged from our relatively small samples today, are considerably lower today than in 2009 and early-2010.

If our diagnostic from our long-term work in the sector, from our current work with the MNRT and MEM, and from this work with the 200 interviews along the entire supply chain is valid, then the number of producers, transporters and vendors have increased dramatically to "get into the business". Retail, consumer prices of charcoal support this – if they are holding relatively steady and producer prices are holding relatively steady, in the face of 8-10% increase in demand per annum, then, both the absolute quantity of supply is increasing and some players along the supply chain are getting squeezed.

Our observations, the observations of a number of key informants, and the surveys for this work show that the middle is being "squeezed" by the growing number of small players. We see this in all similar "open" markets. Market structure and differentiation is decreasing rapidly because charcoal is such an easy livelihood for almost anyone to get into – and they are.

The number of market players, both in absolute and relative terms, is increasing at virtually every node (link) in the supply chain. With very few other opportunities for rural and urban employment and income available, with by far the largest and fastest growing energy sector (and one of the largest economic sectors) in Tanzania, charcoal offers significant opportunities for new entrants with little experience and almost no investment required.

Our estimates are that charcoal demand has been increasing at a rate of 10% per annum since the last years of the last decade. We attribute that to the rate of urbanisation (almost 8% in Dar es Salaam, around 7.5% per annum in other urban areas), the "urban factor" (e.g., where charcoal is used for a number of non-household activities, e.g., restaurants, canteens, etc.), and, very importantly, the shift by high-income consumers from electricity and lpg to charcoal.

If charcoal is growing at that rate, then, the World Bank estimates of 1 million tonnes of charcoal consumption per annum in 2009 should be close to 1.4 million tonnes per year today. Instead of 28,000 bags of charcoal entering Dar es Salaam per day as charcoal inflow surveys conducted by the World Bank and WWF/Camco in 2008/2009 showed, that figure is closer to 40,000 per day currently.[4] Even if the demand rate growth is 8% per annum, just above the rate of urbanisation, then urban charcoal consumption today is

[4] We believe the 28,000 bags per day in 2009/2010 was a significant over-estimate. Even were bags only 56kg (as they were supposed to be officially), that number of bags would have supplied Dar es Salaam with over 570,000 tonnes of charcoal per annum, not the 500,000 estimated by the World Bank and others. If bags were in the range of 80-100kg, as the World Bank study indicated, and as they are today, then, 28.000 bags per day would have meant an average of almost 1 million tonnes per year coming into Dar es Salaam today. We estimate the number today to be on the order of 23,000-24,000. However, a significant number of bicycles, and we believe this number is also growing, bring charcoal into Dar es Salaam, Morogoro and other urban areas. We know, from our surveys, that they deliver "door-to-door", and in larger numbers than ever. Again, this reinforces the reality that the sector is expanding and becoming more highly decentralised. However, information flows from consumer to producer are excellent, and improving with growing competition.

on the order of 1.3 million tonnes per annum and the number of bags of charcoal coming into Dar es Salaam per day is on the order of 38,000.

The primary reason we highlight these figures is to show that the marketplace today is changing rapidly and that assumptions on supply side structure (and how links in the supply value chain are evolving) and participation need to be re-examined. This is crucial for TFCG and its proposed sustainable charcoal project. Participation in the sector is moving rapidly to smaller-scale players. This makes it increasingly more complicated to intervene effectively on the policy side, on the one hand, and has significant implications on strategies for marketing sustainable charcoal, on the other.

While producers do not know their end users (i.e. there is virtually no direct contact between producers and final consumers), in the same way that automobile factory workers do not know the consumers who buy the cars they build, the market is so dynamic that producers get constant, up-to-date feedback through this large, growing, informal system. The current intermediaries, from the bicycle transporters in rural areas through other transporters, wholesalers and retailers, dynamically feed back to producers what consumers want.

This is shown by how quickly the prevalence of large (90kg and more) bags of charcoal have become the "norm" in Dar es Salaam. Five years ago, some attention was paid to the "regulation" 56kg bag, more or less. Now, anyone who supplies bags of 60kg to the market can barely compete because consumers who buy bags expect those bags to be 90-100kg in weight.

Charcoal producers (all of whom, as our surveys and other work show, bag their own charcoal), have responded to demand because the market is dynamic. The smallest transporter, the bicyclist, will rarely buy a bag that is less than 80kg even in remote areas, unless the producer sales prices is heavily discounted (i.e. the price per kg stays roughly the same, even when a bag is smaller in weight). This is truly dynamic market feedback which anyone coming into the market with a "new" product will have to match.

All this is background supported by over 200 interviews in February and March 2013. As Table 3, below, shows, the Camco Team interviewed stakeholders from producers in Kilosa District to urban households, and commercial and institutional consumers in Dar es Salaam, Morogoro, Kilosa and Mikumi. These observations are backed by experience in the charcoal sector in Tanzania (and in neighbouring countries) since the early-1980s, from reviews of and interviews with "sustainably-produced charcoal" and from carbonised briquette producers in pilot projects that are still underway. The observations are reinforced by experience with the introduction of other new products (variations on existing products) including household stoves.

The main thing to take from this analysis is that successful marketing of "sustainably-produced charcoal" will require a well-thought out process where:

- The supplier is in close contact with the consumer, where there are as few intermediaries as possible – ideally, for a "new" product such as "sustainably-produced charcoal", the supplier will work directly with producers and supply consumers, primarily through known retailers, distributors;
- The supplier must be the primary entity that interacts with producers. Producers must understand, as they do in today's very informal but highly competitive market, that if they do not deliver the quality and quantity demanded by the buyer/supplier, then they will not sell their charcoal. That is the way it is now and that must be the framework for selling "sustainably-produced charcoal" – if the

producers think that some intermediary, such as TFCG, can arbitrate, or negotiate on their behalf, the "commercial", market-based activity will not work;

- With the exception of Dar Charcoal, charcoal producer "groups" do not exist in Tanzania. Buyers are used to dealing with individuals and there is almost no experience of co-operating in groups to produce charcoal. While bringing producers into a group is potentially a good idea, it is not the norm and it will be a pilot in Kilosa (all producers interviewed produce on their own, with only a few ever using family labour for harvesting the wood). Thus, if the project is looking to organise producers, it will add another element of risk – it may not be commercially interesting to a buyer/supplier.

Conclusions and Recommended Way Forward

Camco presented its draft final results to the TFCG in late-March 2013. It revised those results in light of comments during that meeting and afterwards. It presented its revised "draft final" market survey results to the TFCG Sustainable Charcoal Workshop, attended by over 20 major stakeholder groups (governmental, non-governmental, private sector) in Dar es Salaam on 23rd May 2013.

Camco's initial recommendations, prior to the 23rd May workshop, were based primarily upon the model set out in TFCG's terms of reference for the charcoal marketing study, namely:

> ***"In order to achieve the desired impacts under Component 1, it is assumed that a significant segment of consumers will be willing and able to pay higher prices for legal, traceable charcoal; that independent systems can be developed for ensuring that all branded charcoal comes from credible PFM systems, and that the benefits for communities from legal, sustainably sourced charcoal outweigh those from current harvesting and production systems.***
>
> ***Experience from earlier attempts to introduce "sustainably produced" charcoal suggests that it is vital to incorporate a strong marketing component through a private sector partner in such ventures, rather than a promotional effort led by project implementers with a non-profit orientation. Thorough market research, and a clear, professionally managed, sales and marketing strategy is essential for tapping into niche markets for sustainably produced charcoal." (page 1, "Terms of Reference: Market research for sustainably produced charcoal", October 2012)***

Camco focused research upon trying to determine whether there was a market in Kilosa, Morogoro and Dar es Salaam for premium-priced charcoal produced sustainably by providing producers with the incentive to manage forest resources in a sustainable manner and produce charcoal more efficiently.

The model is essentially a vertically-integrated single buyer, or small number of buyers, model whereby the buyer purchases the charcoal at "farm gate", paying producers a price that reflects both fewer intermediaries from producer to consumer (i.e. the buyer being the transporter, wholesaler and retailer) and paying the producer a portion of the premium that end-users would be willing to pay for the value (environmental, social, community and economic) of sustainable charcoal.

However, Camco's surveys (conducted in February and March 2013), interviews (conducted into May 2013) and research did not find a strong "willingness to pay" a substantial premium for the charcoal on the part of any end-users. Indeed, end-users, both household and commercial, both "high end" and "low-income/medium-income", showed little willingness to pay more than a marginal premium (5-10% for most of

the over 100 survey respondents, only a few willing to pay higher than that) for charcoal from sustainable sources.

Further, Camco's interviews with potential premium priced sustainable charcoal buyers showed a strong lack of willingness to enter the market, to become a buyer of sustainable charcoal so long as charcoal policy remains as vague and poorly-understood as it is in the market today. Camco's primary recommendation coming out of the study was, and is, that TFCG and other parties concerned with sustainably-produced woody biomass energy supplies should make policy change a key focus of their efforts to promote sustainable charcoal.

Camco's work shows that, over the past five years, only two groups in the supply/value chain have benefited to any significant extent as charcoal demand has increased annual by between 8-10% since 2008 with increased urbanisation and urban demand, and with decreased relative and absolute availability of other alternatives to charcoal (electricity, lpg and kerosene).

The relative share of the final price paid for charcoal has increased for producers from an estimated 18% in 2008 to approximately 24% today (Table 3). Consumers were the other "winners" in the value chain with the relative price of charcoal decreasing in all income groups with consumer charcoal prices hardly changing over the past five years.

Table 3: Percentage Shares in the Charcoal Value Chain from Production to Final Sales – 2008 to the Present with Camco Buyer Model Estimated Value Shares

Value Chain Participant	2008	2013	Proposed "Sustainable"
Producer	**18%**	**24%**	**31%**
Licence, Fees, etc.	15%	19%	17%
Transport	**50%**	**40%**	**20%**
"Wholesale"	**15%**	**12%**	**24%**
"Retail"	3%	6%	8%
Total	**100%**	**100%**	**100%**

The study found, as Table 1 shows, that intermediaries in the value chain, particularly transporters, has seen a significant decrease in their relative and absolute returns from the charcoal business. The study reinforced other work that shows that the number of producers has increased significantly as the opportunities to earn cash revenues from production have increased with Tanzania's rapid urbanisation.

Moreover, the number of small players in transport and sales has also increased significantly over the past five years. Small-scale transporters, particularly bicycle, motorcycle and automobile transporters, as well as non-dedicated lorry drivers (i.e. lorry and small truck drivers returning with either empty vehicles or with space to purchase a number of bags of charcoal to earn extra revenues) have increased in number, and have such low margins, that they are squeezing out large transporters, particularly the type of players the World Bank referred to in 2010 and 2011 as "large-transporter wholesalers".

Similarly, with rapid urbanisation, increasing numbers of small players, with virtually no barriers to entry and few costs, have seized more of the market as retailers, catering more to consumer demand in ways that include increased door-to-door sales and delivery. This has put a further squeeze on large players, wholesalers, in particular.

All this has benefited producers and consumers, and has reduced the margin that accrues to intermediaries. In simple financial terms, Tanzania's charcoal market has become more "efficient". The lack of organisation, the lack of formalisation, the increased number and variety of players in the supply chain, the lack of enforced rules and regulations, the lack of perceived policy, has led to more players entering the market and a significant financial windfall to primarily urban consumers. With electricity prices 3-4 times what they were in 2008, with lpg relatively scarcer (even though absolute amounts of lpg have increased – but without keeping pace with the rate of urbanisation), the percentage of urban households using charcoal has increased from less than 50% in 2002 to over 90% today.

TFCG's Proposed Way Forward

TFCG is a leading promoter of participatory forest management (PFM). Sustainable management of village forests is the cornerstone to their proposed sustainable charcoal project (SCP) in Kilosa. They have worked intensively with villages to improve their village forestry resource management and governance capabilities.

They are working with those villages to put in place a programme whereby trees are harvested for charcoal on a 20 year rotational cycle, such that the village woodlands regenerated, with improved management, so that, after 20 years, trees can be harvested on a sustainable basis. The revenues from selling trees to producers on a 20 year sustainable basis, will more than cover the costs of protecting and managing their village forests.

Regardless the "producer-buyer" model, this sustainable village forestry model will be the same. However, TFCG do not agree with Camco's "single buyer" model, for a number of reasons. Fundamentally, they would like to see as much value of the final charcoal sales price accrue to local producers as possible. They believe that the charcoal production and sales model should benefit local producers as much as possible.

For this to occur, they see the need to reduce the number of intermediaries, hence the value added with each player in the chain, to a minimum. Their key principles for sustainable charcoal are:

- it must be sustainable: ecologically and socially.
- charcoal should be produced and traded legally (formal business);
- the value chain should be commercially viable and pro-poor; and.
- the system / mechanism should be scalable.

Camco supports these principles wholeheartedly. To learn more about how the charcoal sector more sustainable, it is necessary to try out innovative models that support these principles. TFCG and Camco believe that sustainable charcoal can contribute to climate change adaptation and mitigation. Further, sustainable charcoal production can provide an incentive for community-based forest management and generate sufficient benefits for a community to select forest relative to other land uses.

Thus, they would like to encourage local, small-scale transporters to purchase from sustainable charcoal producers and sell directly to urban retailers, eliminating as many "middle men" as possible, as Figure 1 shows.

Figure 1: TFCG Sustainable Charcoal Value Chain – Reducing "Intermediation"

This is a simplified summary of TFCG's strategy. A key point in this strategy presented to, and endorsed by, a wide range of key stakeholders at their 23rd May stakeholder meeting, is that the principle of selling sustainable charcoal at a "premium" is not key to their model. In fact, the model assumes that sustainable charcoal, while packaged, marketed and certified for its benefits and attributes, will sell at the same price as the rest of the charcoal market.

A key element for achieving this is to certify and license charcoal such that it is transported without the various "mark ups" that are currently made by numerous officials along the charcoal transport route. They will work with local authorities, district authorities, the Tanzania Forest Service (TFS) and other key players to develop a sustainable charcoal license and transport certificate that will enable producers and small transporters to pay one fee and reduce the current plethora of "fees" exacted at various points along the transport route.

The stakeholders' workshop endorsed this approach. Discussions are taking place with TFS and other players to help further flesh this model out to put it into practice.

Camco's Recommendations

In light of the comments received and the endorsement of TFCG's proposed sustainable charcoal model, Camco recommends:

- TFCG and other key stakeholders should support the Biomass Energy Strategy (BEST) process to promote the adoption of a national biomass energy strategy, and a national energy policy framework, that will support sustainable charcoal throughout Tanzania. A key element of this is to put in place streamlined, easily-understood, publicly-known, and enforced policies and regulations that promote sustainable charcoal production, that promote the formalisation of the sector, that "level the playing field" such that those producers who produce and supply charcoal that is sustainably produced are able to compete in the market place.
- TFCG examine closely the dynamics of charcoal sales before adopting a "sell directly to retailers" approach. Camco strongly endorses the reduction of intermediation costs, but, also recognises that most current retailers lack, for example, basic storage facilities to handle hundreds of bags of charcoal at any one time. Most retailers lack the capital and finance to buy hundreds of bags of

charcoal at any one time. If a transporter from Kilosa or Morogoro, for example, transports charcoal to Dar es Salaam and distributes to dozens of retailers, the costs (particularly in terms of time and negotiations) will be considerable. To develop a group of reliable, preferred retailers will have a number of costs that small-scale transporters, indeed, large-scale transporters, cannot afford.

These are the two major recommendations that Camco makes following the completion of the research and consultation with TFCG and stakeholders. We believe that, unless significant progress is made on the policy front to level the playing field, it will be difficult for sustainable charcoal producers, who will incur more costs of production than "traditional", non-sustainable producers, to compete in the market. Additionally, we believe that TFCG should work with the transporters to develop a market framework which will reduce their costs of getting the product closer to final consumer.

Summary of Research Methodology and Findings

This Final Report has been prepared by Camco Clean Energy (Tanzania) Ltd in response to call for proposals from the Tanzania Forest Conservation Group (TFCG) in October 2012. This Draft Final Report represents the culmination of nearly three months' work to complete the "Market Research for Sustainably Produced Charcoal in Tanzania" Study with the Tanzania Forest Conservation Group (TFCG), in conjunction with the Tanzania Community Forestry Network (MJUMITA), supported by the Swiss Agency for Development and Cooperation (SDC).

Table 4: Work Plan for Market Research for Sustainably Production Charcoal in Tanzania

Task	Date	Responsibility
1. Submit Revised Draft Inception Report	03/02/13	Camco
2. Receive comments from TFCG	05/02/13	TFCG
3. Incorporate comments from TFCG and finalise Inception Report	07/02/13	Camco
4. Prepare & Send Letters to Kilosa Village & Ward Chairs, DFO, DEO via TFCG	07/02/13	TFCG
5. Recruit Enumerators	08/02/13	Camco
6. Briefing & Training of Enumerators	11/02/13	Camco
7. Prepare & Send Letters of Introduction to "High-End" Hotels, Restaurants, Food Take-Aways, Supermarkets, General Stores, Petrol Stations, Schools, Oil & Gas & Mining Companies	11/02/13	Camco
8. Kilosa District Field Surveys, including Mikumi Town	12 to 14/2/2013	Camco
9. Morogoro Urban Surveys	16 to 20/2/2013	Camco
10. Dar es Salaam "Traditional Charcoal" Retailer, Wholesaler Interviews	12 to 14/2/2013	Camco
11. High-End Hotel, Rest, Take-Away, Super, Gen Store, Pet Station, Institution Interviews	12 to 26/2/2013	Camco
12. Data, Information Entry	12 to 8/3/2013	Camco
13. Data & Information Analyses	28/2/ to 18/3/2013	Camco
14. First Draft of the Market Report submission to TFCG	22/3/13	Camco
15. Comment from TFCG to Camco on Draft Final Report	25/3/2013	TFCG
16. Report Findings Presentation to TFCG Stakeholders' Workshop	23/5/2013	Camco/TFCG
17. Incorporation of Workshop Participants' Comments & Submission of Final Report	9/6/2013	Camco

Survey Methodology Summary

As set out in the "Inception Report", stakeholders were divided into three groups: Government (local authorities), Consumers (households, restaurants, hotels, institutions, others), and Suppliers (charcoal producers, transporters, retailers, wholesalers and "high end" potential sellers – i.e. supermarkets, big stores, petrol stations).

Table 5: TFCG Sustainably-Produced Charcoal Survey & Interview Framework, with Comments

Group \ Geographic Area	DSM	Kilosa	Mikumi	Morogoro	Total	Comments
Government						
Local Authorities	0	10	2	0	**12**	2 government stakeholder interviews in each of 4 villages in Kilosa District. 2 interviews at Kilosa District Government level and 2 interviews at Mikumi Town level.
Demand						
Households						
Low	18	5	3	18	**5**	It was often difficult for enumerators & supervisors to distinguish between "high" and "low-medium" income households, particularly outside Dar es Salaam. Results proved the distinction, from an energy consumption & patterns point of view often to be meaningless, as well. For example, civil servants working for prisons, schools, hospitals
High	6				**6**	
Sub-Total Households	**24**	**5**	**3**	**18**	**50**	
Traditional Rests, Hotels, Instits						
Traditional						
Restaurants	7	2	1	6	**16**	It is somewhat difficult, particularly in Mikumi and Kilosa, and to a lesser extent in Morogoro to differentiate "high-end" restaurants, and to a lesser extent, hotels, from more "traditional"
Hotels	3	3		3	**9**	
Institutions	3			3	**6**	
Other					**0**	
Sub-Total Trad Rests, Hotels, Instits	**13**	**5**	**1**	**12**	**31**	
High End Rests, Hotels, Instits					**0**	
Restaurants	10				**10**	No high end restaurants have been entered for Morogoro, Kilosa or Mikumi.
Hotels	4			2	**6**	
Institutions	3			1	**4**	
Other					**0**	
Sub-Total High-End Rests, Hotels, Ins	**17**	**0**	**0**	**3**	**20**	
Total Demand	**54**	**10**	**4**	**33**	**101**	
Supply						
Charcoal Producers						
Traditional Charc Produceres		4	3		**7**	7 traditional charcoal producers were interviewed. Good interviews.
Sustainable Charc Producers	0	0	0	0	**0**	No sustainable charcoal is being produced yet in Kilosa.
Sub-Total Charcoal Producers	**0**	**4**	**3**	**0**	**7**	
Transporters					**0**	
Bicycles		4	2	3	**9**	Kilosa survey figures include four transport surveys in the villages of Dadwa Sokoine & Lubango in Mvumero District.
Other Lorries				2	**2**	
Small Charcoal Lorries	2			1	**3**	
Large Charcoal Lorries	8	3			**11**	
Motorbikes		2		3	**5**	
Sub-Total Transporters	**10**	**9**	**2**	**9**	**30**	
Charcoal Vendors/Sellers						
Traditional Charc Retailers	6	6	1	5	**18**	
Traditional Charc Wholesalers	9	2		5	**16**	
Supermarkets/Petrol Stations	11			8	**19**	
Charcoal Vendors/Sellers	**26**	**8**	**1**	**18**	**53**	
Total Supply	**36**	**21**	**6**	**27**	**90**	
Total Interviews/Surveys	**90**	**41**	**12**	**60**	**203**	

Over 200 interviews were conducted within those categories, as set out in Table 1, below. Demand interviews totalled slightly more than supply interviews (100 and 90 respectively).

Government stakeholders were interviewed for this survey in Kilosa District (four villages, Mikumi Township and Kilosa District Headquarters). Seven charcoal producers were interviewed in four of TFCG's Sustainable Charcoal Project's villages in Kilosa District.

All other stakeholder groups were interviewed in Mikumi Township, Morogoro Town and Dar es Salaam. Samples of "low- and medium-income" and "traditional" consumers, on the one hand, and "high end" consumers, on the other, were interviewed in all three urban areas.

Summary Survey Results and Analyses

General

Almost all the respondents, particularly households, low- and medium-income commercial establishments (restaurants, bars, pubs, cafes and hotels), charcoal vendors (retail and wholesale), transporters, charcoal producers and local authorities recognise:

- The importance of charcoal to their livelihoods and their energy security;
- The important role that rural producers play in supplying charcoal.
- Charcoal is an affordable and acceptable substitute for electricity and lpg;
- The need to formalise and regularise the charcoal sector, and the entire supply and value chain with rules, regulations, typical market governance;
- The need to support, through education, technical assistance, finance, rural farmers to plant trees, to replant trees they use to produce charcoal, to improve the efficiency and technology of charcoal production.[5]

The striking thing that runs through the interviews is how much people know about charcoal as a source of energy. This includes how many people know where their charcoal comes from, what areas (e.g., geographic, protected or not, etc.), how it is produced and how it gets from points of production to the consumer.

There is not a universal understanding of these factors in the charcoal value and supply chain, but, there is far more of an understanding, a comprehension, than there is for any other energy source (electricity, lpg, kerosene) except firewood. Much of this stems from the fact that most people either come from rural areas or have strong roots in rural areas. Whatever the reason, there is much to build upon in stimulating demand and the market for "sustainably-produced charcoal" – there is almost a universal understanding that current charcoal supply is non-sustainable, has negative effects on the environment, has negative effects on rural livelihoods and needs to be transformed.

Surprisingly, there is also a strong understanding of the role local governments have to play in "formalising" and "regularising" the charcoal business. While there were differences from one group of respondents to the

[5] Virtually all respondents in the supply chain, from producers, local authorities to consumers, equated "sustainable forestry" with tree planning, specifically planting a tree for every tree harvested to produce charcoal. Only a few officials and NGO interviewees realise that "sustainable forestry" is based upon sustainable forestry management, and, specifically, ensuring that wood harvested does not exceed the mean annual increment (MAI) of the forestry stock.

next, government officials, most consumers (households, institutions and businesses) preferred local authorities to "certify" sustainable charcoal than any other body. Most high-end establishments favoured the Tanzania Bureau of Standards, but, overall, consumers, transporters, retailers and wholesalers trust local authorities to certify the origin of their charcoal.

This is critical in any marketing strategy, indeed, in the process of formalising the charcoal supply and value chain. If urban people and businesses empathise with rural producers, if they see a major role for local government to play in formalising the sector, this bodes very well for progress on that front. It reinforces various trends and strategies in land use (e.g., land registration under the National Land Use Planning Commission/NLUPLC, poverty reduction under the "National Strategy for Growth and Reduction of Poverty (NSGRP)" or "Mpango wa Kukuza Uchumi na Kuondoa Umasikini Tanzania (MKUKUTA)", devolution of environmental regulation under the National Environmental Management Commission (NEMC), etc.).

Other Key Points for Discussion

- There is very little awareness of "sustainably-produced charcoal"
    - Few people have heard of it
    - Fewer people have tried it
- When people understand what "sustainably-produced charcoal" is, they are almost all in favour of it – if:
    - It is of high quality
    - It is at a good price
    - It is certified
    - The "premium" to pay for it is not too high (around 5% for lower-income consumers, 10-15% for some of the "high end", high-income households, commercial and institutional consumers)
- Most see certification as a good thing to help "formalise" and "regularise" the market – many saying: "It is like Coca Cola. You would know what you get". They see certification as part of a way of making charcoal another commodity, just like others they can buy in shops and in the market.
- Most consumers would like to see the market "regulated" and "formalised" – they want more certainty when buying charcoal, whether that be on price (very important), quality (as important) or, in a more abstract way (though important to most) "sustainability" – they would prefer charcoal be produced in a "sustainable" way, which most understand is by replanting trees (see footnote 8, above);
- If sustainable charcoal is produced and certification were adopted, a surprising number of respondents from all groups, would like to see local authorities certify it. More would like to see local authorities certify is than the Tanzania Bureau of Standards (TBS), which is a close second. The two are not exclusive as about half the respondents who chose local authorities also chose TBS certification.

General

- Most stakeholders are aware of the environmental impact of current charcoal practices.

- Most stakeholders' recommendation for improving the environmental impact of charcoal production (i.e. of making it more "sustainable") is to replant and plant more trees – tree planting is the single most often-cited activity to make charcoal less "harmful" to the environment and more "sustainable";[6]
- Farmers/producers are most aware. In fact, the closer to production, the more awareness there is of the environmental and economic issues of charcoal – but, a surprising majority of urban consumers are also aware of those issues.

Charcoal – Quality and Price are the Most Important Factor for Consumers

- For most consumers, the two primary issues of charcoal are quality and price – quality is primarily defined as consistency of charcoal, amount of fines or debris.
- Packaging of charcoal is seen by all groups as the least important issue in charcoal marketing;
- The overwhelming number of consumers believe charcoal supplies are reliable - that, coupled with the fact that over 90% of the respondents use charcoal as their primary source for cooking, demonstrates that consumers and suppliers recognise just how important charcoal is to their livelihoods and to the economy
- There is a perception charcoal prices are rising – but, it is not a major concern (indeed, nominal prices of charcoal have not risen by nearly as much as other primary consumer products over the past five years – primarily because supply has increased significantly), but, the degree to which this is felt depends upon the consumer –
    - Surprisingly, traditional restaurants, cafes, bars, hotels pay the least for charcoal and see the price rising the least of all consumer groups.
    - Not surprisingly, lower income households (more than upper income households) feel the price of charcoal is rising;
- Almost all would like to see the charcoal business "regularised" or "formalised". This is felt strongly at producer level, at transporter level and at consumer level, across the board.

[6] Planting trees has been institutionalised for years by Government and many others as a way to combat deforestation. "National Tree Planting Day" and other tree-planting events are promoted as ways to raise awareness about deforestation and the negative environmental effects of it. Thus, it is not unusual for people from all walks of life, from senior politicians to consumers to use the term "planting trees" to be seen as the primary way to achieve sustainable forestry and a means, along with improving kilns and production, of making charcoal "sustainable".

Local Government

A total of twelve (12) local government stakeholders were interviewed as shown below:

Table 6: Local Government Stakeholders Interviewed

Urban Area	No Interviewed
Kilosa Villages	8
Mikumi Town	2
Kilosa Urban	2
Total	**12**

Interviewed local government stakeholders in:

- Nyali Village (Zombo Ward, Kilosa District): Village Chairperson and Village Environment Officer (VEO)
- Ulaya Mbuyuni (Ulaya Ward, Kilosa District): Village Chairperson and VEO;
- Ihombwe (Mikumi Ward, Kilosa District): Village Chairperson and Natural Resource Committee Secretary (NRCS):
- Msimba Village (Mikumi Ward, Kilosa District): Village Chairperson and VEO;
- Mikumi Town (Kilosa District): Acting Township Executive Director and Division Secretary Officer;
- Kilosa Town (Kilosa District) District Chairman – Mr Amer Ahmed; and,
- Kilosa Town (Kilosa District) District Environment Officer (DEO) – Mr Lamech Masembejo

Households Surveyed

Table 7: Households Surveyed by Urban Area

Location	No Households
Mikumi Town	3
Kilosa Town	5
Morogoro Urban	18
Dar es Salaam	24
Total Households	**50**

A total of fifty (50) households were interviewed during the surveys in Mikumi, Kilosa, Morogoro and Dar es Salaam urban areas. It was difficult to differentiate “high income” from “low- and medium income” households for a number of factors. Some “low-income” households live in government accommodation and utilise electricity for cooking, which is usually associated with “high-income” households.

Moreover, charcoal purchases by “low-income” households are usually in small quantities (“debes” of 1, 2 and 5 kg, or even smaller), while “medium” and “high-income” households usually purchase charcoal in bags (“gunias”). There are major anomalies in the surveys that show that households that have access to transport (e.g., drivers), purchase their charcoal (at prices lower than in urban areas) on the road.

All but six (6) out of fifty (50) household respondents use charcoal as their primary source of cooking. Only four in Dar es Salaam (two electricity, one combination of charcoal and electricity, and one lpg) and one each

in Mikumi and Morogoro (both firewood), out of 50 households interviewed in total, did not use charcoal as their primary source of cooking fuel. While these samples are not large enough to be representative, they closely match the national urban averages.

Of all households interviewed (50), the following **fuel mix** was recorded:

Table 8: Household Fuel Mix in All Four Urban Areas Surveyed

Households	Elect	Lpg	Kerosene	Charcoal	Firewood
Dar	6	8	7	24	2
Morogoro	0	0	3	18	3
Kilosa	0	0	2	5	2
Mikumi	3	0	1	2	1
Totals	**9**	**8**	**13**	**49**	**8**

As can be seen, lpg was not recorded in any households outside Dar es Salaam. All but one household used charcoal, followed by kerosene and an almost equal distribution of electricity lpg and firewood. Dar es Salaam reflects the highest fuel mix with nearly half of all households using charcoal and at least one other cooking energy source.

About two-thirds (33) of the households interviewed said they did not know what geographic location their charcoal came from. Most of the 16 who said they did know where their charcoal came from identified the geographic area. Most of the households, including most of those who said they did not know whether their charcoal came from believed it came from primarily from “natural forest” followed closely by “hard wood” sources. Nearly half of all households said they knew how charcoal was produced. Knowledge, or lack of knowledge, of how charcoal was produced was fairly evenly distributed amongst respondents, whether in Dar es Salaam or Morogoro.

Households and Sustainably-Produced Charcoal

Only three of the household respondents in Dar es Salaam said they had ever heard of “sustainably-produced charcoal”. None of the households interviewed in Kilosa had heard of sustainable charcoal while six (out of 18) said they had in Morogoro, while two (out of three) said they had heard of sustainable charcoal in Mikumi. Almost all who said they had heard of sustainable charcoal had heard about it on the radio or television. Most of the rest said they had heard about sustainable charcoal “by word of mouth”.

None of the households in any of the urban areas were using “sustainably-produced charcoal.” Only one household (in Mikumi) said they had bought sustainably-produced charcoal in the past. Almost all Dar es Salaam households interviewed said that they cared how charcoal was produced and thought it should be produced sustainably. Almost all said that current charcoal production was bad for the environment. The most frequently-cited reasons for current charcoal production being “bad” for the environment was destruction of forests (“chopping down trees without replanting trees”).

Most (two thirds) said they would be willing to buy sustainable charcoal, but, most said they would if it was not much more expensive (5% to 10%) than traditional charcoal. Among the households that were noted as being higher income, there was a stated interest to pay a higher “premium” (15% to 25%) than for traditional

charcoal. Reasons cited for willingness to pay more for sustainable charcoal primarily centred on belief that sustainable charcoal would be:

- Higher quality than current traditional charcoal;
- Less expensive than lpg or electricity;
- "Environmentally friendly".

The most frequently-cited reason was a perception that sustainably-produced charcoal would be of higher quality. This was reinforced by responses to the questions on certification.

Improving Charcoal Markets

As with other consumers, households cited their interest in higher quality charcoal as a major interest and as a major way of improving the market. Most of the recommendations on "making the sector work better" centred on formalising and "regularising" the sector, primarily through:

- standard weights and measures for charcoal at specific prices;
- having specific prices like other commodities;
- having designated locations for purchasing charcoal;

Most thought that certifying charcoal would be a "good thing". The most often-cited reasons were to give consumers a better idea of what they were buying with the focus being on improving quality of charcoal. Half of the households thought that local authorities should do the certification, followed by around a quarter suggesting that the Tanzania Bureau of Standards or an NGO should do the certification. Most of the rest did not have an opinion on certification.

Commercial and Institutional Consumers

The Team segmented the commercial and institutional sectors into institutions, restaurants (including bars, pubs, cafes and take-aways) and hotels. Where possible, "high-end" (e.g., 3 star hotels and above) and "traditional" (or low- and medium-income) commercial establishments and institutions were identified. In practice, differentiating "high-end" and non-"high-end" proved difficult. The purpose for differentiation was to test whether or not, as with upper-income and lower and medium-income households, there was any potential difference in demand for "sustainably-produced charcoal".

Table 9: Traditional and "High-End" Commercial Establishments and Institutions Surveyed

	Institutions		Restaurants/Bars /Cafes		Hotels	
Urban Area	**Lo Med**	**Hi**	**Lo Med**	**Hi**	**Lo Med**	**Hi**
Dar	3	3	7	8	3	2
Morogoro	3	1	6		3	2
Kilosa	0	0	2	0	3	0
Mikumi	0	0	1	0	0	0
Totals	**6**	**4**	**16**	**8**	**9**	**4**

Traditional Restaurants – Bars – Cafes and Hotels

Dar es Salaam

Only two out of twelve interviewed use electricity for cooking. All but two use charcoal primarily for general cooking. Almost all (9 out of 12) use lpg for some cooking and all use charcoal for cooking. None use firewood and one uses sawdust. Most use considerable quantities of charcoal. Those using more have charcoal delivered to them. Others purchase it from the market.

Unlike the "higher-end" Dar es Salaam commercial consumers, all but the hotels, pay considerably lower prices for charcoal, averaging TZS 25,000 to 30,000 compared to TZS 40,000 per bag.[7] This indicates a key fact that there is price differentiation in Dar es Salaam attributable both to who is purchasing (and their purchasing power) and the location of the establishment (particularly in relation to charcoal markets).

Further, it is probably a reflection that charcoal plays a far higher role in their costs than it does for "higher-end" consumers. Therefore, the traditional commercial charcoal consumers need to, and are able to, drive better price bargains with suppliers.

Eight of ten said charcoal prices had risen over the past year. However, the range of answers for how much prices had increased were considerable and do not provide any guidance for analysis. When coupled with low-medium income households, the majority (three-quarters) had seen very little price increase over the past year.

Only two out of ten said they knew the source of their charcoal supplies. This differed considerably with "high-end" consumers and, indeed, low and medium income household consumers. Only three knew the type of forest their charcoal came from. This could reflect the fact that, while charcoal plays a major role in their businesses, they take it for granted that it is "just there" and do not need to look into sources, origins and sustainability.

Sustainably-Produced Charcoal

Half of Dar es Salaam traditional commercial consumers knew how charcoal was produced and four out of ten had heard about "sustainably-produced charcoal". Only one (a "kuku" – chicken roasting restaurant and take-away) knew whether or not they were using sustainable charcoal. They knew the origin of the supplies (Arusha) and were very satisfied with it. The price they paid (TZS 40,000 per bag) was about average for charcoal prices in Dar es Salaam. None had heard of anyone else using sustainable charcoal.

As with "high-end" commercial consumers, institutions and household consumers, the highest priority on what they consider to be most important about charcoal is price and quality, by far. Next was reliability of supply and delivery of charcoal. The factor that ranked lowest, by a significant factor, as with all consumers, was packaging.

[7] We were not able to weigh bags of charcoal. There are different sizes of bags, although most cluster around the 90kg weight. A considerable amount of charcoal is not being delivered to both "traditional" restaurants and hotels and high-end ones. There is likely to be some repacking for these "door-to-door" deliveries as has been observed in other urban areas.

Quality and price rank highest because these price-conscious traditional commercial consumers want to get "value for money" – i.e. the highest quality energy output for the lowest price. All who replied said that they would pay a premium price for consistent quality charcoal (i.e. charcoal without fines, dirt, rubbish or broken pieces).

Seven out of ten (with the other three not responding) said they would be willing to pay a premium for sustainably-produced charcoal. However, as with other most other commercial consumers and household consumers, they were not willing to pay much of a premium, namely a few percentage points higher than traditional charcoal, with the one currently using sustainable charcoal willing to pay far more for sustainable charcoal than the other traditional commercial consumer respondents.[8] While that is only one out of ten, it does indicate that when a consumer is satisfied with sustainably-produced charcoal, they are willing to pay a substantial premium for it.

The responses on how they would like to see the sector work better for them centred, as with other groups, around "formalising" and "regularising" the market, with standard prices and units, improved production techniques (including replanting trees), and licensing and taxation of the industry. They felt that to improve the overall sector, there needed to be more education of producers and players along the supply chain, that the whole supply chain needed to be "formalised" and "regularised" in order to make it work more efficiently, and that tree planting was important.

Every respondent said they want charcoal to be sustainably-produced. The two major reasons are to protect the environment and to improve quality. Other responses were that they believed it would create better quality of life for producers, that it was cheaper than lpg and electricity, and that it would ensure long-term supplies.

They felt that current charcoal production is having a negative effect on the environment and that there must be replanting of trees. Deforestation and negative environmental effects were cited by almost all Dar es Salaam traditional commercial respondents as the biggest problems with current production. The way they see to achieve that is to formalise the sector, train people, encourage, or require, them to plant trees.

Certification would be viewed as a good thing, with TBS (Tanzania Bureau of Standards) ranking as their first recommended source of certification, followed very closely by local authority certification. The latter is very interesting because this was highlighted by government stakeholders in Kilosa, by many households and by high-end commercial charcoal consumers – indeed, amongst all respondents along the entire supply chain, local government was the most "trusted" for certification, followed by the TBS. It is obvious that many consumers put faith in local authorities certifying their charcoal.

[8] As almost none had heard of sustainable charcoal, must less seen it or used it, their responses on sustainably charcoal need to be viewed carefully. The fact the enumerators explained to each respondent what sustainable charcoal was and introduced themselves as doing a survey on sustainably-produced charcoal certainly biased responses by some factor.

"High-End" Restaurants – Bars – Cafes and Hotels

Dar es Salaam

In Dar es Salaam, all "high-end" restaurants interviewed use charcoal. Only one uses electricity for cooking and it uses electricity with lpg and charcoal. Only three use lpg while two also use firewood. All but one purchase their charcoal from a supplier (i.e. it is delivered to them on contract) and all knew the price of charcoal, which was clustered at the time of the interviews around TZS 40,000 per bag. All said prices of charcoal had risen over the past 12 months by an average of some TZS 5,000 per bag. All said supplies were reliable.

While aware of charcoal market dynamics, only one of the Dar es Salaam "high-end" restaurants, bars and cafes interviewed knew the source of the charcoal they purchase and consume. This is telling, as, compared to most households, they have little understanding of the dynamics of the charcoal production and supply chain.

Only two of the eight high-end restaurants had heard of "sustainably-produced charcoal" They heard of it through radio/TV and word-of-mouth. None knew whether they were using sustainable charcoal or not. One who had heard of it, had used it two years ago, but, the supplier (not identified) never came back. This was pointed out elsewhere with households and with the more traditional restaurants, bars and cafes. Whoever introduced the sustainable charcoal did not continue providing it, for whatever reasons. Reliability of supply was noted by these who had used it as a key factor on whether they would buy it again.

As with other consumers, price and quality, almost equally, ranked highest as what they want to see most with charcoal. Reliability of supply ranked next, after consistency of quantity and quality. Certification of charcoal was moderately important to these high-end commercial consumers, while packaging was the lowest priority, by far. For these Dar es Salaam commercial consumers, quality translates primarily into consistency and weight of charcoal, i.e. good quality charcoal means charcoal purchased that has sufficient quantity at a high quality (lack of fines, dirt, broken charcoal, etc.).

All but 1 would be willing to pay a premium between 5% and 15% more for consistent quality of charcoal. Respondents who would be willing to pay 5% to 15% more for charcoal were spread fairly evenly amongst all consumers, from lower-income households to "traditional" restaurants. Only in several cases (see above) of high-end beach tourist hotels did respondents say they would pay more than this, with the beach hotels interviewed saying they "might pay 30%, maybe slightly more" for "sustainably-produced charcoal".

Similarly, all but one of the high-end Dar es Salaam commercial consumers would be willing to pay a premium for sustainably-produced charcoal. However, the premium they cite is lower than the quality premium, clustering around 5% higher than for quality of charcoal supplied.

Regarding how they would like to see the charcoal market work better for them, their responses centred almost entirely on quality and price. In other words, if the market is to be "regularised", they would want to see, as with other goods and services they buy, consistency of quality of charcoal and consistency of price (i.e. getting what they pay for).

The same price-quality preference was cited as how they would see the charcoal industry performing better overall. To make the entire charcoal supply chain work, they would see "formalisation" and "regularisation"

of the business, from charcoal production to final sales as key to make the sector more efficient and delivering higher value.

All agree that, currently, charcoal production is not good for the environment. The most often-cited reason is because people do not replant trees (i.e. current charcoal production leads to deforestation).

All see certification as a good thing. They see certification as a way to encourage people to plant trees, i.e. to practice sustainable charcoal production. The fact that this was felt by all high-end commercial service consumers indicates that they strongly see the connection between improving production, with replanting trees (i.e. sustainable charcoal) as an important thing, integral to "regularising" and "formalising" the charcoal business, which would benefit them. All but two said that the TBS should do the certification. Half felt that labelling by district authorities would be good.

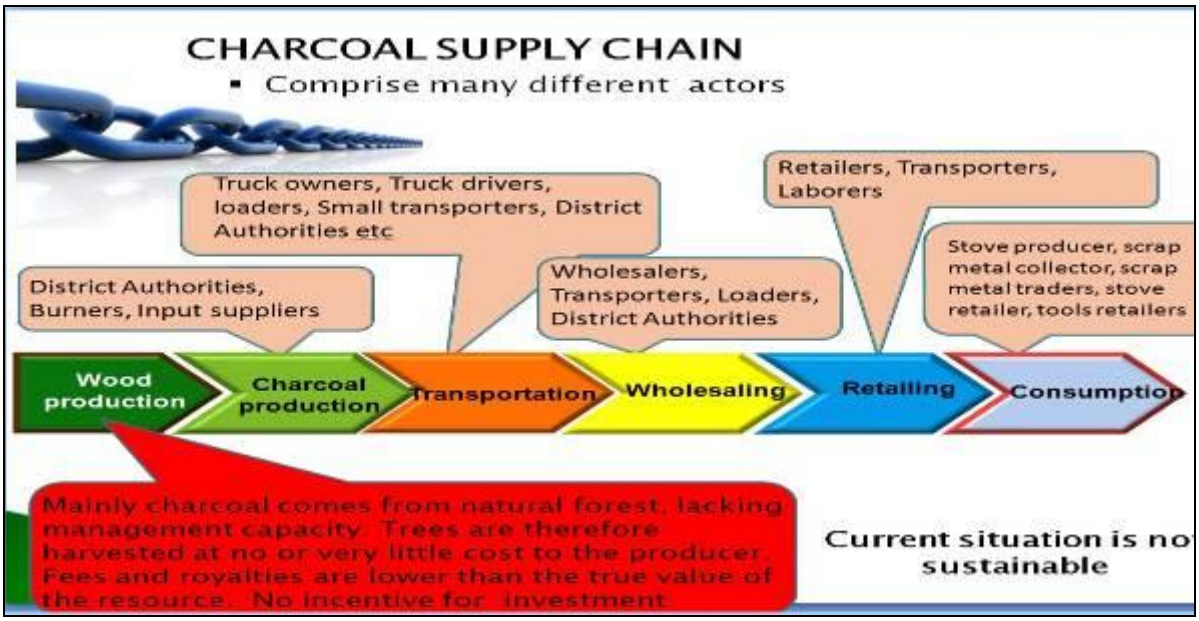
Supply and Value Chain Analyses with Livelihood Analyses

The Team examined each "node" (link) along the entire supply chain from charcoal production to final end use consumption. Questionnaires were designed for each supply chain/value chain group, including:

- Local government authorities, from villages to wards to district level in Kilosa;
- Charcoal producers;
- Transporters of all types (from bicycles, to automobiles, to motorbikes/"boda bodas", government vehicles, non-charcoal lorries, small charcoal lorries and large charcoal lorries);
- Wholesalers and retailers in Mikumi, Kilosa, Morogoro and Dar es Salaam;
- "High-end" commercial and institutional establishments;
- "Traditional" (low-income and medium-income) commercial and institutional establishments (hotels, restaurants, take aways, bars, cafes, schools and universities)
- "High-end" supermarkets and large stores, and petrol stations; and,
- Key informants from Government, NGOs, Development Partners and the Private Sector.

Short Summary of Supply and Value Chain Analytical Framework

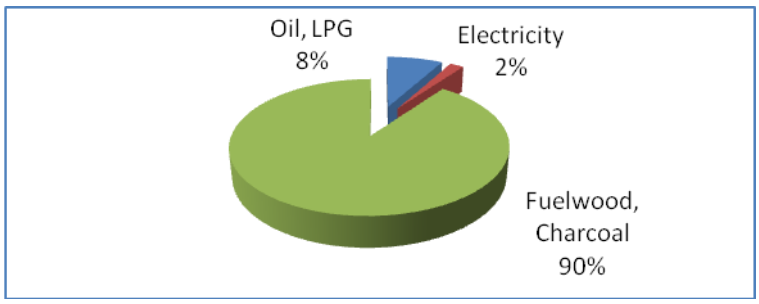
Figure 2: Schematic of Charcoal Supply & Value Chain in Tanzania



Detailed situational and livelihood analysis was carried out through interviews for all economic actors along the supply chain (except wood producers)[9], with analysis of value-chain dynamics within each group ("node" or link) and the value-chain interactions between each link and along the entire chain.

These produced some very interesting and useful insights on the dynamics of the sector, the transitioning of the sector over the past several years, the ever-changing dynamics between each group, where this might be leading and the potential impact this could have on sustainable charcoal marketing.

Figure 3: The growing role of Biomass Energy in Tanzania's Energy Mix: 2012



What was most obvious in the surveys, situational analysis, livelihood analysis and value chain analysis, is how dynamic the entire sector is at the moment, more dynamic in the charcoal sector than any other energy sector and many rural and urban economic sectors. Secondly, it is very noticeable how rapidly the sector is transforming, and has transformed, particularly over the past five years with accelerating urbanisation, with decreased reliability and availability, and increased cost of electricity and kerosene and a relative decrease in the availability of lpg, as cooking substitutes in this rapidly urbanising country.

This has led to a major restructuring of the supply and value chain as more players enter at, particularly, low-income levels. This was particularly true in the transport sector, with bicycles, motorbikes and taxis/automobiles increasing in numbers and importance in the transportation value chain relative to what the World Bank called the large "lorries-transporters-wholesalers". This is also true in the growth and widening market share of retailers and independent wholesalers in urban areas, and increasing numbers of independent suppliers who sell directly to consumers, both household and commercial consumers.

The sector is a "gold mine" of economic opportunity as it grows and as the regulatory framework becomes ever more diffuse, unfathomable and complicated. While there have arisen new opportunities for poor

[9] We believe we should have interviewed people who were directly involved with planting and harvesting trees, if only to provide more insights at the beginning of the supply and value chains. While all charcoal producers we interviewed said they harvest and cut most of their own wood, it would have been useful to interview non-charcoal wood producers, simply to gain a first-hand view of that primary node of the supply chain as its own "livelihood" area, its own part of the value chain. We did not interview any charcoal producers who bought their wood, but, 3 out of six who completed the entire interview used "other labour" (family mostly) to help supply the wood. The wood supply and charcoal production value segments are much more integrated than any of the other links in the supply chain.

governance and rent-seeking, these are more than countered and offset by the rapid increase in number of players who make it ever more difficult to do more than ad hoc regulation and rent seeking. “Out of chaos”, as Professor Ishengoma says, there are emerging opportunities for key groups, notably low-income groups to seize the opportunity to improve their livelihoods by participating in the sector.

However, the major consequence of all this is that non-sustainable harvesting of wood (i.e. not managing local forest resources to ensure that more wood is not harvested than is added annually, more than the MAI) is increasing at an accelerating rate and that the increased economic and livelihood benefits that are accruing to the poorer players on the chain, while enjoying more power vis-a-vis traditional power players, are helping to drive the entire sector towards environmental collapse. It is notable that most players, indeed, most of the lower-income and smaller players are as aware of the environmental consequences as people who are not in the sector, perhaps even more aware because it affects their medium- to long-term livelihoods.

The positive aspect of this is that almost all players recognise this. Producers and small-scale transporters, in particular, have seen their livelihoods improve over the past several years. The largest change that has occurred is that fewer large transporters are engaged in the transport business, and, of those, less than half practice charcoal transport as their sole activity and only half of them do it on a “dedicated” (as opposed to a “backhaul” basis).[10] Charcoal, indeed all commercial biomass energy, is one of the only rural products where the terms of trade have improved, and are continuing to improve, in favour of the rural sector vis-a-vis the urban sector.

As noted above, the relative return to producers of charcoal is increasing as the sector becomes larger with rapidly increasing urban demand. As more players get into the business (lack of barriers to entry, very low investment and operating costs), in a growing business, their relative power and the return on their inputs, are increasing. Small-scale transporters from bicycles to motorbikes, from private automobiles to lorry drivers who buy charcoal with their own money on their return trips, have increased their portion of the transport business, at the expense of the large lorry owners, and are improving and diversifying their livelihoods.

Increasing numbers of wholesalers are “decoupled” from their transporters, both suppliers and sellers (retailers). Given the increased number of transporters, wholesalers have been the least affected by the transformation of the sector. Because they buy and sell, they have a growing consumer base, with an increasing number of retailers, on the one hand, and an increasing number of suppliers, on the other. Thus, their negotiating position has strengthened, without the costs of dedicated transport.

Retailers, on the other hand, appear to be the biggest “losers” in the business. Given the fact that they are urban, with increasing number of competitors as more rural people move to urban areas and seek out work like retailing (low overheads, very few barriers to entry). Retailers’ margins have decreased. They complain about the competition and it is clear that competition is increasing more quickly for most than sales.

[10] A “backhaul” is when a transporter takes goods to one destination, then, returns with other goods. When a transporter is able to backhaul, she/he is usually able to reduce overall transport costs substantially. A “dedicated” transporter is one who delivers goods (or passengers) and is dedicated to that transport. The costs of dedicated transport per unit are higher than backhauls, but, often the trade-off is that the difference in costs is usually covered by whoever’s goods are transported so that they have a reliable, dependable source of transport.

Nonetheless, with a growing market and so few livelihood opportunities as easy as charcoal retailing, the number of participants is growing quickly.

However, with realisation that this cannot go on forever, there are growing opportunities for sustainability, and almost all interviewees in the surveys acknowledged this as a major wish, for government to set up national and local frameworks that would regularise the chaos, that would institutionalise the roles of supply chain players to prevent the ecological disaster that most believe is coming, and to legitimise and formalise their key roles in the sector so that as the feedstock reduces, as the forests diminish, they do not get squeezed out.

Thus, the most critical recommendation that the Team makes after this study, is for TFCG, MJUMITA and SDC to encourage actively the regularisation and formalisation of the sector through Parliamentary legislation that takes into consideration the crucial, essential livelihood and economic needs of, particularly, the poorest in the chain, in order to make the charcoal sector a legitimate economic sector that can be invested in, like any other sector (like coffee, like tea, like tobacco) to realise the full importance of its contribution to the national economy.

Project Survey, Interview and Analytical Review of the Charcoal Supply Chain

Wood Harvesting

Seven charcoal producers were interviewed in four villages. Two each were interviewed in Nyali (Kilosa Township), Ulaya Mbuyuni (Kilosa Township), Msimba (Mikumi), and one in Ihombwe (Mikumi). The respondent in Ihombwe did not answer most questions. The six others participated fully. For purposes of analysis only the six respondents who participated fully are referred to from here onwards. One of the five is a woman. Most have only been producing for several years, although two have been producing for 20 years or more.

All of the producers interviewed harvest most of the wood used for charcoal production themselves. None of them purchase wood. None of them hire labour to harvest or cut the wood, although several occasionally utilise family labour. They harvest the wood on both their own land and forest reserve land (although this was obviously a sensitive topic).

Supply

Charcoal Production

Table 10: Charcoal Producers Interviewed

Village	Town	District	No Produc
Nyali	Kilosa	Kilosa	2
Ulaya Mbuyuni	Kilosa	Kilosa	2
Msimba	Mikumi	Kilosa	2
Ihombwe	Mikumi	Kilosa	1
Total Char Producers			**7**

Charcoal is important to all of the producers. It is the major source of payment for school fees for four of the six who responded. Two responded that the most important livelihood benefit of producing charcoal was to pay for medical or health care. Only one of the six said charcoal provided income for food. This was backed up by the 8 village leaders interviewed. While they saw charcoal as an important livelihood issue, they saw it as contributing most towards education ("paying school fees"). There is virtually no organisation to production. Each producer produces for himself or herself.

Figure 3: Traditional Charcoal Production – Medium Scale, Kilosa

The only two "investments" in charcoal production are their own labour and "capital". Three of the six have invested capital in their production (between TZS 50,000 and 100,000 each). The source of that finance is themselves. They cut the wood into relatively small pieces for ease of transport to kiln and to improve stacking in the kiln. Harvesting and cutting wood accounts for most of their labour spent in production. Again, they all say they "sometimes" use family labour for wood harvesting and cutting.

All say that the source of the wood they use to produce charcoal comes from "natural forests", with two saying the wood is "hardwood" and one saying it is plantation. Later in the survey, they all say the wood comes from their own land and they all say it also comes from village land. It is not clear why this contradiction is there. Perhaps it is that there was not a clear distinction in their own minds about the different terms.

None stated they obtained wood from managed forest areas. None know of anyone who obtains wood from trees that have been replanted. They all say trees are getting more scarce (fewer trees, bringing wood from further away, etc.) and that it is increasingly difficult (year-on-year) to obtain their wood supplies. They all say there are more people producing charcoal and see the link with growing scarcity. They all recognise that lack of forest management and deforestation is occurring, and that charcoal production contributes to that. They all recognise, like almost all transporters, consumers and local authorities that this could be countered by improved forestry management ("planting trees", as most of them said). .

Four of the six say they would pay for wood that was "sustainably-produced", paying TZS 10,000 per tree to yield 10 bags of charcoal – it seems a common assumption that one tree yields 10 bags of charcoal which they sell at between TZS 5,000 per bag to TZS 8,000 per bag to people on bicycles (four of the six) or cars (two of the six).

They do not make charcoal sustainably, nor do they know anyone who does. Most would like to have "improved technology" in order to get higher charcoal yields.[11] They agree (see above) that replanting would be a good thing and would mean that they would not have to go as far as they do now to get trees. They also believe that the charcoal business could be improved by organisation, by co-operation.

"Taxation" is an issue for all of them, with one even mentioning "going to jail" because of not paying "tax". They do not seem to understand upon what basis they are taxed. It is significant that all think that "certifying" charcoal would be a good thing, but, not one of them think it should be certified by local authorities. All believe it should be certified by "NGOs" which is probably partially due to the presence of TFCG, their familiarity with TFCG and the fact that the enumerators were introduced by TFCG.

They "occasionally" sell to lorries. None sell charcoal to "large charcoal (dedicated) lorries". They know which markets the charcoal is destined for, mainly Kilosa and Dar es Salaam. Buyers look most for quality and quantity. The producers do not mention price explicitly, but, buyers who seek quantity and quality are looking for the best buy, either for themselves for those they sell on to. No buyer has ever asked any of the producers for "sustainable charcoal".

They all produce charcoal essentially in the same manner. All cut the wood into smaller pieces primarily to arrange better, but also to make it easier to carry from harvest point to production point. All produce in the "basic earth kiln (BEK)". They all bag their charcoal and all say they know the weights (either 60kg or 100kg).[12] Yields vary from 5 bags of charcoal (at 100kg) to 30 bags (at 100kg for one and 35kg for another). They all bag charcoal in traditional "gunias" (sisal bags).

Production quantity varies from 5 bags to 30 bags per month. They sell bags at between TZS 7,000 per bag (one producer) to TZS 8,000 (two producers), to TZS 13,000 and TZS 14,000 (one each). All agree the price of charcoal varies throughout the year, with all saying the median variation is about TZS 7,000 to 8,000 during the course of the year. None produces charcoal year-round (see above). All interviewed are farmers. They produce charcoal during the dry season primarily. They do not produce during the rainy season, during planting or harvesting times. There is a shortage of labour during those periods.

They all have an idea of their cost structure, with "transport of wood" accounting for the highest portion of their costs, followed by labour. The fact that they are all (but one) aware of their cost structure and that all but one prices their own labour demonstrates a level of business understanding that is very important for going forward, either in terms of formalising the business and/or in moving to sustainability – particularly when coupled with the fact that all but one knew what they would pay for a sustainably-produced tree.[13]

[11] It is obvious the respondents have heard about improved charcoal technology. It is doubtful that most producers in Tanzania would have heard of "improved technology" any more than they would have heard about "sustainable charcoal".

[12] It is difficult to understand how they would all know the differences in weights of bags – unfortunately, they were not asked how they knew. Perhaps, during their charcoal producing time they have had buyers who have brought weighing scales with them. Perhaps they were prompted. However, from transport interviews, most bags are in the 80-100kg range.

[13] This further reinforces our observations that the same people who produce charcoal (those interviewed) are also actively involved with TFCG's/MJUMITA's PFM in their villages. So, they are aware of "sustainable wood production", the benefits of replaning and forest management, hence their responses to the questions.

The median net revenue per bag is TZS 2,500. Again, when calculating their stated costs and yields, this net return shows they are aware of their business cost and sales structure. All said today's selling price is TZS 7,000 to 8,000 per bag. There was considerable difference in how many bags they sell, but, the sales price and the net return per bag was very close amongst the respondents.

When asked how they could increase yields and returns, they all said "change methods of production", which coincides with their other responses on wanting "improved production technology" and education/training. When asked what they would change to make the charcoal sector work better for them, the responses were all different, ranging from setting up marketing centres, to planting trees, to reducing taxes – each gave a different answer and no answers were shared.

Charcoal income was "very important" to three of those who answered and "somewhat important" to the other two. When asked if charcoal was more difficult to produce today than earlier, four responded with (in order of number of responses):

- More people producing charcoal;
- More difficulty obtaining trees;
- Policy and regulations (1 respondent);
- Fees (one respondent); and,
- "Hidden sector" (probably meaning that it was "underground", not "formalised", illegal).

Figure 5: Traditional Charcoal Production, Medium-Scale

When asked how important charcoal earnings were for them, five responded, with three saying charcoal was a very important source of revenue and two others saying "not so important". When asked what the most important challenges they faced in the charcoal sector, they responded, in order of frequency:

- Informal sector;
- Lack of markets; and,

- License, fees, fines;

Four of the six said they cared whether charcoal was produced sustainably. When asked why they cared, they responded that it would increase production (and incomes) and would "preserve the forest". None felt that charcoal production was good primarily because of deforestation and climate change. When asked how to improve this, four out of five said "improve production" and one said plant trees. All were in favour of certifying charcoal and, as stated above, all were in favour of certification being carried out by an NGO.

Figure 6: "Pan" – Land where Charcoal has actually been

Fired Destroying all Residual Vegetation - Morogoro

Analysis:

- The respondents seemed well aware of their business, the technology, their costs and net revenues, where their products were destined;
- They all had a good view of what was happening environmentally and had similar answers on how to tackle this;
- Their primary problems related to the lack of "formalisation" of the business;
- They all had good ideas how to increase the value they accrued from production.
- Most said that "fees", "licenses", "taxation" affected their business, but, at least through the interview, questionnaire process, the reasons for this or what might be done about this, did not come out (as with all respondents, they were reluctant to give details on "irregularities").
- They all recognised seasonal variability due to agriculture and weather, but, there did not appear to be a good understanding of how the market worked downstream, i.e. what really happened in terms of prices, market players, etc once they sold their charcoal.

This latter point is essential as it shows that amongst all market actors surveyed during this study, charcoal producers had the poorest understanding of the workings of the market place and their positions in it. That is, as with subsistence and small-scale farmers in most developing countries, they are price takers. They know, from the people who buy their charcoal, from the smallest purchasers (bicycles) to the largest, what quality and quantity the market demands (hence, response to demand for 90kg bags). But, they do not have any knowledge of how that is set, or, fundamentally, how to influence those factors.

Charcoal Transporters

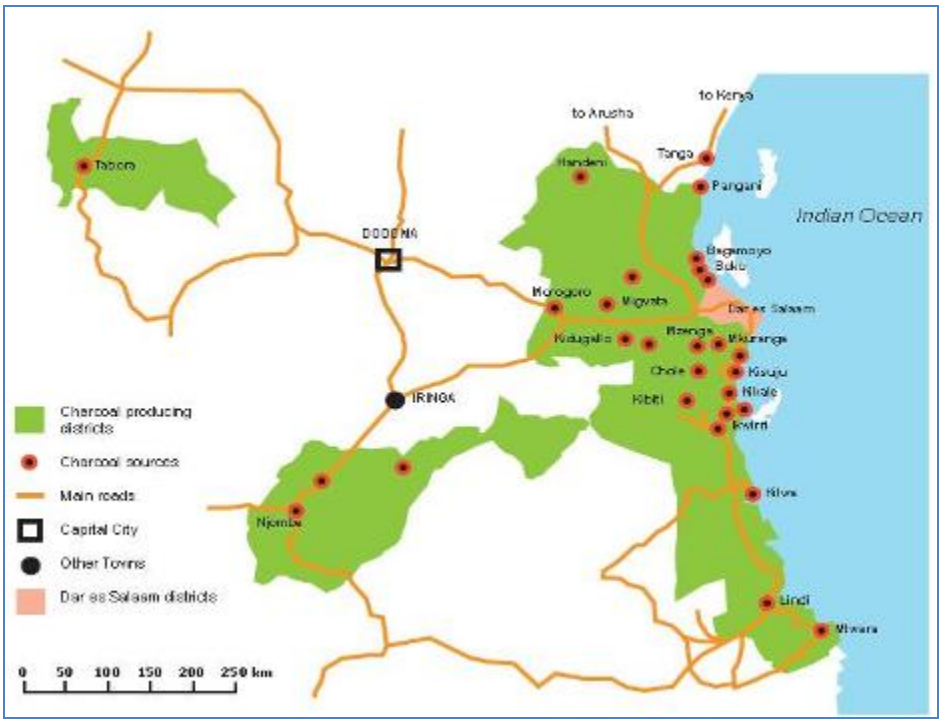
The Team interviewed thirty transporters in the following areas using the following modes of transport.

Figure 7: Livelihood Transport – (Kilosa, February 2013)

Table 11: Charcoal Transporters Interviewed – February 2013

Town	District	Bicycles	Motorcycles	Non-Charc Lorries	Small Char Lorries	Large Charc Lorries	No Transporters
Dar es Salaam					2	8	10
Kilosa	Kilosa	2				3	5
Mikumi	Kilosa	2					2
Dakawa	Mwomero		2				2
Mwomero	Mwomero	2					2
Morogoro	Morogoro	3	3	2	1		9
Total Transporters		**9**	**5**	**2**	**3**	**11**	**30**

Figure 8: Charcoal Supply to Dar es Salaam, Geographic Sources of Supply 2012



Given the wide range of transporter modes for charcoal and where different forms of transport are employed, the wide number of regulatory and tax costs incurred vary widely. Furthermore, given the wide number of overlapping jurisdictions (i.e. village authorities, district authorities, Tanzania Forest Service/MNRT, Tanzania Revenue Authority, traffic police) and the varying ability of different transport groups to negotiate leads to wide differences in costs incurred by each modal group. Finally, given the fact that much of the "tax" and "revenue" collected is, in fact, unregulated, transporters were reluctant to provide information and information varied widely.

Based upon the above, the surveys reinforced what other studies and reports have highlighted, namely that these "revenues" account for a significant proportion of the final price of charcoal and account for major costs to transporters.

Bicycles

Bicycles usually transport charcoal from production point primarily to urban wholesalers, retailers and even final consumers. They carry an average over two 90kg bags per trip (some carry more, some carry only one). They all own their own bicycles. Their primary costs are charcoal, various taxes, fees and bribes, repairs and maintenance of their bikes, ropes, sometimes bags, and the cost of their own labour. They almost never buy from the same producer. Bicyclists are the poorest and most vulnerable transporters.

Most transport charcoal from producer to urban buyers every day or every other day. As with producers, they complain that there is more competition from other transporters, primarily other bicycle transporters every year. Almost all are independent – i.e. they are not transporting charcoal for anyone else. All respondents said they travel they sell their charcoal the same place every time. Of those interviewed, most only transport charcoal – i.e. transporting charcoal is their major source of livelihood.

They have the least ability to negotiate the fees they pay to village governments, to TFS/MNRT, to district authorities and to police. They complain more than any transporters about harassment. A number said they are arrested by forest officers, by police. They all complain about corruption at a village, district and police level.

The most oft-cited complaint given by bicycle transporters was paying bribes to the police. Considering almost all those interviewed during the surveys were transporting charcoal to towns, purchasing it for an average of TZS 7,000 per bag and selling it in urban areas for an average of TZS 20,000 per bag.

All said they paid village taxes of an average of TZS 1,000 per bag. Most said they paid MNRT (which usually means TFS) another 1,000 to 2,000 per bag, variously for "charcoal fee" or "license". They say they pay between TZS 1,000 and TZS 2,000 per trip to police. Some say they pay a further TZS 2,000 per bag to "district authorities" at "checkpoints". The minimum a bicycle transporter pays in "taxes" is TZS 3,000 per bag, while some (on an unlucky day) pay TZS 6,000 per bag. This leaves them with a net of TZS 14,000 to 20,000 per trip.

Motorbikes

Five motorcycle drivers were interviewed. Transporting charcoal is not their major activity. They care other goods and passengers as well. Most have only been in business a short time (one to three years).

They only transport charcoal for themselves, not for others. Unlike bicycle transporters, those interviewed buy charcoal from "others", not producers. This is shown by the average price they pay for a bag of charcoal, TZS 14,000. They sell it at the same place all the time selling a bag for an average of TZS 20,000.

None of the respondents transport charcoal as their major item – they transport goods and people, with charcoal being just another good. Almost all carry charcoal one way, passengers and goods in the other direction, so, the cost of transport is difficult to calculate, but, is relatively minor. They do not complain of harassment and, of all the transporters, they pay the fewest fees.

Lorries

Only two non-charcoal lorries were interviewed. They were carrying several bags of charcoal on "backhaul" from other destinations. They said they always carry charcoal on their backhauls. They said they did not pay any fees or taxes.

Dar es Salaam Charcoal Transporters

Ten transporters were interviewed in Dar es Salaam.[14] Eight of them were large charcoal lorries and two were small charcoal lorries. The two small lorry respondents owned their vehicles as did two large lorry respondents. Two of the respondents were women, and their lorry owners were women. The two small lorry owners were also the drivers of the lorries, making them "owner-operators".

Only one of the ten said there were more transporters today than previously. The rest mainly said "about the same" while two said there were fewer transporters today. This is noticeable because this was the only group on the supply side who did not feel there were more people in the business now than in the past. This corresponds with our observation, and those of others that the large transporters-lorries-wholesalers highlighted by the World Bank are diminishing in number and importance. Further, they do not view bicycle transporters, automobiles and other "casual" transporters as competition.

Figure 9: "Small" Lorries Engaged in the Business

Interviews with wholesalers and retailers, and with consumers support this observation. Only two of the ten Dar es Salaam transporters said they "only" carried charcoal – all others said they carried goods out and charcoal back. In fact, of the ten, six said that charcoal was not their primary business, although they actively engaged in it and were engaged in it when the interviews took place. Eight of the ten cannot be considered "dedicated charcoal transporters" – as they are "back haulers" of charcoal – i.e. the economics of their transporting charcoal is driven, in part, by the financial benefit of returning from transporting other goods with a load of charcoal.

[14] Several of these interviews were undertaken at Forestry checkpoints in Dar es Salaam, given considerable difficulty in getting transporters to engage with enumerators in other parts of the city. Camco went to Forestry and received permission to interview at checkpoints. This most certainly influenced some responses, particularly those dealing with revenues.

Five of the ten said they always purchased or sold charcoal at the place they were being interviewed, while three said sometimes, and two said they rarely bought or sold charcoal at the point of interview. The ones who did not purchase charcoal at the point of interview provided details of three places they purchased charcoal, with no one place of purchase figuring most prominently. Four of the ten transported charcoal for others, with three of the four "always" transporting for others (one always for the same person, and two "most of the time").

Four of the ten said that they always transported charcoal to the same destination in the Dar es Salaam area, while the others said "no" – i.e. they transport it to different areas. Large lorries carried from 60 to 90 bags in one haul, while the smaller lorries transported 40 bags at one time. They said they paid TZS 7,000 to TZS 8,000 per bag, which corresponds directly with what producers in Kilosa said they sell their charcoal for and what bicycle transporters said they paid for charcoal.

Responses to questions asked by enumerators on how much transporters made per haul and whether that varied were either not answered or the responses were not realistic. This was obviously a sensitive subject, particularly since several were interviewed at places where Forestry and TRA (Tanzania Revenue Authority) collect fees.

However, from these interviews, from interviews of lorry drivers in Morogoro and Kilosa (who were carrying charcoal to Dar es Salaam) and from key informant discussions, the following cost profile holds true:

- TRA accounts for their biggest "tax" (and the one they complain about the most, with the average lorry driver paying TZS 2,000 at TRA checkpoints;
- Large lorries generally pay village charcoal "permit" at an average of TZS 500 per bag;
- Occasionally they pay TFS charcoal production fees on average of TZS 1,000 per bag;
- They pay district "taxes" on average of TZS 1,500 per bag;
- They pay "road license" on average of TZS 1,000 per bag;
- They complain about paying "other costs" to police on the road, but, it is a major complaint.

Thus, at minimum, they pay TZS 6,000 per bag in taxes, permits and licenses. On average, when taking police and other "extra" costs, TZS 8,000 per bag is average (Table 11).

Transport costs for fuel to and from Kilosa for a dedicated lorry are, on average, TZS 6,000 per bag. Costs for lorry insurance, depreciation, maintenance, spares, driver, loading and unloading, amount to another TZS 4,000 per bag, for a total transport cost of TZS 10,000 per bag, less than the average cost for taxes, licenses, permits and "other" costs paid to officials.

Thus, with the cost paid to the producer, the various taxes and fees and the transport costs, large dedicated lorries in Dar es Salaam, pay some TZS 25,000 per bag. Wholesalers in Dar es Salaam pay, on average, TZS 30,000 per bag. On average, then, a large, dedicated lorry will net some TZS 5,000 per bag, less than 15% of the consumer sales price.

Table 12: Cost Structure for Large Dedicated Lorry – Kilosa to Dar es Salaam (TZS per bag)

Item	TZS	% Final Consumer Price
Payment to Producer	7,000	18%
Payment to "Officials"	8,000	20%
Cost per bag of Transport (fuel, spares, labour, etc.)	10,000	25%
Sub-Total Costs	**25,000**	63%
Wholesaler & Retailer Margins	10,000	25%
Net to Lorry per Bag	**5,000**	**13%**
Average Consumer Price	40,000	100%

In terms of problems encountered in transporting charcoal, the following, in order or frequency, were cited:

- Police harassment ("disturbing frequently" or "all the time") was cited by six of the ten;
- TRA (unspecified why it was a problem) cited by four of the ten;
- Others included being cited for exceeding weight limits; and,
- DFOs (District Forest Officers, who have to issue a transport license) not readily available, causing delays in getting licenses to travel.

When asked how they dealt with these problems, the most often-cited response was "just talk to get a solution", followed by "play by the rules".

When asking what expenses were incurred during transport, the most frequently cited were:

- Paying TRA fees;
- Paying local taxes and other costs ("village tax" and "district costs");
- Having money to pay police;
- Maintenance for the vehicle; and,
- Fuel and oil.

All but two said they needed special licenses for transporting including:

- Forest Registration License;
- Charcoal Production License;
- Forest Produce Cess;
- "Village Permits;
- Local Government Transit Pass;

- Transit Pass;
- TRA fee; and,
- MNRT.

It is clear that some of these answers relate to the same charges or taxes, just with different names. However, it is also clear that transporters, whether bicycle transporters or large dedicated lorries, face a large and confusing number of fees, legal and not-so-legal, to transport charcoal.

This was a key issue raised by the World Bank and the BEST Tanzania Scoping Study Team in their work in mid-2010. This certainly raises the transaction costs of transporting charcoal, and, judging from responses, increases the risks of carrying out the business. The respondents listed reducing the number of licenses, reducing taxes and reducing police intervention as the three most important areas for price reduction.

The most oft-cited responses on how "to make the charcoal business work better" were (in order of frequency):

- Reduce the number of licenses;
- Have and enforce bag weight limits;
- Improve education on charcoal production;

All knew the source of their charcoal and could name it.

Only 1 bought from one seller, the rest from more than one. Six buy it from producers, while 3 buy it from charcoal sellers in villages and towns. However, the 3 who said they buy it from sellers in villages and towns, also said their primary source is charcoal producers themselves. Half said they bought from the same source all the time and the other half said they did not.

In terms of the value chain, while they have some contact with producers and with vendors (wholesalers, retailers and some consumers), their livelihoods depend most upon their interactions with authorities and with the way the authorities "tax" them, either legally or not. Governance is more obvious to the transporters, particularly the big ones, because they are in more contact with a range of authorities than any other group in the supply chain. While, ultimately what authorities do with the transporters affects all others, authorities are more directly important to the value these stakeholders have than any other along the supply chain.

It is clear from all interviews along the supply chain that these transporters (the largest-scale) were the most affected, in terms of market share, by the growth in the charcoal business, and the growing number of players. However, because charcoal was not their only source of livelihood (unlike smaller transporters, charcoal wholesalers and charcoal retailers), because they are able to diversify into transporting other goods (or had all along), they do not seem concerned that their relative share of the charcoal business is reducing – perhaps, in absolute terms, because charcoal is growing so fast as an economic activity. Whatever the reasons, they did not seem concerned about competition.

All said they cared about whether charcoal is sustainably-produced or not, with all citing halting deforestation, environmental degradation as the main reason. All ten said that current charcoal production is not good for the environment. Tree planting was the most often-cited answer to deforestation and land degradation through charcoal production.

All agreed charcoal should be certified. Answers were mixed as to who should certify, with half saying central government (MNRT) should certify. This is understandable because they have little or no contact with TBS or NGOs, and, in the scheme of things, local authorities have less of an economic effect, less of an influence on the value of their work, than TRA and MNRT.

Non-Dar es Salaam Transporters

Nine transporters were interviewed in Morogoro, five in Kilosa, four in Mvomero (Dakawa and Mvomero) and two in Mikumi. In Morogoro, three bicycles and three motorbikes, as well as two non-"dedicated" (i.e. general) lorries and one small charcoal lorry were interviewed. In Kilosa, two bicycles and three large "dedicated" charcoal lorries were interviewed. In Mvomero, two motorbikes and two bicycles were interviewed, while in Mikumi, two bicycles were interviewed.

For the large "dedicated" charcoal lorries in Kilosa, two of the three interviewees were women. Like the large Dar es Salaam charcoal lorries, they felt there was less business now than before. Again, we believe this reflects a shift in the modes of transport from large lorry-wholesaler-transporter over the past few years to smaller transporters. This appears particularly strong in smaller urban areas where individuals (bicycles, motorbikes and automobiles) are increasing in importance.

Figure 10: Charcoal Transport by Motorbike

None of the large lorry drivers had heard of "sustainable charcoal" before. They were 100% "dedicated" to charcoal (they said they did not transport anything else). Two said they only transported for one buyer while the other said she transported for several. They all were transporting to Dar es Salaam and they said they carried about 80 bags and paid an average of TZS 30,000 per bag. Either they misunderstood

the question, as no transporter pays much more than TZS 7,000 per bag in rural areas, or, as with large lorry respondents, they were very cautious about revealing much information about costs and revenues.

Cross-checking multiple answers, it is clear their cost structure is very similar to the respondents of dedicated large lorry charcoal transporters interviewed in Dar es Salaam. They cited virtually the same list of "official" charges and issues with those.

As with Dar es Salaam large transporters, they cite authorities, from local authorities, to police on the highways, to TRA as their biggest concerns. Again, the reasons are fairly obvious. Given the large amount of charcoal they transport, they attract the authorities' attention.

Bicycles were all driven by men; motorbikes by men and women. As with lorry respondents, all have been in the business a relatively short period of time (1-3 years). Compared to large lorry respondents, they all stated that there was more charcoal available "now than before". They all stated that there was more demand now than before. They all buy directly from producers.

They share with larger transporters the same, if not more, problems with authorities. Their responses were quite open and vocal about "corruption", "being arrested" and having other difficulties with local authorities and officials in their business. As one would expect, these are the most vulnerable transporters. Indeed, given the fact they often travel relatively long distances, they are the most exposed to governance issues of anyone in the supply chain – and, because of that, they are the most affected in their value chain by the vagaries of officials.

Almost all think current charcoal production is not good for the environment. Their answer to improving "the business" is to plant more trees and educate the producers. There is no group along the supply chain whose livelihoods, hence the value of their livelihoods, are as intertwined with another group, namely producers.

They understand producers and production, as one would expect. Given the increasing number of these small transporters, anything that "regularises" and simplifies laws and regulations will go a long way to improving the value of their enterprise, reduce their vulnerability and improve their livelihoods.

Vendors – Wholesalers and Retailers

The Team interviewed 53 sellers, 26 in Dar es Salaam, 18 in Morogoro, 8 in Kilosa and 1 in Mikumi.

Table 13: Summary of Vendors Interviewed

Group \ Geographic Area	DSM	Kilosa	Mikumi	Morogoro	Total
Traditional Charc Retailers	6	6	1	5	**18**
Traditional Charc Wholesalers	9	2		5	**16**
Supermarkets/Petrol Stations	11			8	**19**
Charcoal Vendors/Sellers	**26**	**8**	**1**	**18**	**53**

Actually, only four out of 19 (11 in Dar es Salaam and 8 in Morogoro) classified as "supermarkets and petrol stations" sold charcoal – so, the actual number of charcoal vendors (sellers) was 34. Nine wholesalers were interviewed in Dar es Salaam, five in Morogoro and two in Kilosa. Eighteen retailers (6 in Dar es Salaam, 6 in Kilosa, five in Morogoro and 1 in Mikumi) were also interviewed.

Wholesalers

Wholesalers are very similar, as one would expect, to large charcoal lorries. They keep information related to price pretty much to themselves. However, they buy from a relatively large, and growing, number of suppliers. They sell to a relatively wide number of buyers (both retailers and final consumers). They tend to have been in the business longer than any other group in the charcoal supply chain, much as one would expect.

They have the most intimate and best knowledge of the charcoal business of all stakeholders, knowing in fairly good detail where charcoal comes from, how it is produced and from what stock of trees. They are the most established of all the players in the business and are probably the least vulnerable – they are less affected by official policy, or lack of it, than any other group.

They probably have the strongest negotiating position, although they realise that with the increase in the number of suppliers and buyers, their position is weakening. However, they counter that by widening their sources of supply and by widening their sales base. Wholesalers are adapting the changes in the charcoal market perhaps better than any other players. The value they get from the business is also probably the least changed over the years, given their adaptability.

Figure 11: Large Rural Wholesale Charcoal Depot

Charcoal Retailers

Charcoal retailers have many of the same characteristics of small-scale transporters in the charcoal business, although they have considerably less problems with local authorities and police. They face the stiffest competition of any of the players in the supply chain. This is due to their being in an urban environment

where there is considerable, and increasing, demand for jobs and means to earn a livelihood. They feel it and are the most articulate of any group about how the charcoal business is growing and how they are affected by it.

Figure 12: Charcoal Retailer – "Debes" (tins and buckets) & "Gunias" (bags)

That said, like the small-scale transporters, they benefit from the growth of the market and its transformation. Many have taken to delivering directly to consumers.

But, all have seen their margins between purchase and sales price reduced more than any other players in the supply chain. As with all informal urban sectors, they are subject to changes in the market and competition is their biggest concern. Most of those interviewed have not been in the business long, but, they feel the pressure.

They would like the market to be formalised. They, like low-income households and the more traditional small-scale restaurants and hotels, would like to see charcoal prices regulated, formalised. They would benefit considerably, as would producers and small-scale transporters from a formalisation of the charcoal business, with fewer policies and more certainty.

Supermarkets and Petrol Stations

Over the past several years, a number of supermarkets have started importing charcoal, primarily from South Africa, but also from the United States, to sell in relatively small quantities (2kg, 5kg and 10kg). The Team also interviewed a number of petrol stations as several had actively sold charcoal briquettes during the USAID-supported "Charcoal Briquette Marketing in Dar es Salaam Project".

Of the thirteen supermarkets and petrol stations interviewed, six supermarkets (no petrol stations) were selling charcoal. They all said they were selling primarily to expatriates and understood that demand was almost entirely for "barbecues" or special occasions. It is not a major product for any of those who sell it.

Three of the six also buy local charcoal which is sold in small plastic bags, primarily for convenience for customers who do not wish to buy from “traditional” sellers.

As one would expect, prices bear no reflection to traditional retailers. The imported charcoal is briquetted. Prices vary considerably from one supermarket to the next, but, quantities sold are relatively small – i.e. demand is relatively low.

One supermarket had heard of sustainable charcoal and had sold some. They all said they were interested in it, but, none would like to pay more than a small premium for sustainable charcoal. Given the small demand for charcoal in their stores, they did not see sustainable charcoal as a very attractive item that had much scope for expansion, although they were interested to learn more**.**

Background to Sustainable Charcoal

Profile of Sustainable Charcoal Projects, Other Charcoal Substitution Projects and Lessons Learned

There have been, and are, a number of biomass supply (as opposed to biomass demand reduction or efficiency of utilisation) projects and activities since the 1980s. There are currently at least ten which range from small community-based biomass briquetting projects to the relatively large Dar Charcoal Project (WWF, Camco, Barclays Bank).

All have, or have had, one thing in common – trying to reduce the amount of unsustainable charcoal production either by substituting non-woody biomass, or by supplying sustainable charcoal production, for unsustainable charcoal . Only three fit the category of sustainable charcoal production from wood, and only one of those, Dar Charcoal, has operated (and continues to operate, on a community-based "participatory forestry management (PFM)" approach for replanting trees (afforestation/reforestation) with dedicated components for community-based sustainable charcoal production, and private sector-led and –managed charcoal marketing.

Key lessons should be drawn from both the Dar Charcoal Project (WWF, supported by Barclays Bank, with Camco Clean Energy Tanzania Ltd)[15] and East Africa Briquette Co. Ltd. (EABC - Tanga). The Dar Charcoal project is ongoing. East Africa Briquettes also continues to operate. Sao Hill Industries (Mufindi) is about to start production of charcoal from wood residues in their sawmills.

Dar Charcoal Project

Dar Charcoal was designed essentially as a pilot project to stimulate afforestation/reforestation (tree planting) in three villages in Rufiji and three in Kisarawe, major charcoal supply areas for the Dar es Salaam market. Dar es Salaam accounts for half of Tanzania's charcoal demand. The forest resources of both Rufiji and Dar es Salaam have come under rapidly increasing pressure to supply Dar es Salaam with charcoal.

The Dar Charcoal Project was designed to provide the support, the organisation and the incentives to reverse this forestry resource degradation trend and to improve the livelihoods of producers - all of whom are farmers - simultaneously. The Dar Charcoal Project was also designed to improve charcoal production efficiencies and to market "sustainably-produced charcoal" in the Dar es Salaam market.

"Sustainably-produced charcoal" was intended to be sold to urban consumers with a "price premium" (the premium being a higher price than traditionally-produced charcoal) that would incentivise village producers to plant trees to replace the ones they harvested to make charcoal. The project was also designed to sell the greenhouse gas emission reductions resulting from reduced deforestation and degradation (REDD+) through

[15] The Dar Charcoal Project is still underway. Here, the term "was" is used only for convenience sake, rather than writing "was/is" throughout the report.

tree planting in charcoal-producing areas and from improved charcoal production efficiencies (leading to less emissions from the carbonisation process).

This "carbon finance" component of the project has yet to be put into commercial practice, although a high-level commercial initiative, called TanCarbon Market Ltd., is currently underway to commercialise emission reductions by selling them to Tanzania-based entities (e.g., companies, embassies, individuals).

Figure 12: Dar Charcoal "Half-Orange" Kiln – Rufiji, Tanzania

Dar Charcoal was intended as a pilot to determine whether "sustainably-produced" charcoal could work, from a livelihoods perspective to a commercial perspective. It is based upon "participatory forest management (PFM)" principles to supply charcoal producers with wood on a sustainably-produced basis (at least one tree planted for every tree harvested).

Figure 13: Dar Charcoal Project: Rufiji – Branded Charcoal Bags (56kg)

In addition, the project piloted charcoal producer organisation. This differed from other pilot "sustainably-produced charcoal" projects, such as Tanganyika Wattle Ltd. (under the World Bank's Energy I Project, 1988 to 1994) and the Sao Hill Green Resources A/S (GRAS) pilot at Sao Hill Industries Sawmills (2010-2011), where single industry projects utilise wood waste as charcoal feedstock.

More fundamentally, Dar Charcoal differs from almost all other charcoal production in Tanzania in that there is virtually no history of farmers/producers getting together to produce charcoal in any kind of collective, whether a business, a co-operative or otherwise. This has been a major difficulty for the project because the concept of producers working together - except on a very ad hoc, occasional basis - is alien to charcoal producers. Unlike Kenya or Uganda, for example, there are almost no "itinerant" (full-time) charcoal producers in Tanzania – farmers engage in charcoal production as a supplementary economic activity to generate cash income to supplement what they earn from agriculture and livestock.

Organising producers has been one of the most difficult things about the project and one of the weakest links in the Dar Charcoal Project. Farmers expect to be paid for working directly for the project rather than to be paid as a group (and then distributing the proceeds). All farmers who participate in the project continue to produce their own "traditional" charcoal independently of the Dar Charcoal Project. It is what they know and understand. There is far less "risk" to producing one's own charcoal than to depend upon a group to produce – and, when a farmer produces charcoal on his or her own, they get all the revenues that buyers pay for their charcoal. They do not have to share it (except in taxes, fees and bribes) with other producers.

This will prove to be one of the major hurdles, if not the major hurdle, to TFCG in moving farmers into sustainably-produced charcoal groups. Farmers have not seen this before and have no experience with it. If a buyer is tasked with organising the producers, he or she will need a substantial incentive to take on the task, if they accept to do it at all. If there is one salient lesson to be learnt from Dar Charcoal, it is this.

Traditional buyers control quality by dealing on a one-by-one basis with producers. The market is so competitive that every producer knows that if they do not produce to the buyer's standard (the buyer is their only contact with the market) they will not sell their charcoal, or will sell it at a much reduced price. This is where the buyer has leverage and where the buyer is in a strong position, vis-a-vis the producer.

However, the producer is also in a relatively strong position in so far as they control their own production. Moving to a co-operative or group arrangement is untried and untested. It has many risks. This is not to say it should not be tried, but, it means the project has much more preparatory work to do than if it worked only with individuals. And, if it only works with individuals, improving the technology and sending the signals to producers on sustainability, will be more difficult and more costly.

Basic market research was undertaken and market trials were undertaken from 2010 to 2012. The two marketing experts made good connections with a number of commercial users in Dar es Salaam, primarily in the roast chicken, fast food areas where considerable charcoal is used. These commercial consumers were willing to pay a 20-25% price premium for sustainable charcoal partly on a "corporate social responsibility (CSR)" basis, but, primarily because the charcoal was delivered to them directly by the same suppliers. As our February 2013 survey shows, direct sales, reliability, quality and quantity of supply figure prominently in all commercial establishments.

The problems started when the producers did not uphold their end of the bargain. Actually, in point of fact, the problem was even more fundamental. The buyers/suppliers had no contractual leverage with the farmer/producers because the producers were organised by the Dar Charcoal Project. The Project was not able to manage the producers such that when the buyers came to collect charcoal, having been told that x bags were available, only y were available. Drivers had to sit for days at a time waiting to get the required bags of charcoal, incurring costs as they sat idle.

Further, there was a system of weighing and quality control, but, again, because that was left up to "the project", farmers felt under no real obligation to provide the correct weight or quality of charcoal. Hence, bags were collected by the buyers' transporters and delivered to customers that were underweight, poor quality with considerable charcoal fines, dust, wood and stones and other rubbish that most buyers are able to avoid in the current competitive market because they know what to look for and demand from suppliers.

Consequently, in short, the consumers became increasingly disillusioned with the Dar Charcoal product they were receiving. To make it worse, during this trial commercialisation period, the market transformed quickly and the 56kg bags almost became a thing of the past, replaced by the 90kg (plus) bags. While the regulations and licenses remained (and remain) for a 56kg bag, producers and transporters and sellers have been able to circumvent these rules by the much higher returns they can get selling larger bags, which enable them to incur and pay higher transaction costs from production point and stay competitive.

Dar Charcoal, as an "licensed" (therefore legal) commercial project, pays all the taxes, the cesses, the levies, and must comply with the weight standards. Hence, they are selling an "archaic" product that has little demand in a market that, as over 100 respondents in our February surveys and interviews said, wants "quantity and quality" above all else.

This, combined with the blurred lines of responsibility and commercial links between the project buyers and the producers led the buyers to stop buying charcoal from the project. Now, the Dar Charcoal Project collects the bags and sells them directly to wholesalers and retailers, a process that is not, at present, commercially sustainable without further financial and technical support from the Project.

Two key, fundamental lessons emerge from this, as has been highlighted above:

- Reduce the intermediaries to a minimum and put the purchaser/buyer directly in contact with the producers. Do not let the "project" be an intermediary because the producers will see the Project as the "bosses" (the ones who always pay) and not the buyers – this can never work in a successful commercial venture. Let the buyer determine how to organise production, or, give plenty of time, lots of education and hand-holding with producers to get them ready before introducing the buyer. Do not expect the buyer to do that. Commercial enterprises, particularly in the energy field, are not charities and do not like to take on charitable responsibilities.
- Either work to change the policies (in this case, size and weight of bags), which, in this case, means national policy, or find a niche that is satisfied with small quantities (i.e. do not go after traditional markets where the quantity-price metric is understood by all traditional consumers) with all the high transaction costs and inherent risks that entails.

If the charcoal is the same quantity and quality as the rest of the charcoal in the market, then pushing it out into the marketplace is relatively easy. But, finding consumers who will buy a "different" or "differentiated" product, particularly where it is not the same quantity as traditionally but of similar quality (except the implicit sustainability in the product) requires more marketing effort, more cost and real risks as to returns.

Almost none of the over 100 consumers and transporters said they would pay more than a 10% to 15% premium for "sustainably-produced charcoal" – though, to be honest, only a tiny proportion of them (less than 5%) had ever seen "sustainably-produced charcoal" and not many more (about 10%) had heard of it. Two beach hotels in Dar es Salaam said they would be willing to pay up to 30% more per bag for "sustainable charcoal" so long as quality and delivered quantities were guaranteed.

However, between these two hotels, monthly demand would be a maximum of 30 bags per month. Assuming there were 20 hotels and restaurants in Dar es Salaam who fit these two hotels' profiles, that would mean 300 bags per month. At TZS 20,000 premium per 56kg bag (which they said they might be willing to pay for sustainably-produced charcoal), that would mean TZS 1.2

This reinforces a crucial lesson from the Dar Charcoal Project. In a market that has tens of thousands of suppliers, where the overwhelming majority of the consumers, even the "high end" (as our surveys and the Dar Charcoal Project show) are very price sensitive, unless there is an overall policy and market change, capturing and holding any consumer group will be difficult, if the price paid per unit is significant.

While some consumers said that delivery was important, while some said packaging was important, while some said certification was important, almost all of those said that price and quantity was more important. As Dar Charcoal shows, with those consumer attitudes in the current market situation, it is very easy for a consumer to change suppliers in such a market and it is difficult to hold them.

It will take considerable work to do so, and any commercial buyer/marketer will take this, along with the costs and uncertainties of organising and guaranteeing supplies of "sustainably-produced charcoal" into consideration before committing to the activity. Until national policy changes, it is difficult to see how "sustainably-produced charcoal" can become a commercially profitable product without a lot of piloting activities.

All these factors are what the Dar Charcoal Project has faced from the beginning, and has worked to try to circumvent. Dar Charcoal was, and is, still a pilot project. There are major lessons from Dar Charcoal that are relevant to Kilosa and that must be taken into consideration, which have been elaborated above.

Other Sustainable Charcoal Projects

The first significant attempt to produce sustainable charcoal was pioneered by Tanganyika Wattle Company (Tanwat) in Njombe under the World Bank's Energy I Project (1988 to 1992). TaTEDO (Tanzania Traditional Energy Development Organisation), working with the Ministry of Energy and Minerals (MEM) led these pioneering efforts. They built several improved kilns using the wood residues from debarking wattle (acacia mearnsii) and from saw milling.

The bark is peeled from wattle and tannin is extracted from the bark. The wood is usually left as a "residue". Charcoal was made on a pilot basis and sold in the surrounding towns, in Morogoro and in Dar es Salaam. There was no community participation. All work was contracted out and when that component of Energy I

was complete, charcoal production at Tanwat ceased. They started using the wood residues to generate 2.5MW of steam-driven electricity serving their own operations and feeding into the local isolated TANESCO grid in 1995, which continues until now.

Sao Hills Industries (SHI), a subsidiary of the Norwegian firm "Green Resources A/S", has pioneered sustainable charcoal from wastes/residues from their sawmill operations from the largest forestry plantations in East Africa. Their projects, as with all renewable energy projects, were/are developed through Sao Hills Energy Ltd (GRAS's renewable energy resource development company in Tanzania).

The Norwegian Government funded a set of feasibility studies in 2009 including for a small-scale (2MW) and a large-scale (10MW) biomass waste (sawdust and wood waste from SHI's sawmills and timber processing plants) and a pilot sawdust/wood waste briquetting facility. SHI runs the largest sawmills in Tanzania. Considerable sawdust and other wood residues are produced during the sawing process. Some wood residues are used to heat a large industrial kiln, used to "cure" high grade construction timber. They did not see the value of briquetting under the CDM and recommended that not be pursued.

Figure 14: Green Resources A/S "Katuga Kilns" in Uganda

However, they made an application to the European Commission, under the EU's Economic Development Fund (EDF) to produce charcoal from wastes at their facilities in Mufindi District, Iringa Region. The objective of the project is to produce 7,500 tonnes of "sustainably-produced charcoal" from the residues from their sawmill operations. SHI let a tender for the first kiln, based upon their Uganda "Katuga" kiln, in July 2012. The tender was for production of 2,500 tonnes of charcoal per year. They will scale up to 7,500 tonnes per year over the next two years under the EU's grant .

It is not known what markets they intend to sell into or what their expected prices are. Their production, when they reach 7,500 tonnes, will be almost 135,000 bags of charcoal per year (if they sell them at the

regulated 56kg per bag), probably double what TFCG will be able to produce when in full production from their 18 villages, based upon sustainable production and harvesting.

Other Charcoal Biomass Energy Substitution Projects

There are an increasing number of relatively small projects in the briquetting area in Tanzania. The largest and most successful is East Africa Briquettes Ltd, in Tanga. This project started with an entrepreneur aggregating biomass residues from coffee husks, coconut husks and other biomass residues to supply the Tanga Cement Plant.

Pilot briquetting of residues began in 2005 with assistance from the UN. That project ran for two years. USAID made a grant to East Africa Briquetting to commercialise and market the briquettes, primarily in Dar es Salaam. Camco had the primary marketing contract. A number of sales outlets were established and briquettes were sold from 2008 to 2009. Jiten Chandarana was responsible for the marketing effort.

The project succeeded in selling a considerable quantity of briquettes, but, the cost of transport and handling, the difficulty of the briquettes (at that time) to be used in households without special stoves, led the project not to be continued beyond the USAID grant.

However, East Africa Briquettes continues to operate and sell briquettes successfully, selling some 60 tonnes of briquettes a month.

Tanzania's Appropriate Rural Technology Institute (ARTI) is operating the "Scaling Up Charcoal Briquette Production in Tanzania" as well as training local communities and artisans to produce briquettes from biomass. The Scaling Up Charcoal Briquette" project is funded by the Governments of Finland, Austria and the UK, with financing from the Development Bank of Southern Africa (DBSA).

ARTI is working through the Environment Partnership Programme with Southern and Eastern Africa" to replace unsustainable wood charcoal production with "sustainable non-wood charcoal" for households. The project is based out of Bagamoyo.

Figure 15: Small-Scale Extruded Carbonised Briquettes

Bagamoyo Brikwiti Company (BBC) was set up 2nd February 2012 by ARTI Energy Tanzania Ltd as its efforts to "Scaling-Up of Charcoal Briquette Production in Tanzania" got underway. Bagamoyo Brikwiti Company has

an ownership structure of 60% by ARTI Energy, 10% the local investor, and the remaining 30% opened local community members.

BBC uses charcoal dust to produce briquettes. BBC's extruder has a capacity of producing up to 9.6 tons per month. However, it has so far not been able to produce at that level due to frequent technical problems. The briquette produced are sold to households, food vendors and hotels at TZS 600 per kg. BBC works very closely with ARTI's other charcoal briquette producers, Mkombozi Group, Mlandizi Village in Kibaha District, who have invested in a 1.5hp electrical briquette extruder 11 months after receiving training through the "Waste to Wealth" project. The project, which is funded through the World Bank's Biomass Energy Initiative for Africa (BEIA), has helped 720 people in 24 villages in two Districts to receive comprehensive training and the basic equipment to begin producing charcoal briquettes.

Other small-scale activities include the Mkombezi Biofuel Factory in Kilimanjaro which produces non-carbonised briquettes for schools in the area. Mkombezi has been in operation since 2002. The Tumaine Village Group, in Kibaha District is also producing briquettes, supported by ARTI. The Kilimanjaro Industrial Development Trust (KIDT) has been producing small amounts of carbonised briquettes since 2000.

Figure 16: Map of Tanzania Showing Current Medium to Large Scale Briquetting Projects

Market Economics of Kilosa Sustainably-Produced Charcoal

Herein are some simple calculations, based upon discussions with the most interested potential buyers of TFCG Kilosa Charcoal (beach hotels in Dar). We lay out Table 12 (below) with our major assumptions and walk through the implications. We then set out a very simple financial analysis based upon costs verified by our surveys and interviews of both participants in the current charcoal market, officials, transporters and business people who transport and sell goods to and from Dar es Salaam.

Table 14: Assumptions on Potential Sustainable Charcoal Economics

Item	**TZS**	**TZS**
Current price per 90kg bag	40,000	40,000
Current price equiv for46kg bag	20,000	20,000
Premium per TZS 40,000 bag at 50%	10,000	10,000
TZS per 46kg bag, with 50% premium	30,000	30,000
Hotels/restaurants	20	40
Avg 46kg bags per establishment per month	50	50
Total DSM 46kg bags per month	1,000	2,000
Total DSM 46kg bags per year	12,000	24,000
TZS per month premium x bags/month	**10,000,000**	**20,000,000**
TZS per month equiv to x bags/month @ TZS 30,000 per bag	**30,000,000**	**60,000,000**
TZS per month equiv to y bags/year @ TZS 30,000 per bag	**360,000,000**	**720,000,000**
US$ equiv/month (x bags/month)	**18,750**	**37,500**
US$ equiv/month (y bags/year)	**225,000**	**450,000**
US$ equiv/month per bag	**19**	**19**
US$ equiv/year/hotel-restaurant	**4,500**	**4,500**

We start by assuming a traditional, current (February-March 2013) bag of charcoal sells for TZS 40,000 per bag in the retail market.

We take a positive view and say that the most enthusiastic potential buyers of sustainable charcoal (the up-market beach hotels, some of the safari hotels, and some of the high-end top restaurants) will pay a 50% premium on top of the TZS 40,000 per bag.

As Kilosa is looking to sell 46kg bags (in line with TFS requirements), which are effectively half the current 90kg weight, that implies that producers participating in this scheme, if they could get a 50% premium from buyers of their sustainably-produced charcoal, and could sell the 46kg bags for TZS 30,000 per bag (equivalent to TZS 60,000 for a 90kg bag).

We then assume that 20 of those establishments, owned by five companies, agree to purchase sustainably-produced charcoal from Kilosa and that each will pay the premium for a 46kg bag at TZS 30,000, and that each hotel/restaurant has a demand of 50 bags (46kg) of Kilosa's sustainably-produced charcoal, equivalent to approximately 25 "traditional" bags at 90kg, which is not unusual for the beach hotels and restaurants. This is our "low scenario".

If all 20 buy an average of 50 bags per month, that generates TZS 360 million (US$ 225,000) for 12,500 bags per year in revenues for TFCG's Kilosa charcoal.

If, we test a "high scenario" and double the quantities set out in the low scenario, some 40 establishments do the same, that will generate TZS 720 million per year (equivalent to US$ 450,000 per year), with each bag selling at TZS 30,000.

These are all assumptions from the top down, taking potential, unverified demand, just to examine the implications. Using the high scenario, the 24,000 bags per year account for about one-third of what TFCG believe participating sustainably-produced charcoal producers could get out of the 18 villages through good, sustainable forest management. That means that if demand were to increase significantly beyond those 24,000 bags, scale-up would have to take place very rapidly.

Table 15: Costs for Kilosa Charcoal (56kg TFS Specification Bag)

Revenues per Bag (56kg TFS standard) of Sustainably-Produced		
Net Revenues	**TZS**	**% Cost to Final Consumer**
Producer (per 56kg bag, TFS standard))	***10,000***	***28%***
Branded bag	500	1%
Storage & handling (per bag)	500	1%
Sub-Total "Farm Gate" price (per bag)	**11,000**	**31%**
Local taxes, licenses, etc.	1,000	3%
District taxes	2,000	6%
Road license	2,000	6%
Various other "payments"	1,000	3%
Sub-Total taxes, licenses & "other" payments	**6,000**	**17%**
Transport costs (Kilosa to Dar es Saalam, return 680km) per bag	***7,168***	***20%***
DSM Handling-Storage per bag	750	2%
DSM Delivery, per bag	1,000	3%
Cost per bag	**25,918**	**74%**
Sub-Total before profit	**25,918**	**74%**
Profit (15% per bag pre-VAT)	3,888	11%
Cost before VAT (per 45kg bag)	**29,806**	85%
VAT (18%)	5,365	15%
Final Sales Price per 30kg bag to Consumer	***35,171***	***100%***

The above represents a bottom-up approach for a single buyer, vertically-integrated supplier model. That is, this assumes that a commercial business person, or company, buys from producers in Kilosa villages to supply "sustainably-produced charcoal" to high-end, volume consumers in Dar es Salaam. The vertical integration means that they are the only buyer of this charcoal.

They provide bags with brands. They work with local authorities (including District Forest Officers) and the TFCG/MJUMITA project (preferably through a third party verifier) to certify the charcoal is "sustainably-produced". That means the wood is certified as coming from forest stock that is harvested from sustainably managed forests and that the production ("charring") methods are also to a set efficiency standard (not less than 20% conversion efficiency, contrasted to traditional charcoal which is rarely above 15% efficiency).

The commercial business person pays for storage in the villages so that when they send their transport lorries to collect, there is a full consignment (100 46kg pre-packed bags) of charcoal ready for the dedicated 5-tonne lorry they send to collect the charcoal. Handling is paid because the bags must be loaded and stacked to minimise breakage (a major complaint of buyers). They pay for the storage and for the loading of the

charcoal. The charcoal is transported at a cost of approximately TZS 720 000 per lorry load (approximately 7200 per bag of charcoal in transport).

They have one or more storage depots in Dar es Salaam which they pay for. They deliver charcoal to their customers. They look for a profit of 15% which is reasonable market rate for an enterprise such as this. As commercial charcoal is currently not value-added tax (VAT) exempt, they have to charge their customers 18% in VAT.

Under this bottom-up costing model, the equivalent value of a "normal" 90kg bag of charcoal, costed/priced in this framework, is approximately TZS 70,000 per 90kg bag, roughly 75% more expensive than the average price of charcoal paid in February in Dar es Salaam.

These costs have been obtained from four different companies who transport goods to Kilosa and Morogoro on a regular basis. They reflect transport that on a non-backhaul, "dedicated" basis, which, for reliability and quality control, is what a vertically-integrated business would (and does) demand.

Note that the charcoal producer gets approximately 28% of the sales price per bag of charcoal. This compares to 18% to 20% for charcoal producers today under the current ad hoc, non-sustainable system. The cost of transport, not counting taxes, road license, and "other payments" is 20% of the sales price. When the taxes, road license and "other payments" are added to the transport cost, the share of transport in the final sales price is 37%. Note that the wages and costs of driver and assistant are included in the transport cost (as is fuel, depreciation, spare parts, etc.).

The price paid to the charcoal producer reflects the cost of acquiring wood produced on a sustainable basis and the price of producing charcoal more efficiently (assuming 20% efficiency) and the investment in time, labour and materials that this requires.

It should be noted that no consumers indicated they would be willing to pay much more than 30% above current rates (and those were only several beach tourist hotel owners). The premium that almost all consumers who responded saying they would pay a premium for "sustainably-produced charcoal" was between 5% and 15%. A 15% premium on current (February 2013) consumer prices paid in Dar es Salaam would yield a sales price of approximately TZS 23,000 per 46kg bag, some TZS 12,000 less than the price we have costed for "sustainably-produced charcoal".

The only flexibility in the cost structure set out in Table 13, above, is the price paid to producer – effectively, all other prices are fixed. Reducing that price will certainly reduce the incentive to produce charcoal on a sustainable basis.

Annex 1: Research Survey Methodology, Framework & Questionnaires

Two research/survey teams were set up. One was headed up by Prof. R. Ishengoma to examine production, supply and transport. The other was headed up by Jiten Chandarana, focusing on demand and marketing working along the entire supply and value chains for this study. Over-riding themes of this supply-value chain primary research were engaging key players and stakeholders along the entire supply/value chain in an interactive, consultative interview process. This process involved explaining the concept and context of "sustainably-produced charcoal" to interviewees to form the basis for discussion (see below). The interview process was interactive allowing the persons interviewed to engage in dialogue with the interviewers.

Interviewees were selected to examine governance, market failures (and reasons for those), market dynamics and change (including competition and market failures both for traditional charcoal and "competitive" fuels, including "sustainably-produced charcoal). The role that charcoal plays in urban and rural "livelihoods" in production, transport and marketing was examined.

The Team developed a livelihood framework that drew upon the "M4P" – "making markets work for the poor" (www.m4phub.org)[16] – approaches to examine how structuring the charcoal supply and value chain can work for the poor to make sustainable charcoal "pay". While updating existing information, and generating new information and data (particularly on innovative approaches to marketing sustainably-produced charcoal) along the entire charcoal supply chain, the teams collected data and information that fed into developing strategies to improve returns to participants, particularly the rural and urban poor, along the entire value chain. Interviews encouraged those interviewed to provide their views on how returns might be improved at each stage of the value chain. Ultimately, results from the entire interview chain, from charcoal production to consumption provided the information and data that helped formulate marketing strategies for sustainably-produced charcoal – if analyses shows that sufficient demand exists for that charcoal.

The Production, Supply and Transport Team gathered information and data to set the analytical framework on how supply can be "formalised" to transform traditional "subsistence" charcoal production and supply to a formalised, commercial and sustainable business activity.

This Team surveyed "traditional" charcoal production in Kilosa District. They interviewed producers, village authorities, and ward and district authorities on the "business" of charcoal, on who is engaged in charcoal production and transport, on charcoal production and transport regulation and governance. They conducted transport interviews in Kilosa District, Morogoro Town and Dar es Salaam to obtain a good reading on that segment of the supply and value chain.

Simultaneously, Jiten Chandarana supervised the Demand and Marketing Team. He provided guidance on the urban charcoal demand and marketing survey and interview work in both Morogoro and Dar es Salaam. The

[16] *Making markets work for the poor (M4P) is a practical approach to reducing poverty, grounded in best practice and guided by four underlying principles:1) Systematic action; 2) Sustainable change, 3) Large-scale impact; and, 4) Facilitation for transformation and change. M4P is supported by UK AID (UK Department for International Development/Dfid), the Swiss Agency for Development and Cooperation (SDC) and the Swedish International Development Agency (Sida). .*

Team stratified the market into segments that fit into both "high end" and "traditional" markets. The Team determined where are the most likely "first movers" for buying sustainably-produced charcoal and what they want and need to pay the highest premium for that charcoal.

We examined the current strengths, weaknesses, opportunities and threats (SWOT analysis) of the existing market, and took the data and observations from this survey work, undertook a SWOT analysis for marketing sustainably-produced charcoal to different strata of the market, and compared that analysis with that of traditional charcoal marketing.

During the course of the survey work, the Team also examined past and present efforts to develop and commercialise sustainable charcoal. We did so within the same SWOT analysis framework in order to provide insights for successes and failures, and lessons to be learned from current and previous sustainably-produced charcoal activities.

Further, we reviewed the current "Dar Charcoal Project" and previous work undertaken in "sustainable charcoal". This includes the Ministry of Energy and Minerals (MEM), working with the Tanzania Traditional Energy Development Organisation (TaTEDO, www.tatedo.org), under the World Bank's "Energy I Programme" (1988 to 1994), and other sustainable charcoal work, including Tanganyika Wattle/Tanwat (Njombe) and Green Resources As (GRAS) in Sao Hill (www.greenresources.no/ContactUs/Tanzania.aspx). We also examined supply and demand for charcoal substitutes (namely briquettes), and lessons learnt from these activities.

We examined "competitors" and likely competitors to sustainably-produced charcoal, both in the charcoal field, as well as charcoal substitutes (particularly electricity, lpg and kerosene).

These elements of current "traditional" charcoal marketing, marketing of potentially "competitive" charcoal and competition from "charcoal substitutes" form essential elements of the SWOT analysis where the results of our supply-demand/marketing results were utilised to make recommendations to TFCG.

Our methodology involved stratifying demand into two key consumer market categories: "upscale" (high income) and "mass" charcoal groups. Upscale consumer markets surveyed included supermarkets, three-star (and above) hotels and "high end" restaurants and take-aways in Dar es Salaam and Morogoro.

"Mass charcoal markets" included "traditional" wholesale and retail charcoal vendors, boarding schools, government institutions, medium-price range hotels and restaurants. We interviewed key players on the supply side, including charcoal producers,[17] local authorities/regulators and transporters.

[17] The field supervisors and enumerators will verify the source of wood supplied to charcoal producers. There will be two elements to this verification. The first will be whether or not the source of the wood (specifically from "sustainable" sources as defined by the TFCG project, or not). There is no assumption that a TFCG-supported charcoal producer will always, sometimes or never use sustainably-produced wood or that traditional charcoal producers will always, sometimes or never use non-sustainably harvested wood. Secondly, enumerators will determine whether charcoal producers harvest the wood themselves all the time, some of the time, none of the time, whether they buy the wood supplies or not, whether they use family members to supply the wood for their kilns some of the time, all of the time or none of the time. The field team do not go out with pre-conceived ideas on the sources of the wood supply or how it is supplied. This will be determined, and entered, on the questionnaires.

Data and information from interviews and surveys were entered into a simple spreadsheet that corresponds to each questionnaire for each group interviewed (i.e. traditional charcoal producers, "sustainable" charcoal producers, high end hotels, "traditional" hotels, etc. See Attachment 1, A.3). Supervisors reviewed results and observations with enumerators each day. Data and information were entered into the analysis spreadsheet as questionnaires/interview sheets are completed.

In the case of "high end" potential customers, introductory letters were prepared by the Team and TFCG (who signed them) and were delivered to each interviewee. These were followed up by calls to confirm the interviews. Jiten or Jayen Chandarana conducted many of these interviews (specifically, high-end hotels, restaurants, take-aways, supermarkets, high-end stores, high-end petrol stations, schools/academies, oil , gas and mining companies[18]) and guided enumerators on the rest. The enumerators also conducted high-end household surveys.

The spreadsheet updates were reviewed by the senior team members on a weekly basis, with the Team Leader provided daily updates. Analysis was carried out and fed back by the Team Leader to the Team. Weekly team meetings were held to review results and to guide further work and analysis. This was an iterative approach to ensure that the methodology is followed and that team members were up-to-date with results and any changes in approach. All questionnaires, interview sheets and notes were collated and will be available to TFCG at any time, and passed over with all project documents at the end of the work.

Market Research

Team Structure, Management and Responsibilities

Camco's Team is set out in Table 2, below:

Table 2: Camco's Proposed Team for Sustainable Charcoal Project for TFCG/MJUMITA

1. Consultant	**Position**
Camco Tanzania	
Mike Bess	Team Leader
Peter Sumbi[19]	Deputy Team Leader, Sustainable Forestry Specialist
Prof R Ishengoma	Manager-Supervisor, Production-Demand-Transport (Senior Forestry & Biomass Energy Specialist)
Jiten Chandarana	Manager-Supervisor, Demand-Marketing (Marketing Specialist)
Leo Msanga	Survey Manager
2. Enumerator	

[18] We will utilise contacts with Wentworth Gas (Mtwara), British Gas, Shell, Geita (AngloGold Ashanti/AGA), Barrick Gold, among others, to determine the extent of catering (guesthouses, canteens, etc.) in their camps. Likewise, we will interview Serena, Sarova, Hyatt, Usa River and other hotels who have "up-country" game lodges and safari camps. Given time and resource constraints, all interviews will be made through these companies' headquarters in Dar es Salaam.

[19] Peter Sumbi headed up the WWWF's "Dar Charcoal Project" for over 3 years. He worked with Camco's MD, Jeff Felten, to design the project and was key in managing it. Peter worked with WWF for 9 years and has become an independent consultant, working with Camco on two other activities (including the TanCarbon Marketing Initiative and BEST). His CV is attached as Attachment 5 to this Inception Report.

Production, Supply, Transport	Experienced Enumerators (3)
Demand-Marketing	Experienced Enumerators (3)

Project Guidance, Supervision and Management

Figure 2: TFCG Sustainable Charcoal Team Structure

Figure 2, and Table 2, above, set out our Project guidance, supervision and management structure.

The research and survey methodology had two major thematic components: 1) Production, Supply and Transport, and, 2) Marketing and Demand. The Team focused on three geographic areas: 1) Kilosa District (including Mikumi), 2) Morogoro Municipality, and 3) Dar es Salaam Municipality. Each topical and geographical component was managed and supervised as set out below.

Table 3: Project Thematic and Geographic Guidance, Supervision & Management

Project Management & Responsibilities	
Topical Area	**Responsible**
Overall Project & Technical Area Guidance & Management	
Overall Project and Survey Guidance & Management	Mike Bess
Tanzania Day-to-Day On-the-Ground Project Guidance & Management	Peter Sumbi
Overall Project Supply & Transport Guidance & Supervision	Prof R. Ishengoma

Overall Project Marketing & Sales Guidance & Supervision	Jiten Chandarana
Specific Topic & Area Guidance, Supervision & Field Management	
Kilosa Supply Guidance & Management	
Kilosa Supply Supervision & Guidance	Prof Ishengoma
Kilosa Supply Field Management	Leo Msanga
Mikumi & Morogoro Demand & Marketing Guidance & Management	
Mikumi & Morogoro Marketing Supervision & Guidance	Prof Ishengoma, with support from Jiten Chandarana
Mikumi & Morogoro Marketing Field Management	Leo Msanga
Dar es Salaam Demand & Marketing Guidance & Management	
Dar es Salaam Marketing & Sales Overall Supervision & Guidance	Jiten Chandarana, with Jayen Chandarana
Dar es Salaam Marketing & Sales Overall Management	Peter Sumbi
Dar es Salaam Marketing & Sales Field Management	Leo Msanga

Briefly, as set out in Table 3, above, Mike Bess provided the overall TFCG Project management and guidance. The on-the-ground, day-to-day overall project guidance and management was provided by Peter Sumbi, supported by Jayen Chandarana.

Thematic managers provided overall guidance on the key technical elements of the work. Professor Ishengoma guided research on production, supply and transport. Jiten Chandarana, supported by Jayen Chandarana, provided overall guidance on charcoal marketing and demand.

Prof Ishengoma provided topical and geographical guidance and management, and had overall responsibility for research in Kilosa District (including Mikumi Town) and Morogoro Municipality, assisted by Leo Msanga as field manager. They were assisted by 3 very experienced enumerators working with them in the field in Kilosa District and in Morogoro Municipality.

Jiten Chandarana provided guidance to Professor Ishengoma on the market and demand survey and interview framework in Morogoro Municipality, Mikumi and Kilosa Townships. He also had three very experienced enumerators to work with him and Jayen Chandarana in conducting “high end” interviews and surveys, and in carrying out “traditional” charcoal market and demand surveys/interviews in Dar es Salaam.

On marketing and demand in Dar es Salaam, Jiten Chandarana was strongly supported by Jayen Chandarana. As experienced and successful businessmen, who both have experience with sustainable charcoal and briquette marketing in Dar es Salaam, they provided the overall guidance and management to the Team.

Overall Research Framework and Methodology

We set up two research/survey teams to work along the entire supply and value chains of this study. One focused on production-supply-transport, headed up by Professor R. Ishengoma. The other focused on demand and marketing, headed up by Jiten Chandarana. An over-arching research theme for both teams was to collect information and data that focus on the "livelihood" aspects of production, transport and marketing.

The Team drew upon the "M4P" – "making markets work for the poor" (www.m4phub.org)[20] – approaches to examine how formalising the charcoal sector (from basically a subsistence, informal, often illegal, set of activities, to a formalised, legalised, regulated, licensed sectoral set of activities), identifying and removing market barriers, can work for the poor to make sustainable charcoal "pay" as a viable economic activity.

The Team drew upon its research under the Biomass Energy Strategy (BEST) in Tanzania, particularly the current work with the Ministry of Energy and Minerals (MEM), the Tanzania Federation of Cooperatives (TFC), the Ministry of Natural Resources and Tourism's (MNRT) Forestry and Beekeeping Division (FBD) and the Tanzania Forest Service (TFS). The Team consulted with the Tanzania Revenue Service (TRS), the Ministry of Finance (MOF) in the area of identifying how to "formalise", legalise and improve governance in the charcoal sector. Senior personnel from each of these Government agencies was consulted as were the chairs of the Private Sector Foundation-Tanzania (PSF-T), the Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA), and the Confederation of Tanzania Industries (TCI).

The M4P approach is very relevant, in this context, as it seeks to link producers to markets by systematically examining each point (node) on the supply chain to identify obstacles and barriers, to help identify strategies to remove them and thereby increase value at each point.

This is relevant to the charcoal production context. Charcoal is essentially a "cash crop", more like an agricultural cash crop than to, say, timber. However, its production, transformation, transport and sales is not formalised - and, in the absence of structure, value is lost to producers and sellers and accrued by numerous intermediaries, including numerous "unofficial" and "official" intermediaries who reap "rent" from charcoal, extracting it along the entire value chain. If it is regularised, with producers organised, trained in better production and business management, it can be a very successful cash crop bringing far more returns to producers than at present.

The Team utilised its survey work to update existing information, and to generate new information and data, particularly on innovative approaches to marketing sustainably-produced charcoal. The Team collected data and information that fed into developing strategies to identify means to improve returns to participants, particularly the rural and urban poor, along the entire value chain.

The Production, Supply and Transport Team examined how the activities and organisation of supply could be "formalised" in such a way as to transform traditional charcoal production and supply from a non-sustainable, essentially "subsistence" activity into a viable sustainable business activity. The surveys and interviews were designed in such a way as to provide guidance on how producers can be supported to

[20] Making markets work for the poor (M4P) is a practical approach to reducing poverty, grounded in best practice and guided by four underlying principles:1) Systematic action; 2) Sustainable change, 3) Large-scale impact; and, 4) Facilitation for transformation and change. M4P is supported by UK AID (UK Department for International Development/Dfid), the Swiss Agency for Development and Cooperation (SDC) and the Swedish International Development Agency (Sida). .

operate in a more long-term commercial way that would increase their incomes by generating more revenues and, thereby, incentivise them to produce charcoal sustainably.

This team interviewed producers, village authorities, and ward and district authorities on the "business" of charcoal, on who is engaged in charcoal production and transport, on charcoal production and transport regulation and governance. They conducted transport interviews in Kilosa District, in Morogoro Municipality and in Dar es Salaam.

A.1 Guidance to Interviewers

Guidance to Enumerators/Interviewers

TFCG Market Research for Sustainably-Produced Charcoal

Overall

It is essential to keep in perspective that the objective of all interviews is:

> "...to identify suitable markets for sustainably produced charcoal (not briquettes) the objective is to acquire a thorough understanding of the current market situation in the main charcoal markets i.e. Dar es Salaam, Morogoro Town, Mikumi and Kilosa towns including understanding the challenges, threats and opportunities. This will be achieved through a detailed market and sales research (survey/analysis) for sustainable charcoal The market and sales research should provide thorough knowledge and insights into the current market situation and thus create a good foundation for the development of a strong sales and marketing strategy.". (TFCG "Market research for sustainably produced charcoal – Terms of Reference, October 2012)

While the market research interviews and surveys are intended to determine whether there is a market for sustainable charcoal, and, if so, with which potential consumers and under what conditions, interviewers should not think that those they are interviewing are familiar with or understand the concept of "sustainably-produced charcoal". Very few people understand what this term means. Therefore, it is important to explain the concept to each person interviewed, regardless whether they have been introduced to the concept or not.

What is "Sustainably-Produced Charcoal"?

Sustainably-produced charcoal is charcoal that is produced from trees that are "sustainably harvested" – that is, a tree is planned and managed to maturity for every tree that is cut for charcoal. So, the amount of forest remains the same, no matter how much charcoal is produced under "sustainably-produced charcoal".

An added benefit of sustainably-produced charcoal is that it is produced by improved, more efficient charcoal methods – that is, sustainably-produced charcoal is produced at higher efficiencies than traditional charcoal. This means that every sack of charcoal requires fewer trees than traditional charcoal. A real benefit of sustainably-produced charcoal is that the amount of forest stays at least the same as without the charcoal production. This is critical to Tanzania, because cutting trees for charcoal production without replanting is one of the major contributors to deforestation in Tanzania.

It is important that the person interviewed understands this, as almost all current charcoal production in Tanzania is from "non-sustainable" sources. As the number of people in urban areas increase, the amount of charcoal sold to meet urban people's needs increases by almost 10% per year. This is rapidly increasing Tanzania's deforestation. Moving to sustainably-produced charcoal is possible and should be encouraged. This is a primary objective of this project.

Encourage Discussion

While there are a number of questions that require simple "yes", "no" or other "tick box" responses, the overall approach to the interview should be "two way". That is, you should encourage people to provide their thoughts and opinions to provide additional insights, where possible and to the extent that time permits. It is important to balance the requirement that the questionnaires must be completed, key questions have to be asked, with encouraging people to participate in a "consultative" manner. In the enumerator, team training, we will test practice this "consultative" approach.

Always record the major points that a person interviewed makes during the interview in the "remarks" section at the end of the questionnaire before moving on to the next interview. It is important to record those thoughts and comments while they are still fresh in your minds. These additional comments from the interviews, and your thoughts and observations will be very important for analysing the interviews and for drawing conclusions.

Regular Review and Final Debriefing

Your supervisor will spend time at the end of every day to review with you the day's interviews, to ensure that questionnaires are completed fully and to get your thoughts and observations. Your thoughts and observations are very important to us.

At the end of the surveys, we will bring you and all the team together for a full team debriefing. We will ask for your thoughts, your observations and your conclusions from the survey work you have done. This is very important for us to assist us with the analysis of the work and to make conclusions. Remember that your thoughts and observations are important for the success of these surveys.

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A.2 Draft Letter of Introduction for Surveys

TFCG LOGO

7th Februari 2013

KWA YEYOTE ANAYEHUSIKA

Re: BARUA YA KUWATAMBULISHA WATAFITI WA MASWALA YA MKAA KUTOKA KAMPUNI YA CAMCO TANZANIA WANAOKUJA KUKUTEMBELEA KWA MAJADILIANO

Shirika la Kuhifadhi Misitu ya Asili Tanzania (TFCG) ni taasisi isiyokuwa ya serikali (NGO) inayojishughulisha na kutunza na kuendeleza rasilimali za misitu na utunzani wa misitu endelevu Tanzania.

Hivi karibuni, shirika la TFCG imeliteua kampuni la CAMCO linaloshughulikia maswala ya nishati endelevu kufanya utafiti wa kina wa kuangalia mahitaji na uwezekano wa kuwepo kwa soko kwa ajili nya mkaa unaozalishwa kutoka vyanzo endelevu. TFCG wakishirikiana na Mtandao wa Jamii katika Ushirikishwaji wa Misitu Tanzania (MJUMITA) tumeanzisha mradi wa utunzajii wa misitu endelevu na uzalishaji wa mkaa kutoka kwenye vyanzo endelevu kwa kutumia fursa za MKUHUMI huko wilayani Kilosa.

TFCG inatambua kwamba wewe/ofisi yako ni moja ya wadau wa malengo ya mradi wetu huu kwa njia moja au nyingine. Hivyo basi tunakuomba uwpokee watafiti hawa wa kampuni ya CAMCO, ili muweze kujadiliana ufahamu wako, na kama ungependelea kuwa mdau wa kununua aina hii ya mkaa unaotengenezwa kutoka kwenye vyanzo endelevu – yaani kutoka kwenye misitu inayotunzwa na kuendelezwa kwa kufuata taratibu na kanuni za ushirikishaji wa wananchi katika kutunza rasilimali za misitu Tanzania, kinyume na utaratibu wa zamani wa kuvuna mkaa kiholela sehemu yeyote bila kufuata utaratibu mzuri. Utaratibu huu wa zamani (ambao ndiyo sehemu kubwa ya mkaa uliopo sokoni nchini) umekuwa unalsababisha uharibifu mkubwa sana katika mazingira.

Mkaa endelevu hutengenezwa kutokana na miti ambayo imetunzwa na kuvunwa kwa utaratibu mzuri na unaokubalika – na unazingatia kuwa kila mti unaokatwa kwa ajili ya mkaa, mti mwingine mpya hupandwa na kutunzwa hadi uwe mkubwa tayari kwa kuvunwa tena. Kwa utaratibu huu, rasilimali ya misitu inabakia vilevile bila kupungua. Mkaa mmwingi unaopatikana kwenye soko, ni mkaa ambao miti imevunwa bila kurudishia miti mingine kwa kupanda. Utaratibu huu japo ndio uliozoeleka siyo endelevu na unasababisha madhara makubwa sana kutoweka kwa misitu na uharibifu wa mazingira hapa Tanzania.

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Faida ya nyongeza kuhusu huu mkaa endelevu ni kwamba mkaa huu huzalishwa au hutengenezwa kwa kutumia aina ya matanuru yaliyoboreshwa zaidi na yenye ufanisi mkubwa zaidi ukilinganisha na mkaa unaotengenezwa kutoka kwenye matanuru ya asilia ya udongo tu ambayo ufanisi wake ni duni sana. Hii ina maana kwamba mkaa endelevu unahitaji miti michache zaidi kupata gunia moja la ujazo ule ule. Lakini kikubwa zaidi ni kwamba mkaa endelevu unatupa uhakika kuwa ukubwa wa rasilimali zetu za misitu unabakia vilevile bila kupungua. Na utaratibu huu kwa kweli ni muhimu sana kwa nchi yetu, kwa kuwa kukata miti kwa ajili ya mkaa bila kupanda miti mingine ni chanzo kukubwa sana kinachosababisha kutoweka kwa misitu Tanzania.

Sisi TFCG tutafurahi sana iwapo wewe mwenyewe au mwakilishi wako mwenye uzoefu wa kutosha utakubali kuwakaribisha na kukutana na Watafiti hao kuanzania tarehe 11 hadi 28 Februari 2013. Majadiliano kati yako na watafiti hao hayatachukua muda mrefu ni kiasi cha nusu saa tu kinatosha kabisa kupata maoni yako kuhusu hii dhana ya mkaa endelevu. Pamoja na barua hii, tunaaambatanisha na kipeperushi kinachoelezea huu mpango wa mkaa endelevu kwa ajili ya wewe kupata taarifa zaidi, faida za mkaa huu na umuhimu wako wa kuwa mdau wa aina hii ya mkaa endelevu.

Natanguliza shukrani zangu kwa ushirikiano wako.

Wako katika kutunza Misitu,

Charles Meshack – Mkrugezi Mkuu

Kikundi Cha Utunzania wa Misitu ya Asili Tanzania

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TFCG LOGO

7th February 2013

Address (to be hand-delivered and, where possible, emailed)

Dear (appropriate decision maker in hotel, restaurant, supermarket, institution, etc.)

Re: Introducing CAMCO Consultative team and request for a meeting appointment

Tanzania Forest Conservation Group (TFCG), Tanzania's leading non-governmental organisation supporting community participation in forestry management and sustainable forestry, has recently contracted CAMCO Tanzania to undertake a market study to determine the potential demand and market for "sustainably-produced charcoal" from on-going joint TFCG/MJUMITA Sustainable Forest Management and REDD programme in Kilosa.

We are aware of your business, and therefore you have been selected because we would like to discuss your potential interest in purchasing "sustainably-produced charcoal" instead of the "traditional charcoal" that makes up almost all charcoal available in Tanzania.

Sustainably-produced charcoal is charcoal that is produced from trees that are "sustainably harvested" – that is, for every tree that is cut for charcoal, a tree is planted and managed to maturity. So, the amount of forest remains the same, no matter how much charcoal is produced under "sustainably-produced charcoal". "Traditional charcoal" – what you find in the market place, is produced from harvesting trees without replanting. This is not sustainable and is causing enormous deforestation in Tanzania.

An added benefit of sustainably-produced charcoal is that it is produced by improved, more efficient charcoal methods – that is, sustainably-produced charcoal is produced at higher efficiencies than traditional charcoal. This means that every sack of charcoal requires fewer trees than traditional charcoal. A real benefit of sustainably-produced charcoal is that the amount of forest stays at least the same as without the charcoal production. This is critical to Tanzania, because cutting trees for charcoal production without replanting is one of the major contributors to deforestation in Tanzania.

We would appreciate it very much if you could meet our consultancy team between 18th and 28th February 2013 or any of your team whom you think is appropriate, for half an hour to discuss your potential interest in, and thoughts about, sustainable charcoal. We include a brochure on TFCG's sustainable charcoal programme for your information. We look forward to speaking with you about this programme, its benefits and your potential interest in sustainably-produced charcoal.

Yours sincerely,

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Charles Meshack – Executive Director

Tanzania Forest Conservation Group

Questionnaire A: Charcoal Producers Questionnaire

QUESTIONNAIRE A: CHARCOAL PRODUCERS/PROJECTS			
Name of Enumerator		Contacts :	Telephone:
			Email:
Completed by the enumerator	Questionnaire No:		Date: Time:
	Village:		District:
Details of the respondent	Name:		
	Telephone:		
	Email:		
	Resident:		

PART 1: OVERVIEW OF THE PRODUCER/GROUP			
i.	(a) Name of the Group/Producer: (b) Is the Producer Woman or Man? Yes ( ) or No ( )		(c) Date commenced production (mm/yy):
ii.	(a) Is Person interviewed the only producer of this charcoal? Yes ( ) or no ( )		(b) If no, how many other producers are producing with her/him?
iii.	How many producers are (list number):	(a) Men	(b) Women:

iv.	a) How long in business?	b) How long in this place? c) Is this the only place that you make charcoal? Yes ( ) or No ( ) d) If no, where else do you produce charcoal?	
v.	Total investment cost in your production (TSHS) :		
vi.	Source of Finance	a) Self: Yes ( ) or No( )	b) If other (specify) c. If other, specify amount (TSHS)
PART 2: Wood Supply			
i.	a) Does seller know source of charcoal: Yes ( ) or No ( ) b) If yes, where does the charcoal come from (district):		
ii.	From what source does charcoal come from (put a tick) a) Soft wood b) Hard wood c) Natural forest d) Planted forest e) Forest reserve f) Non-reserve forest		
Part 3: Wood Supply Organisation			
i	a) Do you buy this wood? Yes ( ) No ( ) b) If yes, do you always buy wood for charcoal? Yes ( ) No ( )		
Ii	Where does the bought wood come from? *Put a tick to the appropriate answer*		

	a) Respondent's own land b) From village forest land c) From village other land d) From "general" land e) From forest reserve land
Iiii	a) If producer does not buy wood, does producer cut wood for charcoal herself/himself? Yes ( ) no ( ) *b)* If she/he buys, where does the wood come from? *Put a tick* 1. Respondent's own land 2. From village forest land 3. From village other land 4. From "general" land 5. From "forest reserve" land c) Does respondent's family ever help with cutting wood? Yes ( ) or No ( )
Part 4: Wood Supply Sustainability	
i.	Does the wood that you use for charcoal production ever come from land where trees are replant (sustainable tree harvesting)? Yes ( ) or No ( )
ii.	If Yes, who supplies that wood?
iii.	If Yes, where does that sustainable wood come from?
iv.	If Yes, how much of wood that producer uses for charcoal come from sustainable sources (estimate %)
v.	If Yes (sustainable wood supply) is this wood easier or more difficult to get than wood from non-sustinably produced supplies? Easier/More difficult
vi.	If Yes (sustainable wood), does producer prefer using sustainable wood for charcoal production? Yes/no
vii.	If producer prefers sustainable wood, why (short answer)?

viii.	Does the producer know other charcoal producers using sustainable wood? Yes ( ) or No ( )
ix.	If respondent knows others who use sustainable wood, how many does she/he know? (give number)
x.	Is wood getting easier or more difficult to obtain this year than two years ago? Easier/more difficult
xi.	If more difficult, why? (short answer)
xii.	If more difficult, does the respondent have any suggestions on how to make it less difficult? (short answers, listing how to make it less difficult) a. b. c.
xiii.	If the respondent buys wood for charcoal, would she/he pay more for the wood it if was sustainably produced? Yes ( ) or No ( )
xiv.	If yes, how much more (percentage of what is paid now)
xv	If no, why would she/he not pay more? (short answers on why not pay more, a to d) a. b. c. d.
Part 5: Charcoal Sales	

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i.	a) Does the respondent sell charcoal to (tick all appropriate) 1. Bicycle 2. Private car 3. Government car 4. Non-charcoal lorry 5. Small charcoal lorry 6. Large charcoal lorry 7. Other (specify) b) Which one of these do you sell to most of the time? (fill in blank) c) Which one of these do you sell to the next most time?
ii.	a) Do you know where the charcoal they buy is going? Yes ( ) or ( ) b) If yes, where do you think it is going? Most frequent place
iii.	What do charcoal buyers look for most (e.g., quantity, quality, etc.)? Fill in the blank
iv.	Have you ever had a charcoal buyer ask you for "sustainably-produced charcoal"? Yes/no
v.	If yes, are you asked for sustainably produced charcoal often? Yes ( ) or No ( )
vi.	If yes, who asks for sustainably produced charcoal? Short answer
vii	Why do you think they ask for sustainably produced charcoal? a. b. c.
PART 6: Charcoal Production	

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i.	Briefly describe how you prepare the wood for charcoal production? a. b. c.
ii.	Do you ever dry the wood before charcoal production? Yes ( ) or No ( )
iii.	If you do dry it, how long do you dry it? Days
iv.	Do you ever cut the wood into smaller sizes before you burn it? Yes ( ) or no ( )
v.	If yes, why do you cut it?
vi.	How do you make the charcoal (tick appropriate) a. Basic Earth-mound Kiln (BEK) b. Improved Basic Earth-mound Kiln (IBEK) c. Adam Gas Retort d. Half Orange Kiln (HOK) e. Casamance Kiln f. Brick Kiln g. Other (please describe):
vii	Do you bag your charcoal?
viii	Do you know how much each bag weighs? Yes ( ) or No ( )
ix	If yes, what is the average weight?
x	How many bags do you sell per month?
xi	Do you ever "package" the charcoal in anything other than a bag (gunia)?
xii	If yes, what do you package it in (short answer)
Xiii	Does the number of bags you sell every month change over the year? Yes/No
Xiv	If yes, why does the number of bags change? (short answer)

xv	Any other comments on production a. b. c. d.
Part 7: Production Cost	
i.	How many kg or bags of charcoal do you produce per month:
ii.	How much is a kg or bag of charcoal (*in TSHS*):
iii.	Does the price of charcoal change during the year? Yes/ No
iv.	If yes, by about how much percent above compared to today's prices?
v.	If yes, by about how much percent lower compared to today's prices?
vi.	Do you produce throughout the year? Yes/no
vii.	a) How much do you spend on the following expenses per month (in local currency): 1. Labour: 2. Wood: 3. Transport: 4. Security: 5. Packaging: b) Do you get profit from this business? Yes/no
PART 8: CHARCOAL SALES & REVENUESS	
i.	What do you think your net earnings from charcoal are per day per: a) 1 kg debe b) 2 kg debe

	c) 5 kg debe d) Bag
ii.	How much do you estimate you make a day from selling charcoal?
iii.	Has the amount you make from charcoal sales changed since this time last year (yes, no)?
iv.	If yes, how much has charcoal earning changed since this time last year (estimate)?
v.	Where is charcoal purchased
vi.	From whom is charcoal purchased
vii.	Is charcoal purchased from same person all the time
viii.	How much is charcoal sold today per: a) 1 kg debe b) 2 kg debe c) 5 kg debe d) bag (give weight)
ix	How do you think your charcoal earnings could be improved? a. b. c.
x	Please list three things that you would want to change to make the charcoal production sector work better for you? a. b. c.
xi	List three things that would make the charcoal production sector work better overall?

	a. b. c.
xii	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?
PART 9: Livelihoods	
i.	How important is charcoal income to you & your family (please tick somewhat or very, below)? a) Somewhat important b) Very important
ii.	a) Is it easier or more difficult to produce charcoal than two years ago? Easier/more difficult b) If more difficult, do you know why? (short answer) 1. 2. 3. 4.
iii.	Is charcoal your main source of income? Yes/no
iv.	If yes, what proportion of your income does charcoal provide?
v.	What other activities do you engage in: a) Agriculture b) Livestock c) Fishing d) Beekeeping e) Other (specify)

vi	What do you use the income from charcoal for (most important thing by a, next important by b, etc.)? a) Food b) Health c) School fees d) Other (specify)		
vii	What other source of cash income do you have (please specify)? a. b. c.		
PART 10: CHARCOAL BUSINESS			
i	(a) Have you ever tried to apply for a business loan for the charcoal business?	Yes ☐	No ☐
	(b) If YES, did you get the loan?	Yes ☐	No ☐
	(c) If NO, what reason was given?		
ii	State three of your **MAIN** challenges with the charcoal business		
	a.		
	b.		
	c.		
iii	List all the licences and fees required to operate this business		
	(a)		
	(b)		
	(c)		
	(d)		

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PART 11: EXTERNAL SUPPORT	
i.	What programmes, policies, incentives by government or development partners or NGOs or others if put in place would enable growth in the charcoal business?
ii.	Any other comments (focusing on the contribution of charcoal resources to the broader total income to see if charcoal is making a significant contribution to the total welfare of rural households):
PART 12: OTHER QUESTIONS	
i.	Do you care whether charcoal is sustainably-produced or not? Yes/no
ii.	If you care, why do you care? (short answer) a. b. c
iii.	Do you think current charcoal production is good for the environment? Yes/no
iv.	If no, why do you think it is not good for the environment? a. b. c.
v.	If no, how would you suggest making charcoal better for the environment? a. b. c. d.
vi.	a) Do you think that "certifying" charcoal (e.g., where it is produced, from what sources it is produced, whether it is sustainably produced, etc would be a good thing? Yes/No

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	b) If yes, why do you think charcoal certification would be a good thing? (short answer)
vii.	What would convince you that "certified" charcoal was sustainably-produced? (tick each relevant box): 1. Tanzania Bureau of Standards (TBS) label saying charcoal was sustainably-produced 2. Label showing district authorities had certified charcoal as sustainable 3. Label from a non-government organisation (name the organisation) that the charcoal was sustainably-produced 4. Label from central government ministry or agency (name the agency) that the charcoal was sustainably-produced? 5. Other (please state): 6. Nothing would convince me on a label that charcoal was sustainably produced?
viii.	If nothing, what would convince you that charcoal was sustainably produced? 1. 2. 3.
ix.	Other – Please feel free to add any comments or questions a. b. c. d. e.

Questionnaire B: Government Representatives Questionnaire

QUESTIONNAIRE B: GOVERNMENT AGENCIES AND REGULATORS *(The questions below are to be used only to guide the discussion)*			
Completed by the enumerator	Questionnaire No:		Date: Time:
	Name of Enumerator:		Tell:
	Village:		District:
Details of the respondent	Name:		
	Organization:		
	Locations:		Village: Ward: District:
	Designation:		
	Telephone:		
	Email:		
Part 1: Background			
i	a) How long have you been in this position title? b) How long have you been in this position?		

	c) What are your primary responsibilities? 1. 2. 3.
Part 2: Charcoal	
i.	What are your primary responsibilities with regard to charcoal (e.g., village land management, agriculture, licensing, regulation, etc.)? 1. 2. 3. 4.
ii.	Please estimate the numbers of individuals are group within your jurisdiction who are engaged in charcoal production (number).
iii.	Please list the key issues you face in your work with regard to charcoal producers? 1. 2. 3.
iv.	What are the key policies, regulations, laws that govern charcoal production in your area of jurisdiction? 1. 2. 3.
v.	What are the key policies, regulations, laws that govern charcoal sales in your area of jurisdiction? 1. 2.

	3.
vi.	What are the key policies, regulations, law that govern charcoal transport in your area of jurisdiction? 1. 2. 3.
vii.	Where does the charcoal come from (village, ward, district):
viii.	How many people do you estimate are active in producing charcoal in your area (village, ward, and district)?
ix.	Are most, all of the charcoal producers in your area local in your area? Yes/no
x.	Do you think that charcoal production is an important economic activity in your area? Yes/no
xi.	If yes, please indicate how important you think it is (tick appropriate): 1. Very important 2. One of many economic activities 3. One of the most important economic activities
xii.	On a scale of 1 to 5 (5 being most important) please indicate how important charcoal production is in your area (rank the following from 1 to 5 and only give one number, e.g. 5 to each): 1. Income generation 2 Livelihoods 3. Employment 4.Paying school fees 5. Helping people to buy food 6 Other (specify) 3. Charcoal Production & Sources
xiii.	Do you have any idea how charcoal is produced (yes, no)
xiv.	If yes, please answer the following questions:

	From what source does charcoal come from: 1. Soft wood 2. Hard wood 3. Natural forest 4. Planted forest 5. Forest reserve 6. Non-reserve forest 7. Don't know
xv.	Is charcoal produced on village land following a forest management plan? a) Yes b) No c) Don't know
Part 3: Charcoal Production & Sources (*Enumerator: Explain in more detail what sustainable charcoal is, what makes it "sustainable")*	
i.	a) Do you have any idea how charcoal is produced (yes, no) b) If yes, from what source does charcoal come from (put a tick to the appropriate answer) 1. Soft wood 2. Hard wood 3. Natural forest 4. Planted forest 5. Forest reserve 6. Non-reserve forest 7. Don't know
ii.	Is charcoal produced on village land following a forest management plan? a) Yes b) No c) Don't know

Part 4: Sustainable Charcoal (Enumerator: Explain in more detail what sustainable charcoal is, what makes it "sustainable")	
i.	a) Have you ever heard of sustainable charcoal? Yes/No b) If yes, how did you learn about sustainable charcoal? (Tick one) 1. Radio/TV adverts 2. Workshop/seminar 3. Word of mouth 4. Brochures/posters 5. During a market visit 6. Other (please state)
ii.	Do you care whether charcoal is sustainably-produced or not? Yes/no
iii.	If you care, why do you care? (short answer) 1. 2. 3. 4.
iv.	Do you think current charcoal production is good for the environment? Yes/no
v.	If no, why do you think it is not good for the environment? 1. 2. 3. 4.
vi.	If no, how would you suggest making charcoal better for the environment? 1. 2. 3. 4.

vii.	What are the current policies and legislation affecting sustainable charcoal production? 1. 2. 3. 4.
viii.	What are the key policy and legislative gaps that prevent charcoal from being produced sustainably? 1. 2. 3. 4.
ix.	What the main government initiatives to promote sustainable charcoal production and markets? 1. 2. 3. 4.
x.	What are the main barriers and challenges of the current situation in the charcoal sector and what are the main barriers and challenges of scaling-up the sustainable charcoal production and markets? 1. 2. 3. 4.
Part 5: Please give us your thoughts, observations and recommendations on the charcoal sector in your area and nationally?	

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i.	Please list three things that you would want to change to make the charcoal sector work better for you? 1. 2. 3.
ii.	List three things that would make the charcoal sector work better overall? 1. 2. 3.
iii.	The charcoal sector, from charcoal production to charcoal transport to charcoal selling is very "informal" (not organised). List 3 things you think should be done or could be done to organise the entire charcoal sector? 1. 2. 3.
iv.	Do you care whether charcoal is sustainably-produced or not? Yes/no
v.	If you care, why do you care? (short answer) 1. 2. 3. 4. 5.
vi.	Do you think current charcoal production is good for the environment? Yes/no
vii.	If no, why do you think it is not good for the environment? 1. 2.

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	3. 4. 5.
viii.	If no, how would you suggest making charcoal better for the environment? 1. 2. 3. 4. 5.
ix.	Do you think that "certifying" charcoal (e.g., where it is produced, from what sources it is produced, whether it is sustainably produced, etc would be a good thing? Yes/No a) If yes, why do you think charcoal certification would be a good thing? (short answer) b) What would convince you that "certified" charcoal was sustainably-produced? (tick each relevant box) 1. Tanzania Bureau of Standards (TBS) label saying charcoal was sustainably-produced 2. Label showing district authorities had certified charcoal as sustainable 3. Label from a non-government organisation (name the organisation) that the charcoal was sustainably-produced 4. Label from central government ministry or agency (name the agency) that the charcoal was sustainably-produced? 5. Other (please state): 6. Nothing would convince me on a label that charcoal was sustainably produced? .

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x.	If nothing, what would convince you that charcoal was sustainably produced? 1. 2. 3. 4.
xi.	Other – Please feel free to add any comments or questions

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Questionnaire C: Transporter Questionnaire

QUESTIONNAIRE C: TRANSPORTERS ***(The questions below are to be used only to guide the discussion)***		
Completed by the enumerator:	Questionnaire No: Enumerator's Name:	Date: Time:
	Village/Municipality/Location:	District:

Details of the respondent	Name	
	Location	
	Town	
	District	
	Telephone	
	Email	

Part 1: General	
i.	What type of transport is this? (tick appropriate) 1. Bicycle 2. Private car 3. Government car 4. Non-charcoal lorry 5. Small charcoal lorry 6. Large charcoal lorry 7. Other (specify)
ii.	Are you the driver of this vehicle? Yes/no
iii.	If no, what are you (vehicle owner, charcoal loader, other, specify)
iv.	Is this transport vehicle/mode owned by you? Yes/no

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v.	Is the Owner Woman or Man (indicate)
vi.	Is transporter/interviewee man/woman (indicate)
Part 2: Charcoal Transport Business	
i.	How long in business (fill in years)
ii.	Is this your primary economic activity? Yes/no
iii.	How often do you transport charcoal (times/month)?
iv.	Does it seems like there are more, less or the same amount of charcoal transporters now (competition btw traders)
v.	Do you always purchase/sell charcoal at this place? (tick appropriate) 1. Always 2. Most times 3. Rarely 4. Not buying or purchasing charcoal here
vi.	If no, where else do you purchase charcoal? (list up to 3 places) 1. Place 1 2. Place 2 3. Place 3
vii.	Do you transport charcoal for others? Yes/no If yes, how often do you transport for others? (tick appropriate) 1. Always 2. Most times 3. Rarely
viii.	If you transport charcoal for others, is it always for the same person/company? (tick appropriate) 1. Always 2. Most times 3. Rarely
ix.	Is charcoal the only thing you transport? Yes/ No
x.	If no, what else do you transport? (short answer)

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	1. 2. 3.
xi.	Do you ever transport charcoal one way (e.g., to urban areas) and transport other products the other way (e.g., to rural areas)? Yes/no
xii.	If yes, what do you transport to rural areas? (short answer) 1. 2. 3.
xiii.	Where is the final destination for the charcoal you are transporting now (name town/city, and, if possible, place in town/city): _____
xiv.	1. Is your destination for your charcoal you are transporting now the same destination you always transport charcoal? Yes/no 2. If the answer to is no, please name other place(s) you transport charcoal? (fill in up to 3 additional places) a. Destination 1 b. Destination 2 c. Destination 3
xv.	How many bags can you carry at once and how much does each bag cost? (fill in): 1. No of bags at once: 2. Cost per bag:
xvi.	How much charcoal do you transport per trip (average number of bags per trip)
xvii.	How much do you estimate you make each trip you transport charcoal? Tshs per trip
xviii.	Has the amount you make from charcoal transport changed since this time last year (yes, no)?
xix.	If yes, how much has charcoal earning changed since this time last year (estimate)?

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Part 3: Charcoal Transport Regulation & Control	
i.	What challenges do you encounter in transporting charcoal? (list 3 in order of most important) 1: 2: 3:
ii.	How do you deal with these challenges? (short answer) 1: 2: 3:
iii.	What are expenses incurred in transporting charcoal? (list ALL costs & expenses starting with most important) 1: 2: 3: 4: 5:
iv.	Do you require any special licenses or permits to transport charcoal? Yes/No
v.	If yes, list all the kinds of licenses/permits you require & from which authority (e.g., local government, policy, forest officers, etc.) 1: 2: 3:
vi.	Do you pay any taxes or other fees to transport charcoal? Yes/no
vii.	If yes, please list ALL (official and unofficial) taxes/fees & who you pay these fees to: 1. Tax/Fee 1:

	2. Tax/Fee 2: Tax/Fee 3:
viii.	Please list three things that you would want to change to make the charcoal transport sector work better for you? 1. 2. 3.
ix.	List three things that would make the charcoal transport sector work better overall? 1. 2. 3.
x.	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? 1. 2. 3.
Part 4: Charcoal Source Information	
i.	Do you know the source of the charcoal you are transporting? (yes, no)
ii.	If yes, where does the charcoal come from (district)
iii.	From what source does charcoal come from: 1. Soft wood 2. Hard wood 3. Natural forest 4. Planted forest 5. Forest reserve 6. Non-reserve forest 7. Do not know

iv.	Do you only buy from one seller (yes, no)
v.	If you buy from more than one, how many (number)
vi.	Where is charcoal purchased (location)
vii.	From whom is charcoal purchased (tick ALL appropriate) 1. Charcoal Producer 2. Road side Seller? 3. Charcoal Seller in Village/Town? 4. Other (specify)
viii.	From which of these sources do you purchase most of your charcoal? (list one)
ix.	Is charcoal purchased from same source all the time (yes, no)
Part 5: Charcoal Production	
i.	Do you have any idea of how charcoal produced (yes, no)
ii.	Has charcoal price changed since this time last year?
iii.	If yes, how much have charcoal price changes since this time last year (estimate)?
Part 6: Other	
i.	Do you care whether charcoal is sustainably-produced or not? Yes/no
ii.	If you care, why do you care? (short answer)
iii.	Do you think current charcoal production is good for the environment? Yes/no
iv.	If no, why do you think it is not good for the environment? 1. 2. 3. 4.
v.	If no, how would you suggest making charcoal better for the environment? 1.

	2. 3.
vi.	Do you think that "certifying" charcoal (e.g., where it is produced, from what sources it is produced, whether it is sustainably produced, etc would be a good thing? Yes/No
vii.	If yes, why do you think charcoal certification would be a good thing? (short answer) 1, 2. 3.
viii.	What would convince you that "certified" charcoal was sustainably-produced? (tick each relevant box) 1. Tanzania Bureau of Standards (TBS) label saying charcoal was sustainably-produced 2. Label showing district authorities had certified charcoal as sustainable 3. Label from a non-government organisation (name the organisation) that the charcoal was sustainably-produced 4. Label from central government ministry or agency (name the agency) that the charcoal was sustainably-produced? 5. Other (please state): 6. Nothing would convince me on a label that charcoal was sustainably produced? 7. 7. If nothing, why would no label would convince you that charcoal was sustainably produced?
ix.	Other – Please feel free to add any comments or questions

Questionnaire D: Charcoal Users - Commercial and Institutional **Consumers**

Questionnaire D: Charcoal Users - Commercial and Institutional Consumers ***Completed by the enumerator***				
Name of Enumerator		Contacts :	Telephone:	
			Email:	
Questionnaire No:			Date: Time:	
Town:			District:	
Details of the respondent	Name			
	Location			
	Town			
	District			
	Telephone			
	Email			
Name of Hotel, Restaurant, Cafe, Take Away (tick appropriate)				

Part 1: Overview of Hotel/Restaurant/Cafe/Take Away/Boarding School/Canteen/Prison	
i	When was establishment opened?
ii	How many full-time employees does establishment have?
iii	Number of Rooms (hotel, boarding school, prison)
iv	How many restaurants, cafes does establishment have?

v	Seating capacity of restaurant(s)/cafe(s)
vi	What energy sources do you use for cooking? (tick all appropriate) 1. Electricity 2. LPG 3. Kerosene 4. Charcoal 5. Firewood **6.** Other (specify)
vii	Does establishment use charcoal for general cooking? Yes/no
viii	Does establishment use charcoal for special cooking (e.g., bbqs)? Yes/no
ix	If yes, what special occasions? (list)
Part 2: Charcoal Demand	
i	How many bags of charcoal do you purchase per month?
ii	How much do you pay per bag?
iii	Where do you purchase your charcoal?
iv	How many charcoal suppliers do you have? (tick appropriate) 1. One 2. Two **3.** More (specify)
Part 3: Charcoal Supply	
i	Has charcoal price changed since this time last year? Yes/no
ii	If yes, how much has charcoal price changed since this time last year (estimate)?
iii	Is charcoal supply reliable? Yes/no
iv	Do charcoal suppliers deliver to you? Yes/no

v	If no, where do you buy your charcoal?
Part 4: Sources of Charcoal Supply	
i	Do you know where your charcoal comes from? Yes/no
ii	If yes, where does the charcoal come from (district)
iii	From what source does charcoal come from: 1. Soft wood 2. Hard wood 3. Natural forest 4. Planted forest 5. Forest reserve 6. Non-reserve forest **7.** Don't know
iv	Do you have any idea how charcoal is produced (yes, no)
Part 5. Sustainable Charcoal (*Enumerator: Explain in more detail what sustainable charcoal is, what makes it "sustainable")*	
i	Have you ever heard of sustainable charcoal? Yes/No
ii	If yes, how did you learn about sustainable charcoal? (Tick one) 1. Radio/TV adverts 2. Workshop/seminar 3. Word of mouth 4. Brochures/posters 5. During a market visit 6. Other (please state)
iii	Do you know whether the charcoal you currently buy is sustainably produced or not? Yes/no
iv	If yes, from whom do you buy it? (name, company)
v	If yes, for how long have you been buying it?

vi	If yes, how much do you pay per bag (equivalent) for the sustainable charcoal? Tsh/bag
vii	If yes, are you happy with the sustainable charcoal? Yes/no
viii	If you are not happy with sustainable charcoal, why are you not happy with sustainable charcoal (short answer)?
ix	Have you ever bought sustainably produced charcoal in the past? Yes/no
x	If yes, from whom did you buy it? (Name, company, etc.)
xi	If yes, when did you buy it? (year)
xii	If yes, were you satisfied with it?
xiii	If you were not satisfied with the charcoal, why were you not satisfied? (short answer) 1. 2. 3. 4.
xiv	Do you know anyone who is using sustainably produced charcoal?
xv	If yes, please tell us who. (name)

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Part 6: Marketing Questions	
i	List using 1 to 8 (8 highest), what is most to least important to you about charcoal **(use number only once)**? 1. Reliability of supply? 2. Charcoal delivered to your establishment? 3. Certification that charcoal is sustainable? 4. Consistent good quality of charcoal? 5. Packaging of charcoal 6. Consistent quantity that conforms to what you order? 7. Price of charcoal 8. Quality of charcoal
ii	If quality is important to you, what do you mean by quality? (open answer)
iii	Are you willing to pay a higher price (premium for charcoal) delivered to you? Yes/no
iv	If yes, how much more (percent) would you pay for delivery to you?
v	Are you willing to pay a higher price (premium for charcoal) for consistent good quality of charcoal? Yes/no
vi	If yes, how much more would you pay (in percent) for consistent quality of charcoal?
vii	Are you willing to pay a higher price (premium for charcoal for sustainably-produced charcoal? Yes/no

viii	If yes, how much more would you be willing to pay for sustainable charcoal?
ix	If you are willing to pay extra for sustainably-produced charcoal, why would you pay that premium? (simple answer)
x	Are you willing to pay a higher price (premium for charcoal) for reliability of delivery/supply of your charcoal? Yes/no
xi	If yes, how much more (percent) would you pay for reliability of delivery?
Part 7: Other Questions	
i	Please list three things that you would want to change to make the charcoal sector work better for you? 1. 2. 3.
ii	List three things that would make the charcoal sector work better overall? 1. 2. 3.
iii	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? 1. 2. 3. 4.
iv	Do you care whether charcoal is sustainably-produced or not? Yes/no

v	If you care, why do you care? (short answer) 1. 2. 3.
vi	Do you think current charcoal production is good for the environment? Yes/no
vii	If no, why do you think it is not good for the environment? 1. 2. 3.
viii	If you do not think charcoal production is good for the environment, how would you suggest making charcoal better for the environment? 1. 2. 3.
ix	Do you think that "certifying" charcoal (e.g., where it is produced, from what sources it is produced, whether it is sustainably produced, etc would be a good thing? Yes/No
x	If yes, why do you think charcoal certification would be a good thing? (short answer) 1. 2. 3.

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xi	What would convince you that "certified" charcoal was sustainably-produced? (tick each relevant box) 1. Tanzania Bureau of Standards (TBS) label saying charcoal was sustainably-produced 2. Label showing district authorities had certified charcoal as sustainable 3. Label from a non-government organisation (name the organisation) that the charcoal was sustainably-produced 4. Label from central government ministry or agency (name the agency) that the charcoal was sustainably-produced? 5. Other (please state): 6. Nothing would convince me on a label that charcoal was sustainably produced?
xii	If nothing, what would convince you that charcoal was sustainably produced? 1. 2. 3.
xiii	Other – Please feel free to add any comments or questions

Questionnaire E: Charcoal Sellers Questionnaire

QUESTIONNAIRE E: Charcoal Sellers			
Name of Enumerator		Contacts :	Telephone: Email:
Completed by the enumerator	Questionnaire No:		Date: Time:
	Village:		District:
Details of the respondent	Name:		
	Telephone:		
	Email:		
	Resident:		

PART 1: Overview of Seller	
i.	Name of Seller:
ii.	Is Seller the Owner?
iii.	Is the Seller Woman or Man?
iv.	Is the Owner Woman or Man?
v.	How long in this place
vi.	Is place of business in fixed building (yes, no)
vii.	How many employees/workers at business site
viii.	How many women employees (non-owner)
ix.	How much investment in place of business (TSHS): 1. Source of Finance 2. Self (Yes, No)

	3. Other (specify) 4. Other (specify amount)
Part 2: Charcoal Supply Info	
i.	Does seller know source of charcoal (yes, no)
ii.	If yes, where does the charcoal come from (district)
iii.	From what source does charcoal come from 1. Soft wood 2. Hard wood 3. Natural forest 4. Planted forest 5. Forest reserve 6. Non-reserve forest 7. Do not know
iv.	Does seller only buy from one seller (yes, no)
v.	If buy from more than one, how many (number)
vi.	Where is charcoal purchased (location)
vii.	From whom is charcoal purchased (tick) 1. Bicycle 2. Private car 3. Government car 4. Non-charcoal lorry 5. Small charcoal lorry 6. Large charcoal lorry 7. Other (specify)
viii.	Is charcoal purchased from same source all the time (yes, no)
ix.	How much is charcoal is bought each day (number per day) 1. 1 kg debe 2. 2 kg debe 3. 5 kg debe 4. Bag

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x.	If bag, give weight of bag (kg)
xi.	Do you have any idea of how the charcoal you sell is produced (yes, no)
xii.	If you have idea of how charcoal is produced do you think from earthen kiln or from improved kiln (give one answer or other)
xiii.	How much do you pay for charcoal per day?
xiv.	Has charcoal price changed since this time last year?
xv.	If yes, how much has a charcoal price changed since this time last year (estimate)?
Part 3: Charcoal Income	
i.	How much charcoal do you sell per day (average number per day) 1. 1 kg debe 2. 2 kg debe 3. 5 kg debe 4. Bag
ii.	What do you think your net earnings from charcoal are per day per: 1. 1 kg debe 2. 2 kg debe 3. 5 kg debe 4. Bag
iii.	How much do you estimate you make a day from selling charcoal? TSHS
iv.	Has the amount you make from charcoal sales changed since this time last year (yes, no)?
v.	If yes, how much has charcoal earning changed since this time last year (estimate)? TSHS
vi.	Where is charcoal purchased?
vii.	From whom is charcoal purchased?
viii.	Is charcoal purchased from same person all the time? Yes / No
ix.	How much is charcoal sold today per 1. 1 kg debe

	2. 2 kg debe 3. 5 kg debe 4. bag (give weight)
x.	Do you think your charcoal earnings could be improved? Yes/No
xi.	If yes, how do you think your charcoal earnings could be improved, give some examples how? 1. 2. 3.
Part 4: Other	
	Please list three things that you would want to change to make the charcoal sector work better for you? 1 2 3
	List three things that would make the charcoal sector work better overall? 1 2 3
	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? 1. 2. 3.
	Do you care whether charcoal is sustainably-produced or not? Yes/no

	If you care, why do you care? (short answer) 1. 2. 3.
	Do you think current charcoal production is good for the environment? Yes/no
	If no, why do you think it is not good for the environment? 1. 2. 3.
	If no, how would you suggest making charcoal better for the environment? 1. 2. 3.
	Do you think that "certifying" charcoal (e.g., where it is produced, from what sources it is produced, whether it is sustainably produced, etc would be a good thing? Yes/No
	If yes, why do you think charcoal certification would be a good thing? (short answer) 1. 2. 3.

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	What would convince you that "certified" charcoal was sustainably-produced? (tick each relevant box): 1. Tanzania Bureau of Standards (TBS) label saying charcoal was sustainably-produced 2. Label showing district authorities had certified charcoal as sustainable 3. Label from a non-government organisation (name the organisation) that the charcoal was sustainably-produced 4. Label from central government ministry or agency (name the agency) that the charcoal was sustainably-produced? 5. Other (please state): 6. Nothing would convince me on a label that charcoal was sustainably produced?
	What would convince you that charcoal was sustainably produced? 1. 2. 3.
xiii.	Other – Please feel free to add any comments or questions

Questionnaire F: High End Potential Charcoal Sellers Questionnaire

QUESTIONNAIRE F: POTENTIAL CHARCOAL SELLERS/ High End Supermarkets, Large Stores, Petrol Stations				
Name of Enumerator		Contacts :	Telephone:	
			Email:	
Completed by the enumerator		Questionnaire No:	Date: Time:	
		Town:	District:	
Details of the respondent		Name of Supermarket, Petrol Station, Other Up-Market Vendor (tick appropriate)		
		Respondent Name:		
		Telephone:		
		Email:		
		Resident:		

Part 1: Overview of Seller	
i.	Name of Seller
ii.	Is Seller the Owner? Yes/no
iii.	Is the Seller Woman or Man (specify)
iv.	Is the Owner Woman or Man (specify)
v.	How long in business
vi.	How long in this place
vii.	How many employees/workers at business site

viii.	How many women employees (non-owner)
ix.	How many men employees (non-owner)
x.	What are the main products sold here (most important item first, then next second, etc.) 1. Product 1 2. Product 2: 3. Product 3: 4. Product 4: 5. Product 5:
xi.	Do you sell charcoal? Yes/no
xii.	**If yes, go to Part 2, Charcoal Supply Information, and complete the questionnaire from there**
xiii.	**If no, go to Part 6, Sustainable Charcoal, and complete the questionnaire from there.**
Part 2: Charcoal Supply Information	
i.	How long have you been selling charcoal?
ii.	Have you ever sold charcoal before now (i.e. Did you sell charcoal before, stop and start selling again?) Yes/No
iii.	If yes, who did you buy charcoal from before? (individual, company, importer name)
iv.	If yes, why did you stop before? (short answer)
v.	If yes, why did you start selling charcoal again? (short answer)

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vi.	Are our charcoal customers primarily: 1.Households 2.Businesses
vii.	If businesses, what type of businesses (e.g., restaurants, hotels, etc.) please specify: 1. Restaurants 2. Hotels 3. Other (specify);
viii.	Are your charcoal customers primarily: 1. Local Tanzanians 2. Expatriates 3. Other (specify)
ix.	Do you know the main use for your charcoal by your customers? Yes/no
x.	If yes, is it for: 1. Ordinary cooking 2. Special cooking (e.g., barbeques, etc.) 3. Special commercial cooking (e.g., tandoori, roast chicken, etc.) 4. Other (please specify)
xi.	With so much "traditional" charcoal available in the markets, at retailers, etc why do you think your customers prefer to buy charcoal from you? (short answer) 1. 2. 3.
Part 3: Charcoal Income	

i.	Has charcoal price changed since this time last year?
ii.	If yes, how much has a charcoal price change since this time last year (estimate)?
iii.	In what quantities do you sell charcoal: 1. 5 kg bags 2. 10 kg bags 3. Other (specify)
iv.	How many of each do you estimate you sell each month? 1. 5 kg bags 2. 10 kg bags 3. Other (specify)
v.	Have your charcoal sales increased or decreased over the past year? Increased/Decreased
vi.	If charcoal sales have increased, why do you think they have increased?
vii.	How much do you estimate you make a month from selling charcoal?
viii.	Has the amount you make from charcoal sales changed since this time last year (yes, no)?
ix.	If yes, how much has charcoal earning changed since this time last year (estimate)?
x.	How do you think your charcoal earnings could be improved?
Part 4: Charcoal Source of Supply *(Enumerator: Explain in more detail what sustainable charcoal is, what makes it "sustainable")*	
i.	Do you know the source of your charcoal (yes, no)

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ii.	If yes, where does the charcoal come from: (tick appropriate) 1. Local (specify district) 2. Imported (specify country)
iii.	Do you only buy from one seller (yes, no)
iv.	If you buy from more than one seller, how many (number)
v.	From whom is charcoal purchased (tick) 1. Local producer (specify whether individual, company, etc.) 2. Importer (if charcoal is imported) 3. Local wholesaler (if charcoal is imported) 4. Other retailer (if charcoal is imported) 5. Other (please specify)
vi.	Is charcoal purchased from same source all the time (yes, no)
vii.	How often do you purchase charcoal 1. Once a week 2. Once a month 3. Other (specify)
viii.	Do you have any idea of how charcoal is produced (yes, no)
ix.	From what source do you think your charcoal comes from 1. Soft wood 2. Hard wood 3. Natural forest 4. Planted forest 5. Forest reserve 6. Non-reserve forest 7. Sustainably-Produced Charcoal 8. Do not know

Part 5: Marketing Questions	
i.	List using 1 to 8 (8 highest), what is most to least important to you about charcoal **(use number only once)**? 1. Reliability of supply? 2. Charcoal delivered to your establishment? 3. Certification that charcoal is sustainable? 4. Consistent good quality of charcoal? 5. Packaging of charcoal 6. Consistent quantity that conforms to what you order? 7. Price of charcoal 8. Quality of charcoal
ii.	If quality is important to you, what do you mean by quality? (open answer)
iii.	Are you willing to pay a higher price (premium for charcoal) delivered to you? Yes/no
iv.	If yes, how much more (percent) would you pay for delivery to you?
v.	Are you willing to pay a higher price (premium for charcoal) for consistent good quality of charcoal? Yes/no
vi.	If yes, how much more would you pay (in percent) for consistent quality of charcoal?
vii.	Are you willing to pay a higher price (premium for charcoal for sustainably-produced charcoal? Yes/no

viii.	If yes, how much more would you be willing to pay for sustainable charcoal?
ix.	If you are willing to pay extra for sustainably-produced charcoal, why would you pay that premium? (simple answer)
x.	Are you willing to pay a higher price (premium for charcoal) for reliability of delivery/supply of your charcoal? Yes/no
xi.	If yes, how much more (percent) would you pay for reliability of delivery?
Part 6: Sustainable Charcoal	
i.	Have you ever heard of sustainable charcoal? Yes/No
ii.	If yes, how did you learn about sustainable charcoal? (Tick one) 1. Radio/TV adverts 2. Workshop/seminar 3. Word of mouth 4. Brochures/posters 5. During a market visit **6.** Other (please state)
iii.	Do you know whether the charcoal you currently buy is sustainably produced or not? Yes/no
iv.	If yes, are you happy with the sustainable charcoal? Yes/no
v.	If no, why are you/are you not happy with sustainable charcoal (short answer)?
vi.	Have you ever bought sustainably produced charcoal in the past? Yes/no

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vii.	If yes, from whom did you buy it? (Name, company, etc.)
viii.	If yes, when did you buy it? (year)
ix.	Do you know anyone who is using sustainably produced charcoal?
x.	If yes, please tell us who (name)
xi.	Do you think there is a market for sustainably-produced charcoal? Yes/no
xii.	If yes (and you are not already selling it), would you be willing to sell sustainably-produced charcoal? Yes/No
xiii.	If yes, why would you be willing to sell it? (short answer)
xiv.	If you think there is a market for sustainably-produced charcoal, who would buy it? (list all who you think might buy it) 1. 2. 3.
xv.	If you think there is a market for sustainably-produced charcoal, how big is the market (estimate number of type of bags you are currently selling that you think you could sell for sustainable charcoal)?
xvi.	Do you think those who would buy sustainably-produced charcoal would pay more than the charcoal you are currently selling? Yes/No
xvii.	If yes, how much more (percentage on current price) do you think they would be willing to pay?
xviii.	What kind of things would those who would buy sustainably-produced charcoal, want to see: 1. Strong certification that charcoal is sustainable? Yes/no 2. Good packaging? Yes/No

	3. Good labelling and branding? Yes/No 4. Other (please list other factors)
xix.	In addition to sustainability, what other factors do you think would be important for selling sustainably-produced charcoal? 1. Quantity available 2. Reliability of supply 3. Consistent quality 4. Testimonials/endorsements (if yes, what kind and from whom?) 5. Other (please specify)
xx.	Other comments on sustainably-produced charcoal? (list) 1. 2. 3.
Part 7: Other Questions	
i.	Please list three things that you would want to change to make the charcoal sector work better for you? 1. 2. 3.
ii.	List three things that would make the charcoal sector work better overall? 1. 2. 3.
iii.	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?

	1. 2. 3. 4.
iv.	Do you care whether charcoal is sustainably-produced or not? Yes/no
V.	If you care, why do you care? (short answer) 1. 2. 3.
vi.	Do you think current charcoal production is good for the environment? Yes/no
vii.	If no, why do you think it is not good for the environment? 1. 2. 3.
viii.	If you do not think charcoal production is good for the environment, how would you suggest making charcoal better for the environment? 1. 2. 3.
ix.	Do you think that "certifying" charcoal (e.g., where it is produced, from what sources it is produced, whether it is sustainably produced, etc would be a good thing? Yes/No
x.	If yes, why do you think charcoal certification would be a good thing? (short answer) 1.

	2. 3.
xi.	What would convince you that "certified" charcoal was sustainably-produced? (tick each relevant box) 1. Tanzania Bureau of Standards (TBS) label saying charcoal was sustainably-produced 2. Label showing district authorities had certified charcoal as sustainable 3. Label from a non-government organisation (name the organisation) that the charcoal was sustainably-produced 4. Lable from central government ministry or agency (name the agency) that the charcoal was sustainably-produced? 5. Other (please state): 6. Nothing would convince me on a label that charcoal was sustainably produced?
xii.	If nothing, what would convince you that charcoal was sustainably produced? 1. 2. 3.
xiii.	Other – Please feel free to add any comments or questions

Questionnaire G: Household Questionnaire

QUESTIONNAIRE D: CHARCOAL USERS/ Household Consumer				
Name of Enumerator		Contacts :	Telephone:	
			Email:	
Completed by the enumerator		Questionnaire No:		Date: Time:
		Town:		District:
Details of the respondent		House No:		
		Respondent Name:		
		Telephone:		
		Email:		
		Resident:		
Part 1: Overview of Household				
i.	How long have you lived here? (years)			
ii.	Do you own this house? Yes/No			
iii.	Do you rent this house? Yes/No			
iv.	How many rooms does this house have? (number)			
v.	How many people sleep in this house regularly? (number)			
vi.	What energy sources do you use for cooking? (tick all appropriate) 1. Electricity 2. LPG 3. Kerosene			

	4. Charcoal 5. Firewood 6. Other (specify)
vii.	What source of energy do you use primarily for cooking? (specify)
Part 2: Charcoal Demand	
i.	How often do you purchase charcoal? (tick appropriate) 1. Every day 2. Every few days 3. Once a week 4. Once more than a week
ii.	How much charcoal do you buy each time you purchase charcoal (number) 1. small debe 2. medium debe 3. large debe 4. Bag (gunia/sisal bag)
iii.	If bag, give estimated weight of bag: _____ kg
iv.	How much do you pay per (specify unit & Tshs) 1. small debe 2. medium debe 3. large debe 4. Bag (gunia/sisal bag)
v.	Where do you purchase your charcoal? 1. From door-to-door sellers 2. From street sellers 3. From small local shops (dukas) 4. From large charcoal sellers **5.** Other (specify)

vi.	How many charcoal suppliers do you buy from in any month? (tick appropriate) 1. One 2. Two **3.** More (specify)
Part 3: Charcoal Supply	
i.	Has charcoal price changed since this time last year? Yes/no
ii.	If yes, how much has charcoal price changed since this time last year (estimate)?
iii.	Is charcoal supply reliable? Yes/no
Part 4: Sources of Charcoal Supply	
i.	Do you know where your charcoal comes from? Yes/no
ii.	If yes, where does the charcoal come from (district)
iii.	From what source does charcoal come from: 1. Soft wood 2. Hard wood 3. Natural forest 4. Planted forest 5. Forest reserve 6. Non-reserve forest **7.** Don't know
iv.	Do you have any idea how charcoal is produced (yes, no)
Part 5. Sustainable Charcoal (*Enumerator: Explain in more detail what sustainable charcoal is, what makes it "sustainable")*	
i.	Have you ever heard of sustainable charcoal? Yes/No

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ii.	If yes, how did you learn about sustainable charcoal? (Tick one) 1. Radio/TV adverts 2. Workshop/seminar 3. Word of mouth 4. Brochures/posters 5. During a market visit 6. Other (please state)
iii.	Do you know whether the charcoal you currently buy is sustainably produced or not? Yes/no
iv.	If yes, from whom do you buy it? (name, company)
v.	If yes, for how long have you been buying it?
vi.	If yes, how much do you pay per bag (equivalent) for the sustainable charcoal? Tsh/bag
vii.	If yes, are you happy with the sustainable charcoal? Yes/no
viii.	If no, why are you are you not happy with sustainable charcoal (short answer)?
ix.	Have you ever bought sustainably produced charcoal in the past? Yes/no
x.	If yes, from whom did you buy it? (Name, company, etc.)
xi.	If yes, when did you buy it? (year
xii.	If yes, were you satisfied with it
xiii.	If you were not satisfied with the charcoal, why were you not satisfied? (short answer)

xiv.	Do you know anyone who is using sustainably produced charcoal?
xv.	If yes, please tell us who. (name)
Part 6: Marketing Questions	
i.	On a scale of 1 to 5 (5 highest), how important to you is: 1. Reliability of supply? 2. Certification that charcoal is sustainable? 3. Consistent good quality of charcoal? 4. Packaging of charcoal
ii.	Are you willing to pay a higher price (premium) for sustainably-produced charcoal? Yes/no
iii.	If yes, how much more would you be willing to pay for sustainable charcoal? (x percent more, specify)
iv.	If you are willing to pay extra for sustainably-produced charcoal, why would you pay that premium? (simple answer)
Part 7: Other Questions	
i.	Please list three things that you would want to change to make the charcoal sector work better for you? 1. 2. 3.

ii.	List three things that would make the charcoal sector work better overall? 1. 2. 3.
iii.	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? 1. 2. 3. 4.
iv.	Do you care whether charcoal is sustainably-produced or not? Yes/no
V.	If you care, why do you care? (short answer) 1. 2. 3.
vi.	Do you think current charcoal production is good for the environment? Yes/no
vii.	If no, why do you think it is not good for the environment? 1. 2. 3.

viii.	If you do not think charcoal production is good for the environment, how would you suggest making charcoal better for the environment? 1. 2. 3.
ix.	Do you think that "certifying" charcoal (e.g., where it is produced, from what sources it is produced, whether it is sustainably produced, etc would be a good thing? Yes/No
x.	If yes, why do you think charcoal certification would be a good thing? (short answer) 1. 2. 3.
xi.	What would convince you that "certified" charcoal was sustainably-produced? (tick each relevant box) 1. Tanzania Bureau of Standards (TBS) label saying charcoal was sustainably-produced 2. Label showing district authorities had certified charcoal as sustainable 3. Label from a non-government organisation (name the organisation) that the charcoal was sustainably-produced 4. Lable from central government ministry or agency (name the agency) that the charcoal was sustainably-produced? 5. Other (please state): 6. Nothing would convince me on a label that charcoal was sustainably produced?
xii.	If nothing, what would convince you that charcoal was sustainably produced? 1.

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	2. 3.
xiii.	Other – Please feel free to add any comments or questions

Annex 2: Institutions and People Consulted

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Annex 3: Select References Consulted During Inception Phase

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Author	Publication Name	Year/date of Publication
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