Tanzania Forest Conservation Group
Shirika la Kuhifadhi Misitu ya Asili Tanzania

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

TFCG Technical Paper 46

Charcoal certification in Tanzania: history, context and options for the future

By Severin K Kalonga

Dar es Salaam

2020

This report was prepared by:

Dr Severin K. Kalonga, Environment and Forest Certification (EFC)) Ltd, Plot No. 21, Ally Hassan Mwinyi Road, Regent Estate, Kinondoni, P.O. Box 6986 Dar Es Salaam, Tanzania.

On behalf of the the project:

Conserving Forests through sustainable, forest-based Enterprise Support in Tanzania' – CoForEST.

The goal of the project is to achieve a sustainable, pro-community natural forest management that transforms the economics and governance of the forest products value chains and contributes to climate change mitigation and adaptation.

The project is designed to achieve its overall goal through three inter-related Outcomes:

Outcome 1: The capacity of national, regional and local authorities and community members is strengthened to implement and scale-up CBFM in ways that diversify livelihoods and reduce deforestation.

Outcome 2: A supportive policy framework and financing mechanism for community based forest management and sustainable natural forest based enterprises is in place

Outcome 3: Research and learning institutions in Tanzania are generating new knowledge about enterprise oriented CBFM and are integrating this in student learning.

The project is financed by the Swiss Agency for Development and Cooperation and is implemented by the Tanzania Forest Conservation Group in partnership with the Tanzania Community Forest Conservation Network (MJUMITA)

Recommended citation: Kalonga, S. 2020. Charcoal certification in Tanzania: history, context and options for the future. TFCG Technical Paper 46. p. 87

Tanzania Forest Conservation Group
Shirika la Kuhifadhi Misitu ya Asili Tanzania

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Table of Contents

Acknowledgements

The Consultant, Dr. Severin Kusonyola Kalonga – EFC Ltd would like to express sincere gratitude to TFCG for giving him the opportunity to conduct this study on charcoal certification and standards in Tanzania.

The consultant would like to thank the technical team, in particular TFCG team (Ms Nike Doggart, Mr. Emmanuel Lyimo, Mr. Ewald G. Emil and Mr. Charles Leonard) for their guidance during the execution of this assignment. Moreover, the Consultant is grateful to the TFCG for funding this study and making all the necessary logistical arrangements.

It would have not, however, been possible to carry out a successful study without active participation of all the people who were consulted during the study. Special thanks are extended to all the stakeholders consulted and/or interviewed for providing valuable and useful information relevant to this study.

Abbreviations and Acronyms

AFF	African Forest Forum
BEA	Biomass Energy Agency
CBFM	Community Based Forest Management
CBs	Certification Bodies
CoC	Chain of Custody
CoForEST	Conserving Forests through sustainable, forest-based Enterprise Support in Tanzania
DPs	Development Partners
EFC	Environment and Forest Certification
FBD	Forest and Beekeeping Division
FC	Forest certification
FLEGT	Forest Law Enforcement, Governance and Trade
FM	Forest Management
FSC	Forest Stewardship Council
GRL	Green Resources Ltd
LGAs	Local Government Authorities
MCDI	Mpingo Conservation and Development Initiative
MDAs	Ministries, Departments and Agencies
ME	Ministry of Energy
MJUMITA	Tanzania Community Forest Conservation Network
MNRT	Ministry of Natural Resources and Tourism
NFC	New Forest Company
NFSS	National Forest Stewardship Standards
NGOs/CSOs	Non-Governmental Organisations/Civil Society Organisations
PEFC	Programme for the Endorsement of Forest Certification
PFPII	Participatory Forestry Programme – Phase II
PM	Particulate Matter
PO-RALG	President's Office Regional Administration and Local Government
SCP	Sustainable Charcoal Production
SDC	Swiss Agency for Development and Cooperation
SDGs	Sustainable Development Goals
SFM	Sustainable Forest Management
SUA	Sokoine University of Agriculture
TaFF	Tanzania Fund Fund
TAFORI	Tanzania Forest Research Institute
TBS	Tanzania Bureau of Standards
TFCG	Tanzania Forest Conservation Group
TFS	Tanzania Forest Service Agency
TTCS	Transforming Tanzania Charcoal Sector
TTGAU	Tanzania Tree Growers Association Union
UNFF	United Nations Forum on Forests
VLFR	Village Land Forest Reserve
VNRC	Village Natural Resource Committee
VPA	Voluntary Partnership Agreements
VPO	Vice President's Office
WWF	World Wide Fund For Nature

Executive Summary

This report generates evidence-based recommendations about how charcoal standards and/or certification could contribute to improving the economic, environmental and health outcomes of the charcoal value chain. This information is needed to inform discussions and planning around charcoal certification and standards (voluntary or compulsory) in Tanzania. Desk review and stakeholders consultation were deployed for this assignment.

Over 90% of Tanzania population's energy needs are met through the use of woodfuel (Charcoal and firewood). Charcoal demand is high and the production is unsustainable. Although the main driver of deforestation in Tanzania is agriculture, about 40% of the forest degradation could be attributed to unsustainable charcoal production alone. Without supply and demand side interventions, demand will almost double by 2030 from the 2010 demand estimates. It has been confirmed that forest certification, as a tool for sustainable forest management (SFM) practices contribute positively to halting deforestation and forest degradation.

Certifying forest products as sustainable is intended to prevent overexploitation. Not only that unsustainable charcoal production is environmentally disastrous, but also has health related effects from air pollution to producers as well as consumers. Once the wood has been harvested, health concern arises in the form of pollution produced at the site of production affecting producers. This pollution is a threat not only to the environment as a whole, through greenhouse gas emissions, but it also poses a health risk to those in close proximity to the kiln during firing/carbonization. Around 26,000 Tanzanians died in 2013 prematurely from causes attributable to particulate matter (PM) air pollution. Over 22,000 of these deaths were caused by household (indoor) air pollution, which is associated with the widespread use of solid biomass (firewood and charcoal) as domestic energy source. These mortality figures are higher than those of neighbouring countries. In economic terms, this costed the country around $11 billion in 2013. These environmental and health concerns must be properly addressed if the production of charcoal is going to move toward sustainability. One of the tools recommended to achieve sustainability is charcoal certification and standards. Social, economic and environmental aspects will be dealt with, by ensuring that kiln specifications and cook stove standards are adhered to, during charcoal production and use along the value chain.

Certification standards would help to set-up expectations on acceptable charcoal quality including moisture content, dust and residues content. This will ensure that consumers get a fair and healthy product, i.e., resolving issues around standardised packaging so that consumers get a 'fair deal' when they buy a package of charcoal. Furthermore, it will enhance production governance which provides an indication of whether a packet of charcoal has been produced in accordance with laid down legal framework and standards. Namibia's experience shows that it is the country in Africa after South Africa with the second highest number of Forest Stewardship Council (FSC) certificates. But also Namibia is among the three African countries that have made forest certification legal. Others are Uganda and South Africa. The charcoal value chain in Namibia is well organized and firmly regulated by Namibian forestry and environmental policies.

Although there is inadequate awareness among government ministries, departments and agencies (MDAs) and general public about certification and standards in the country, there is a potential for adopting FSC certification and standards, linking the Transforming Tanzania Charcoal Sector (TTCS) model with FSC National Forest Stewardship Standards (NFSS) for

Tanzania. The experience from Namibia and Mpingo Conservation and Development Initiative (MCDI)'s performance in the country could serve as a platform for awareness raising and hence adoption of certification standards for charcoal production.

Since 2004 MCDI, has been developing an approach to CBFM which focuses specifically on sustainable management of high-value hardwood timbers, working in the miombo woodlands on communal village lands. The aim was to conserve endangered forest habitats in East Africa by promoting sustainable and socially equitable harvesting of valuable timber stocks, and with a particular focus on African Blackwood, *Dalbergia melanoxylon* Guill. & Perr., which is used for making clarinets, oboes and bagpipes. In March 2009, MCDI was awarded the first certificate by FSC for community-managed natural forests in the African continent.

Among the benefits communities enjoy include earnings from the sale of FSC-certified African Blackwood, *Dalbergia melanoxylon* Guill. & Perr., and other miombo spp, domestically and abroad. The revenue is used to facilitate community related development projects such as schools, health and water. This has been made possible through forest certification which creates an enabling environment for market access that recognizes good stewardship and rewards it accordingly.

There is a number of certification schemes globally for voluntary standards, the popular ones are the FSC and the Programme for the Endorsement of Forest Certification (PEFC). The FSC is the only one active in Tanzania with National Forest Stewardship Standards for mainland (NFSS) in place. FSC standards aim at promoting environmentally appropriate, socially beneficial and economically viable management of forests.

One of the challenges associated with these FSC certification standards is their voluntary nature. A complementary with TBS compulsory standards would enhance the adoption and application of the voluntary standards on the ground. The combination of the Tanzania Bureau of Standards (TBS) Charcoal compulsory standards with FSC standards would maximize and enhance sustainability practices.

In terms of policy, the charcoal sub-sector in the region still faces some challenges. There are still no specific or clear policy and legal framework for biomass energy, and thus even the existing policies such as the National Energy Policy and National Forest Policies are silent on how can sustainable charcoal production (SCP) initiatives be initiated and promoted in the country. Even though the National Biomass Energy Strategy was developed back in 2015 in Tanzania, corresponding action plans have not been prepared to date, and therefore the strategy has not been put into practices since then. Similar policy gap was observed in other neighbouring countries within the region. Just like in Tanzania, there are no specific policy on biomass energy in Kenya, Uganda, Mozambique, DRC, Namibia and Zambia.

The major reason, among others, underpinning the illegal charcoal production is that the charcoal industry is largely unregulated and thus informal. but also, there is uncoordinated forest resource management among actors a) Tanzania Forest Services (TFS) Agency under the Ministry of Natural Resources and Tourism; b) The Regional Secretariat which is foreseer of all natural resources in the region; Local Government Authority which predominantly own and manage the local government forest reserves; and ME, VPO, MNRT – who is the leading ministry? Each player develops and implements plans by themselves and issue out orders that may not be compatible with plans of another player in the sub-sector, resulting into uncoordinated forest resource management in the country.

Harmonized policy measures are required to make production and use of charcoal more environmentally sustainable. Sustainability depends on the practices applied along the value chain, including: a) Harvesting of forest resources guided by Land Use and Management Plans; b) Charcoal produced from sustainably managed sources with harvesting plans in place; c) Regulations governing the sector adequately enforced; d) Improved charcoal production methods and technologies applied on a large scale; e) Large scale marketing and use of improved charcoal stoves by end users; f) Having a common vision, charcoal can be a clean, sustainable modern energy carrier.

Despite of the challenges facing the industry, the charcoal sub-sector is a major employer and contributes over US$ 650 mn annually to the national economy. However, due to its informal nature, over US$ 100 mn in tax revenues are lost. With the value of Tanzania's charcoal business conservatively estimated at about US$ 650 million, this represents unregulated trade of around US$500 million per year. The potential annual taxes and levies lost from this represent around 20 % of its total value, or around US$100 million. Moreover, charcoal is largely produced locally using traditional, inefficient and ineffective methods; they typically have an efficiency of 8-12%.

Reducing unsustainable charcoal production and use is one of the great challenges of our time, and it is clear that wood charcoal will continue to be the leading fuel in urban areas for decades to come. Thus, government and key stakeholders need to promote and facilitate transition from current reliance on unsustainable charcoal, to a mixture of clean cooking fuels through charcoal certification and standards adoption. There are a number of benefits, including the streamlining of forest operations due to improvements in efficiency and greater control of production processes. Moreover, the standards mark of quality makes people buy with confidence. On the other hand, it protects the manufacturers from competing with inferior products and enables them to prove to the market that their products satisfy all the requirements specified in the standards.

Optionally, stakeholders in Tanzania could pursue the charcoal certification and standards process in a number approaches. One recommended is the 'Voluntary certification system, bottom-up approach'.

In this approach, a group of governments' MDAs, companies, and other interested parties voluntarily adopts standards and certification schemes, as e.g., the FSC Group certification schemes could be a starting point. Promotion and adopt the FSC-NFSS for all forest management operations, combined with reporting obligation for environmental and social sustainability issues with a view to improve performance over time. The NFSS is setting minimum standards for forest management/harvesting practices for producers/processors/traders of forest produce, including charcoal. Recommend private sector to take lead in the process with support from government MDAs. Existing instruments or organizations can be used to push the process, e.g., Development partners, NGOs/CSOs, etc are relevant players in this process.

Year 2 of this project, the research should focus establishing more information to inform on the processes of charcoal certification and standards for the implementation of the system.

1) Introduction

1.1 BACKGROUND

With Financial Support from the Swiss Agency for Development and Cooperation (SDC), the Tanzania Forest Conservation Group (TFCG) in partnership with the Tanzania Community Forest Conservation Network (MJUMITA) is implementing the project 'Conserving Forests through sustainable, forest-based Enterprise Support in Tanzania' (CoForEST). The project's goal is to achieve a sustainable, pro-community natural forest management that transforms the economics and governance of the forest products value chains and contributes to climate change mitigation and adaptation, with a number of outcomes including research on charcoal certification and standards. The CoForEST project, therefore, has launched a consultancy to research on Charcoal Certification and standards in Tanzania to meet energy needs.

Available statistics show that over 90% of Tanzania population's energy needs are met through the use of woodfuel[1], mainly charcoal and firewood for cooking and heating (Figure 1).

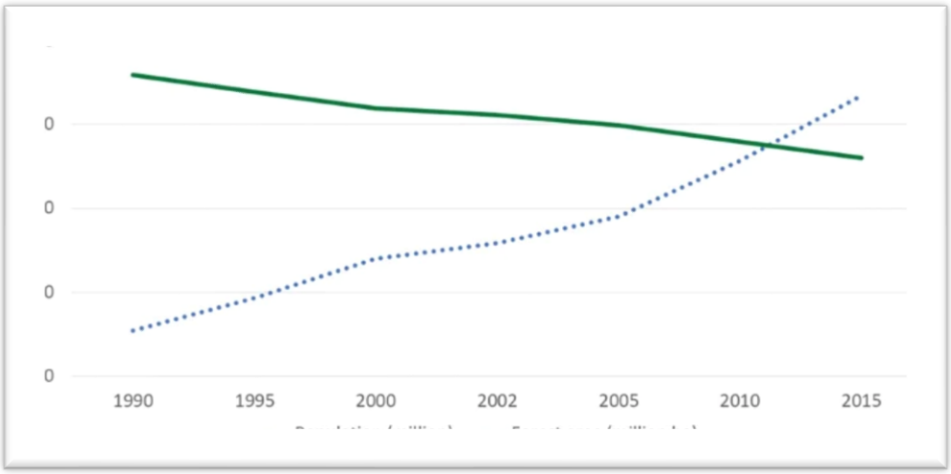

Figure 1: Forest area and population in Tanzania 1990–2015[2]

In Tanzania, charcoal demand is high and the production is unsustainable[3],[4]. Without supply and demand side interventions, demand will almost double by 2030[5] from the 2010 demand estimates (Figure 2).

[1] BEST, 2014. Tanzania Tanzania Biomass Energy Strategy and Action Plan - Final Report
[2] Arvola, A., Malkamäki, A., Penttilä, J. et al. 2019. Mapping the Future Market Potential of Timber from Small-Scale Tree Farmers: Perspectives from the Southern Highlands in Tanzania. Small-scale Forestry 18, 189–212. https://doi.org/10.1007/s11842-019-09414-8
[3]World Bank. 2009. Environmental Crisis or Sustainable Development Opportunity? Transforming the charcoal Sector in Tanzania: A Policy Note; URT-VPO, 2019. State of Environment Report #3
[4] Msuya, N; Masanja, E and Temu, AK. 2011. Environmental Burden of Charcoal Production and Use in Dar es Salaam, Tanzania. *Journal of Environmental Protection*, 2, 1364-1369 doi:10.4236/jep.2011.210158 (http://www.SciRP.org/journal/jep)
[5] FAO, 2011. Review of food and agricultural policies in the United Republic of Tanzania

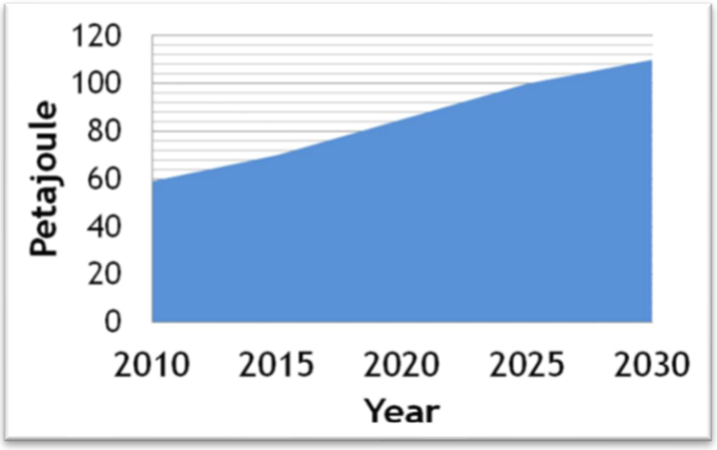

Figure 2: Projected Charcoal Demand for Tanzania[6].

However, the literature around the relative contribution of unsustainable charcoal production to deforestation and forest degradation acknowledge that the relationship is complex and not easily determined[7],[8],[9]. Recent research findings, however; confirm that agriculture is the main driver of deforestation in Tanzania, and that charcoal is a by-product of land clearing for agricultural development[10],[7]. It should be noted that sustainable charcoal provides an opportunity to reduce deforestation. Charcoal is a well-established value chain that could provide the economic incentive for communities to retain forests on village land, rather than converting it to agriculture. To reduce deforestation communities need to accrue financial benefits from their forests. If communities are not supported to benefit financially from their forests, it is entirely rational that they convert that land to agriculture.

The charcoal sector is a major employer and contributes over US$ 650 mn annually to the national economy. However, due to its informal nature, over US$ 100 mn in tax revenues are lost[11]. With the value of Tanzania's charcoal business conservatively estimated at about US$650 mn, this represents unregulated trade of around US$500 mn per year. The potential annual taxes and levies lost from this represent around 20% of its total value, or around US$100 mn. Moreover, charcoal is largely produced locally using traditional, inefficient and ineffective methods - they typically have an efficiency of 8-12%[12].

---

[6] MEM, 2014. Ministry of Energy - Biomass Energy Strategy (BEST) Tanzania: Tanzania Biomass Energy Strategy and Action Plan. CAMCO Clean Energy (Tanzania) Limited. Final Report

[7] Mabele, M. B. 2020. The 'war on charcoal' and its paradoxes for Tanzania's conservation and development. Energy Policy 145: 111751 https://doi.org/10.1016/j.enpol.2020.111751

[8] Chidumayo E.N. 2012. The environmental impacts of charcoal production in tropical ecosystems of the World: A synthesis. Presentation made at the 2011 Annual Conference of the Association for Tropical Biology and Conservation and Society for Conservation Biology. 12 – 16 June, Arusha, Tanzania; CHAPOSA (2002). Charcoal Potential in Southern Africa. ICO_DEV: International Cooperation with Developing countries (1998-2007); Malimbwi, R.E. and Zahabu, E. 2008. Analysis of sustainable charcoal production systems in Tanzania. In S. Rose, E. Remedio & M.A. Trossero, eds. Criteria and indicators for sustainable woodfuels: case studies from Brazil, Guyana, Nepal, Philippines and Tanzania.

[9] Doggart N and Meshack C. 2017. The Marginalization of Sustainable Charcoal Production in the Policies of a Modernizing African Nation. Front. Environ. Sci. 5:27.

[10] Nike Doggart et al. 2020. Agriculture is the main driver of deforestation in Tanzania. Environ. Res. Lett. 15: 034028

[11] World Bank, 2010. Enabling Reforms: A Stakeholder-Based Analysis of the Political Economy of Tanzania's Charcoal Sector and the Poverty and Social Impacts of Proposed Reforms

[12] https://energypedia.info/wiki/Charcoal_Production

It has, for some time, been widely recognized that Charcoal certification is extremely inevitable to ensure sustainability of biomass production[13]. Charcoal certification and standards could play a key role in a shift towards well-managed production from village lands, further incentivizing communities to retain woodlands. Forest certification (FC), as a tool for sustainable forest management (SFM) practices contribute positively to regulating production more and reducing consumption[14], e.g., biomass recovery, in miombo woodlands[15].

The original purpose of FC was two-fold to (Nussbaum and Simula, 2005): a) improve the social, environmental and economic quality of forest management, thereby, providing a tool to contribute to the achievement of sustainable or responsible forest management; and b) allow the market to reliably differentiate and purchase products coming from responsibly managed forests and provide the managers of these forests with improved market access for their products. However, over the last decade several additional uses have emerged, including: a) investment reduction and a mechanism for helping to raise funds for good forest management; b) a reduced need for law enforcement and higher collection rate of forest taxes and royalties; c) improved efficiency in forestry, logistics and marketing of forest products; and d) verification that donor funds are resulting in projected improvement in management. The proposed broader objective of FC is to: promote and facilitate policy-oriented learning amongst actors in the forest policy domain so that acceptable standards of forest management, covering economic, social and environmental issues can be defined and used in a balanced manner. This encapsulates and emphasises the policy process view of certification.

Certifying forest products as sustainable is intended to prevent overexploitation. Not only that unsustainable charcoal production is environmentally disastrous, but also has health related effects from air pollution to producers as well as consumers[16]. Once the wood has been harvested, health concern arises in the form of pollution produced at the site of production affecting producers. This pollution is a threat not only to the environment as a whole, through greenhouse gas emissions, but it also poses a health risk to those in close proximity to the kiln during firing/carbonization. These environmental and health concerns must be properly addressed if the production of charcoal is going to move toward sustainability[17]. One of the tools recommended to achieve sustainability is certification standards[18].

Certification standards would help to set-up expectations on acceptable charcoal quality including kilns specifications, moisture content, dust and residues content. This will ensure that consumers get a fair and healthy product, i.e., resolving issues around standardised packaging so that consumers get a 'fair deal' when they buy a package of charcoal. Furthermore, it will enhance production governance which provides an indication of whether a packet of charcoal has been produced in accordance with laid down legal framework and standards.

---

[13] Malimbwi, R.E. and Zahabu, E. 2008. Analysis of sustainable charcoal production systems in Tanzania. In S. Rose, E. Remedio & M.A. Trossero, eds. Criteria and indicators for sustainable woodfuels: case studies from Brazil, Guyana, Nepal, Philippines and Tanzania.

[14] Kalonga, K; Midtgaard, F and Klanderudet, K. 2016. Forest certification as a policy option in conserving biodiversity: Empirical study of forest management in Tanzania. Forest Ecology and Management 361:1-12

[15] Chidumayo, E.N. and Gumbo, D., 2012. The environmental impacts of charcoal production in tropical ecosystems of the world: A synthesis. Energy for Sustainable Development

[16] World Bank. 2019. Tanzania: Country Environmental Analysis – Environmental Trends and Threats, and Pathways to Improved Sustainability. 2019. Washington, DC: World Bank

[17] Roop, J T. 2013. "Moving Toward Sustainable Production of Charcoal in Sub-Saharan Africa: A Teaching Case Study". Chemistry Publications and Other Works. http://trace.tennessee.edu/utk_chempubs/38

[18] Cashore, B; Gale F; Meidinger E and Newsom, D 2006. Confronting Sustainability: Forest Certification in Developing and Transitioning Countries.

There are a number of certification schemes globally for voluntary standards, the popular ones are the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC)[19]. The FSC is the only one active in Tanzania[20],[21] with National Forest Stewardship Standards for mainland (NFSS)[22] in place. Transparently, FSC label makes clear whether the forest products were harvested or produced responsibly[23] (Figure 3).

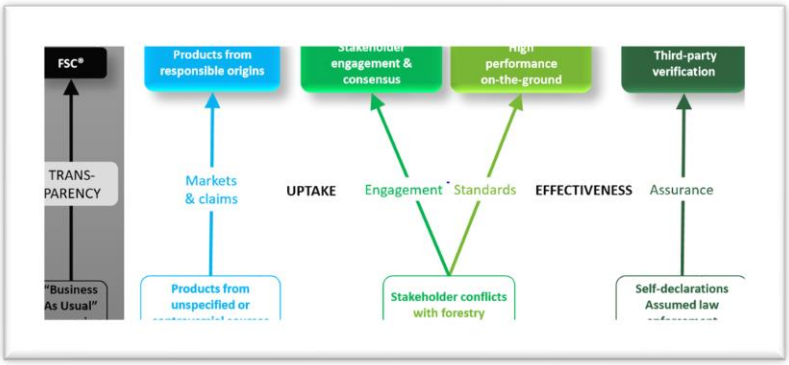

Figure 3: Transformation through FSC certification[24]

Intended to help customers choose their product consciously, the label certifies firms if they fulfill the principles and criteria set in the associated standards. Additionally, FSC standards aim at promoting environmentally appropriate, socially beneficial and economically viable management of forests.

The FSC has two types of certificates: Forest Management (FM) and Chain of Custody (CoC). The former deals with certifying all forest operations for the production of forest products (e.g., timber, etc) and conservation. The latter is about verifying that FSC-certified material has been identified and separated from non-certified and non-controlled material as it makes its way along the supply chain, from the forest, processing, to the market, including charcoal production/processing and trading[25]. It should be noted that forest management certification applies to the entire forest management unit. Therefore, all products and services generated in a certified forest management unit have the potential to carry the label of the certifier, including non-wood forest products.

One of the challenges associated with these certification standards is their voluntary nature[21]. Complementarity with compulsory standards would enhance the adoption and application of the voluntary standards on the ground. Moreover, a combination of the Tanzania Bureau of Standards (TBS) Charcoal compulsory standards with FSC standards would maximize and enhance sustainability practices. TBS has the mandate to do it as per the TBS Standards Act #2, 2009 which provides for the promotion of the standardization of specifications of

[19] Struwe, J and Thorsten Specht, T. 2015. Introduction to Forest Certification Schemes. Tropical Forestry Handbook. DOI 10.1007/978-3-642-41554-8_237-1
[20] Teketay D., Mbolo A. M. M., Kalonga S. K. and Ahimin O. 2016. Forest certification in Africa: achievements, challenges and opportunities. African Forest Forum, Nairobi, Kenya. 157 p.
[21] Kalonga, S. K., Teketay, D. and Mutta, D. 2019. Status of forest certification in eastern and southern Africa sub-regions. African Journal of Rural Development 4 (1): 109-123
[22] The FSC National Forest Stewardship Standard for Tanzania Mainland (https://fsc.org/en/newsfeed/tanzania-launches-fsc-national-forest-stewardship-standard)
[23] Nghobuoche Frankline, Ngoufo Roger, Tatuebu Tagne Claude, Louis Defo, Kiming Ignatius Ngala. 2020. Forest Certification for Sustainable Forest Management in Cameroon: Myth or Reality. International Journal of Environmental Protection and Policy. 8(6):105-116. doi: 10.11648/j.ijepp.20200806.11
[24] FSC, 2014. Overview of the FSC Theory of Change "Rewarding responsible forestry"
[25] Nussbaum, R. & Simula, M. 2005. The forest certification handbook. Second edition. London, Earthscan

commodities and services, and for other related matters. There are Biomass Cook stoves standard TZS 473:2019, and Wood Charcoal and briquettes standards TZS 1312:2010 (*under review*) operational. Since Tanzania has FSC-NFSS, it would benefit forest managers and other actors in the forest industry/sector, if TBS could adopt the FSC standards as national standards with TBS number/standard quality mark to enhance sustainable solid biomass production for charcoal. Then, TBS could consider complementing these by developing standards for kiln specifications, etc for charcoal so as to attract domestic and international market, but also as a tool for governance of the sector, contributing socio-economic benefits to local communities and nation at large, while benefiting nature.

1.2 OBJECTIVE OF THE ASSIGNMENT

The initial analytical objective of the assignment is to take account of issues on the ground, be forward looking and provide recommendations for significant SFM practices that practically can be implemented, e.g., charcoal certification and standards.

This research is needed to inform discussions and planning around charcoal certification and standards in Tanzania. The overall aim of the assignment is establishing data and information that will inform stakeholders in the CoForEST project area (Figure 4) and the nation at large on issues related to the charcoal certification and standards (voluntary or compulsory).

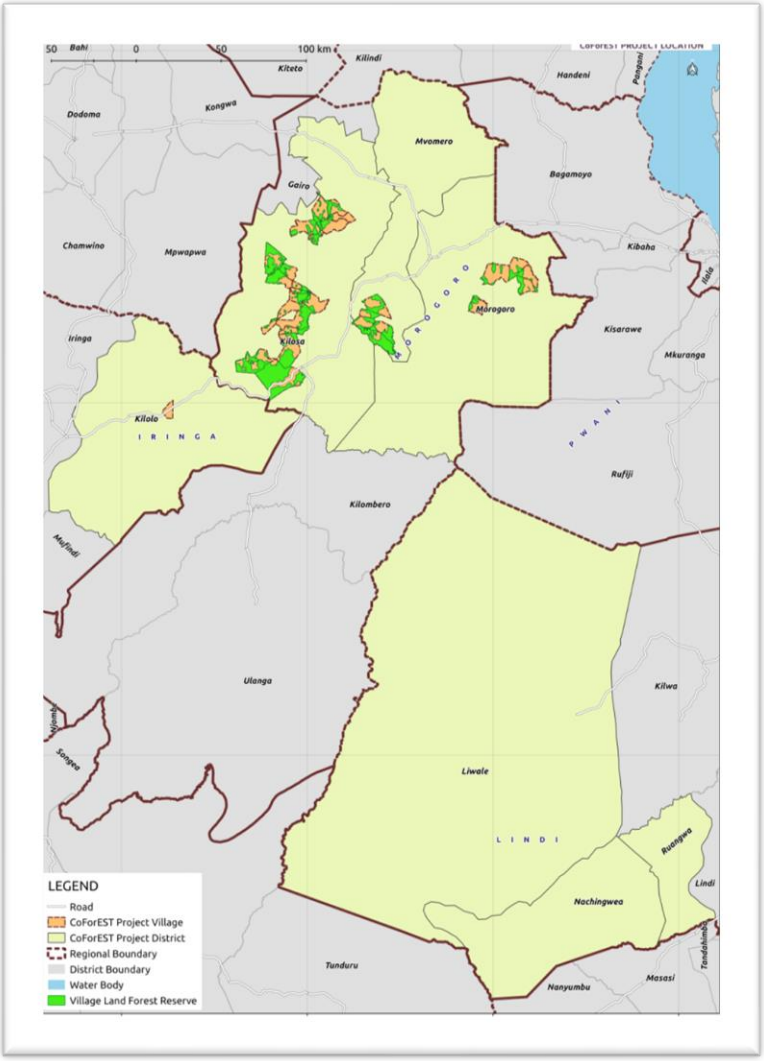

Figure 4: CoForEST Project map showing participating districts (Kilosa, Morogoro, Mvomero, Ruangwa, Kilwa, Nachingwea, Liwale and Kilolo).

1.3 OBJECTIVES AND SCOPE

The objective of the study covered, but not limited to, research on charcoal certification and standards for sustainable forest management, specifically:

- Identifying certification and standards options for charcoal in Tanzania based on a review of the literature and policies, and experiences in other countries and in other value chains in Tanzania;
- Establishing advantages and disadvantages of different options including national standards covered through the TBS Standards Act #2, 2009 vs voluntary standards such as FSC;
- Reviewing of FSC status for timber in Tanzania and how or whether charcoal could link with the existing FSC-NFSS;
- Assessing awareness and attitudes in government MDAs about charcoal certification and standards;
- Examining the potential for standards and certification to link with the Transforming Tanzania Charcoal Sector (TTCS) model, based on a review of project reports and other materials such as the charcoal manuals and other descriptions of the model.
- Evaluating other benefits of standards (as well as environmental benefits) including benefits to consumers in setting standards on product quality (particularly on health grounds), weights and measures and legality or compliance.
- Review of lessons learned from the adoption of FSC standards for timber (linking with Mpingo Conservation and Development Initiative - MCDI) and consider modifications that would be required to apply to sustainable charcoal.
- Analyze relevant stakeholders in terms of their influence and role in charcoal standards
- Generate evidence-based recommendations about how charcoal standards and / or certification could contribute to improving the environmental and health outcomes of the charcoal value chain
- Provide recommendations for further research on charcoal certification.

The study covered issues relevant at national and regional level. However, the study also covered project and non project districts including: Kilosa, Kilolo and Kilwa.

2) Methodology

2.1 OVERALL APPROACH TO THE RESEARCH

The consultant innovatively used systematic desk review and stakeholder consultation approach. These approaches ensured full engagement of the client and key stakeholders and partners and assurance for quality checks and hence provide opportunity for adjustments as per client needs. The employment of several techniques did not only allow collection of qualitative and quantitative data, but also helped in triangulation purposes[26].

The *desk review* method involved review of recently published and unpublished studies that focus on certification in Tanzania and other countries. The review included understanding the certification in Tanzania's legal framework's context (i.e., legislation and policies) and from other countries, through the exploration of legal/policy implication and intervention/activities employed in the adoption of charcoal certification and standards. The systematic desk review was synchronized and hence collated all information from these studies to suit the study

[26] Mwanje, J. (2001). Issues in Social Science Research: Social Science Research Methodology Series Module 1. Addis Ababa: OSSREA

objectives. The list of documents reviewed included policies, certification and standards, research papers on certification, reports, etc (Annex 1).

Stakeholders' consultation: A participatory approach was employed for undertaking stakeholders' identification and analysis to allow for stakeholder consultation[27]. Some of the key stakeholders that are interested and/or affected by charcoal certification and standards were identified using interviews with key informants, historical data and consultant's experience. Moreover, the identification based on their previous or current participation in charcoal production and/or forest resource management, economic planning, community development, environment and local governance. The stakeholders also included respondents who have long experience by living and using forest resources directly or indirectly for charcoal production.

Thereafter, some of them were selected for an in-depth study on their linkages to the overall charcoal certification and standards concept. They were consulted mainly through key informant interviews for the purpose of exploring their views/opinion and feelings to obtain information about a particular topic or issue related to charcoal certification and standards.

The key stakeholders for consultation in this assignment came from relevant LGAs, government MDAs, Development Partners, NGOs/CSOs, private sector and other stakeholders interested and/or affected with charcoal certification and standards (Annex 2). Results of the stakeholder consultation/ meetings were summarized (Annex 3).

2.2 METHODS EMPLOYED

Desk review and stakeholder consultation were deployed for this assignment. The assessment was undertaken with a primary emphasis on understanding the qualitative and quantitative aspects of charcoal certification and standards rather than pursuing statistically representative analysis.

2.3 DATA COLLECTION AND ANALYSIS

Primary and secondary data and information about charcoal certification and standards were gathered through documents and literature review (legislation, policies, journal papers, books, reports, forest certification schemes website/databases, certified companies websites/databases, TBS compulsory/voluntary standards, etc). Other tools used were stakeholder consultation through key informants interviews (by phone, by emails, zoom or monkey survey). Semi-structured questionnaire was developed and used for data collection. Specifically, data collection aimed at gathering data and information to address specific objectives as presented in section 2.1.1.

Key quantitative data collected included costs and revenue from sales of charcoal. These data/information were supplemented from secondary information, mainly annual reports and charcoal production reports from technical reports from TFCG. Perceptions and opinions of the key informants on Charcoal certification and standards were explored as well. Data and information gathered were analysed using qualitative and quantitative methods. The qualitative information gathered from stakeholder interviews were analysed descriptively.

[27] Bryson, J. M. 2004. : What to do when stakeholders matter: Stakeholder Identification and Analysis Technique. Vol. 6 Issue 1: 21-53 Public Management Review ISSN 1471-9037 prinViSSN 1471-9045 online

3) Charcoal Certification and Standards in Tanzania and the region

3.1 CONTEXTUAL ANALYSIS

3.1.1 Forest Certification

The concept of '*certification'* for forest management came about as a result of the Rio Summit to address sustainable development agenda[28] (Figure 5).

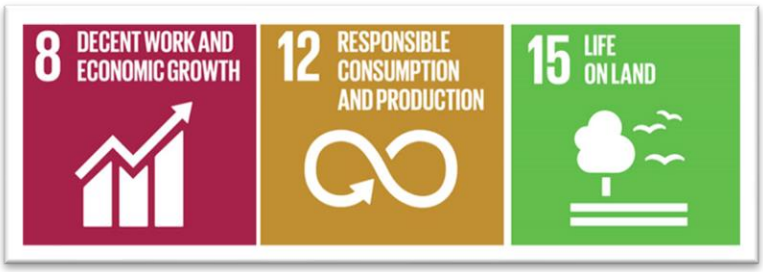

Figure 5: Forest certification contributes to sustainable development goals (SDGs).

Since the first half of the 1990s, forest certification[29] has been promoted as a means to tackle global deforestation and forest degradation in response to the failure of governmental and intergovernmental processes to establish a global compact on forests[30]. According to some scholars, forest certification is one of the most important developments in forest governance in the last couple of decades and an alternative to the failure of traditional, largely public regulations to address social and environmental problems[30].

Forest certification is voluntary, with the purpose of encouraging change in the forest sector through forest operations (Forest Management certification) and their wood processing enterprises in the value chain (Chain of Custody certification), aiming at linking producers and consumers of forest products that meet an agreed set of environmental and social requirements[31]. The Forest Management certification focuses not only on ecological aspects of harvesting for timber production; but also includes social and economic standards[32]. The Chain of Custody traces the wood through manufacturers and retailers to verify that the line of supply at all stages, including forest harvesting, processing, shipping, manufacturing, transportation and distribution have been maintained thus preventing non-certified products from entering the chain[25]. Theoretically, on one end of the value chain, there is a consumer or retailer who is willing to pay more for a product labelled as environmentally friendly or socially just, and on the other end, an owner or producer who seeks market advantages through use of superior practices[30] (Figure 6). It is argued that such a mechanism would improve

[28] Cashore, B., Fred, F., Meidinger, E. and Newsom, D. (eds.). 2006. Confronting Sustainability: Forest Certification in Developing and Transitioning Countries. Yale Publishing Services Center. USA

[29] …is a voluntary process whereby an independent third party (the "certifier") assesses the quality of forest management and production against a set of requirements ("standards") predetermined by a public or private certification organization. Forest certification, and associated labelling, is a way of informing consumers about the sustainability of the forests from which wood and other forest products were produced

[30] Marx, A. and Cuypers, D. 2010. Forest certification as a global environmental governance tool: What is the macro-effectiveness of the Forest Stewardship Council? Regulation and Governance 4:408-434

[31] Pinto, L. F. G. and Mcdermott, C. 2013. Equity and forest certification—A case study in Brazil. Forest Policy and Economics 30:23-29

[32] Duchelle, A. E., Kainer, K. A. and Wadt, L. H. O. 2014. Is Certification Associated with Better Forest Management and Socioeconomic Benefits? A Comparative Analysis of Three Certification Schemes Applied to Brazil Nuts in Western Amazonia. Society and Natural Resources 27:121-139

governance of forest products by creating more business value than forest products from non-certified forests and hence catalyze changes towards SFM[31].

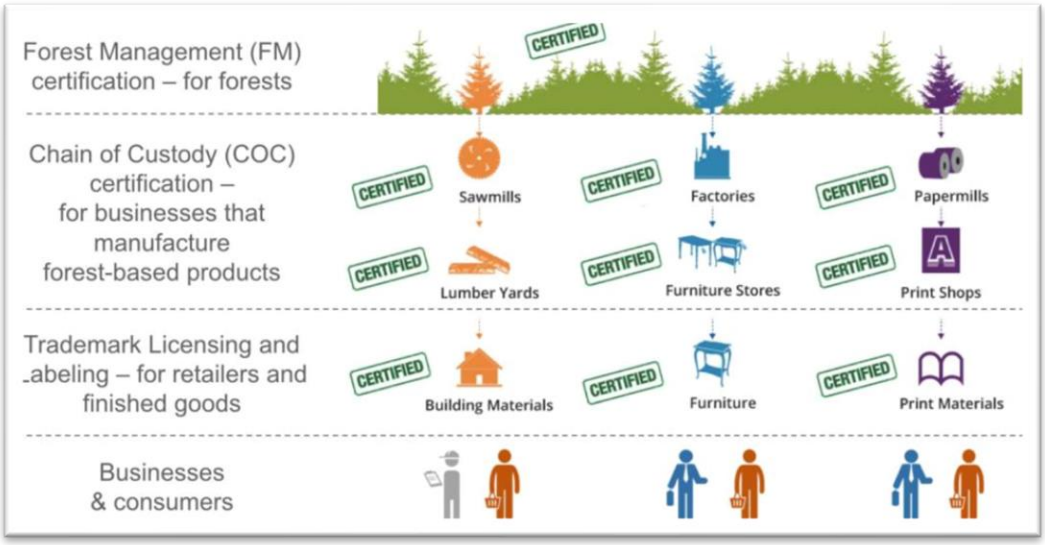

Figure 6: FSC Forest Management and Chain of Custody certificates linkages[33]

Forest certification as presented by Nussbaum and Simula (2005)[25], is a market-based, non-regulatory forest conservation tool designed to recognize and promote environmentally-responsible forestry and sustainability of forest resources. Moreover, forest certification is intended to serve as a seal of approval, i.e. a means of notifying consumers that a forest product comes from forests managed in accordance with strict environmental and social standards. Furthermore, forest certification schemes are claimed to be innovative instruments for assuring the sustainability and multifunctional role of forest assets for human wellbeing, and hence contributing concomitantly and increasingly to the vision of green growth and economy[34].

In the processing of forest products raw materials, it is essential to show that sufficient material have been purchased to produce products sold as certified (e.g., charcoal), including wastage. The processor shall specify the methodology and calculate '*conversion factors*' for each product group and keep the information up to date (Figure 7).

Example	Images	Notes
Charcoal		Charcoal burning involves taking wood and burning it in reduced oxygen to make charcoal. The rule of thumb is roughly 3 to 5 tonnes of fresh wood makes 1 tonne of charcoal. It varies on species and technology of the equipment. Also, ash can be combined with glue to make briquettes, so this is more complex. The weight of the ash will go up when the glue is added, so the CF might be "positive" for briquettes.

Figure 7: Raw materials control in the certified products production process[35],[36]

[33] FSC: https://us.fsc.org/en-us/certification/chain-of-custody-certification
[34] Muthoo, M. 2012. Forest certification and the green economy. Unasylva (FAO) 63:17-23
[35] Soil Association, 2019. Introduction to Chain of Custody Certification
[36] FSC, 2019. FSC Chain of Custody 101

The FSC) and the PEFC are major certification schemes globally[19]. The FSC is an international not-for-profit, multi-stakeholder organisation established in 1993 to promote responsible management of the world's forests; and it is an international system which requires producers to meet a global set of standards for good forest stewardship and provides a trademark for product labeling[37]. On the other hand, the PEFC is an international, non-profit, non-governmental organisation which promotes SFM through independent third party certification; and it is considered the certification system of choice for small forest owners, established in 1999[25]. The PEFC is not operational in Tanzania yet, making FSC the only scheme which is operational in the country, demonstrating responsible forest management practices in protecting the environment, biodiversity and ecosystem services[38]. This was also confirmed by stakeholders during consultation/interviews (Figure 8).

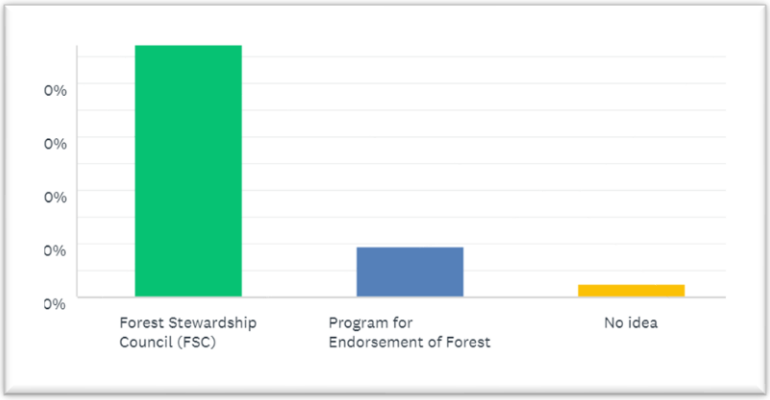

Figure 8: Knowledge of FSC presence in Tanzania. Source: Own survey data.

Scholars have attempted to examine, although mainly qualitatively, the influence of forest certification compared to other forest management regime approaches. This includes the FSC forest management approach on community forestry in Africa, Latin America and Southeast Asia. They claim that forest certification meets not only public expectations for better forest management and environmental practices, social standards and economics analyses, but also promotes high quality management practices[39]. The FSC standards are claimed to reduce pressure on forest resources by creating alternative of livelihood to communities through sustainable logging for timber production while maintaining forest ecosystem integrity[37] (Figure 9a).

[37] Karmann, M. and Smith, A. 2009. Forest Stewardship Council reflected in scientific and professional literature. Literature study on the outcomes and impacts of FSC certification. Forest Stewardship Council Policy Series, Bonn. 244pp

[38] Kalonga, S. K., Teketay, D. and Mutta, D. 2019. Status of forest certification in eastern and southern Africa sub-regions. African Journal of Rural Development 4 (1): 109-123

[39] Cubbage, F., Diaz, D., Yapura, P. and Dube, F. 2010. Impacts of forest management certification in Argentina and Chile. Forest Policy and Economics 12:497-504

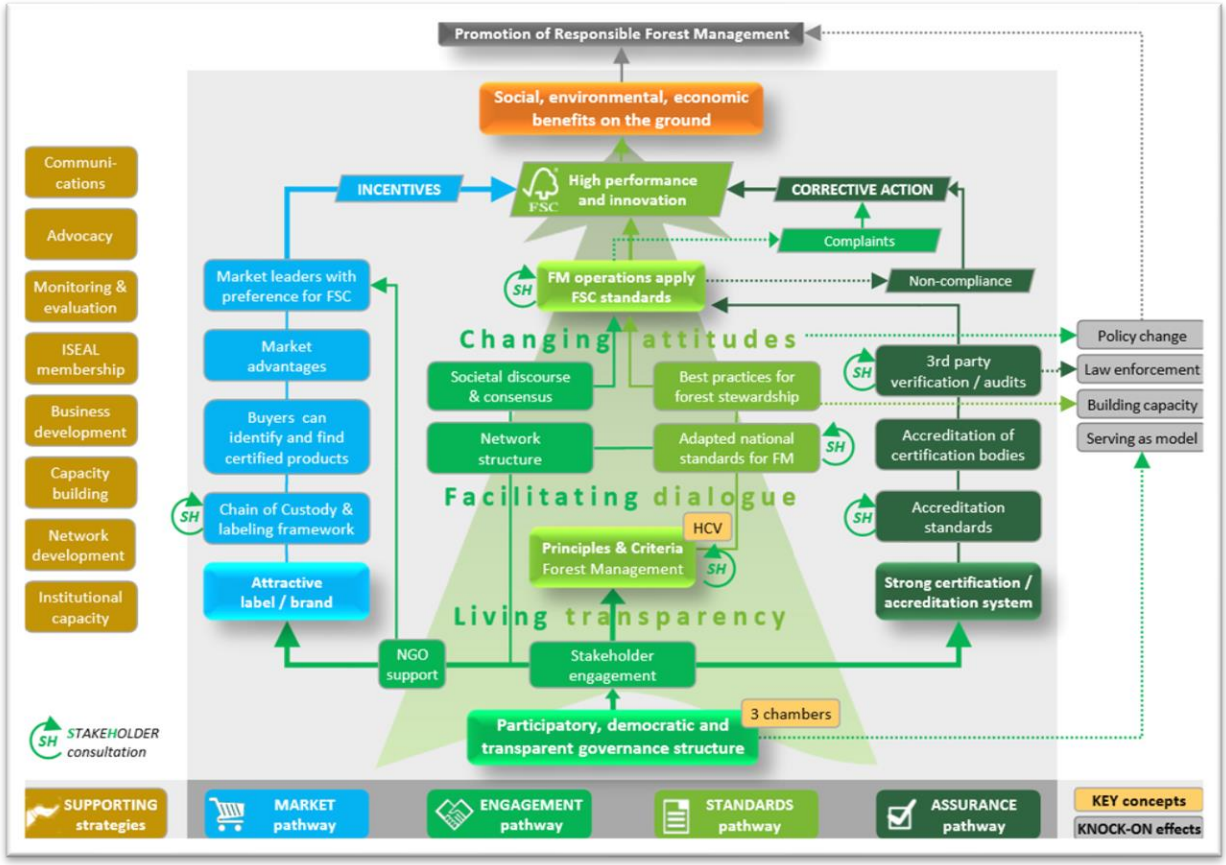

Figure 9a: FSC certification benefits[40]

Another group of scholars further claim that forest certification implementation results in increased self-confidence in villagers' ability to affect communities' social change[41]. Moreover, they claim that, certification for community-based forests provides socioeconomic benefits for communities, such as improved labour conditions and employment, land tenure security and access rights to forest resources. The FSC is a way to recognize and encourage sustainable community-based forest management initiatives, and improve market access for communities' forest products[37]. In addition, it is claimed that FSC-certified Chain of Custody governs the wood processing enterprises in the value chain[31]. Findings by Marx, A and Cuypers, D. (2011). Halting deforestation and forest certification. What is the macro-impact of the forest stewardship council? reveal that there is a significant correlation between certification and halting deforestation, as well as increase in human development (Figure 9b).

[40] FSC, 2014. Overview of the FSC Theory of Change "Rewarding responsible forestry
[41] Quaedvlieg, J., Roca, G. and Ros-Tonen, M. A. 2014. Is Amazon nut certification a solution for increased smallholder empowerment in Peruvian Amazonia? Journal of Rural Studies 33:41-55

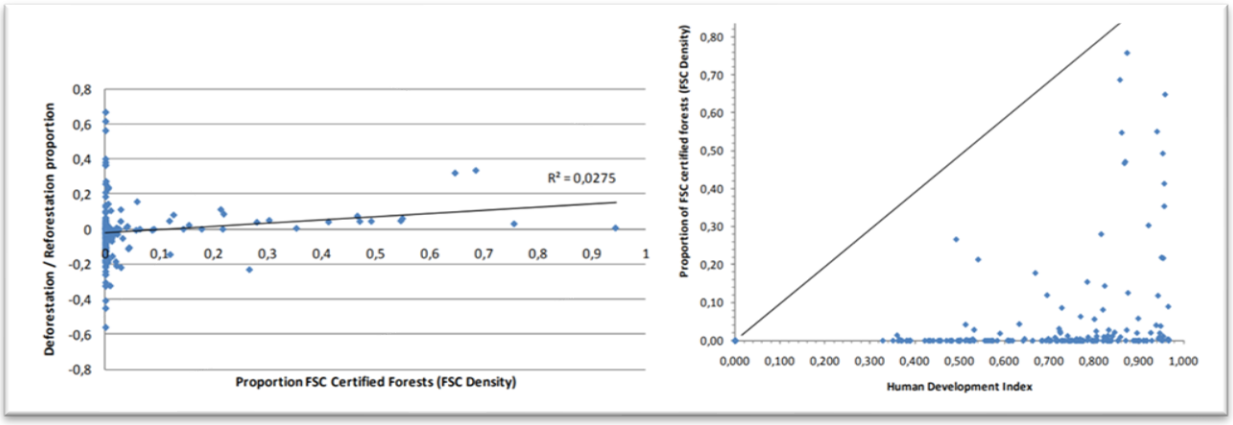

Figure 9b: Relationship between forest certification and deforestation-reforestation and development

3.1.2 Charcoal production and trade:

The charcoal production and trade in Tanzania is regulated by the Forest (Sustainable Utilization of Logs, Timber, Withies, Poles or Charcoal) Regulations, 2019 of the Forest Act (Cap.323); Regulations (Made under section 106(1) (a)). *It is popularly known by the title of GN #417.*

Charcoal can be produced from wood and other biomass types in a process called carbonization, which is the method of burning wood or other biomass in the absence of air after which it breaks down into liquids, gases and charcoal[42]. World production of charcoal has been increasing steadily since 1992 in Africa, whereby it is traditionally being produced in earth-pits or earthen, brick or steel kilns[43]. The efficiency of charcoal production varies considerably depending on many factors, such as kiln type, moisture content, species, wood density, the arrangement of the wood inside the kiln, the skill and experience of the producer, and even the climatic conditions[42]. In recent years, more efficient charcoal production methods have been developed to meet environmental and energy norms and to improve carbonization yields[44],[45]. All these methods require significant investment and are usually unaffordable by small scale charcoal-makers in developing countries, including Tanzania, making unbalanced supply and demand in the value chain.

3.1.3 Sustainable Charcoal Value Chain

The charcoal value chain starts where the tree grows and the wood is cut. It continues with transformation through carbonization of the wood, packing, transport and consumption[46]. Specifically, sustainable charcoal involves both sustainable forest management on supply side and processing of forest produce and consumption on demand side (Figure 10).

---

[42] John Vos, Martijn Vis. 2010. Making charcoal production in Sub Sahara Africa sustainable. BTG Biomass Technology Group BV, Netherlands.
[43] FAO. 2010. Criteria and indicators for sustainable woodfuels, Forestry Paper 160
[44] FAO. 2007. Sustainable charcoal production, trade and use in Europe. Proceedings of International Expert Consultation, Zagreb, Croatia. Rome.
[45] VITA. 1981. Making charcoal: the retort method. Arlington, Virginia, USA, Volunteers in Technical Assistance.
[46] Schure, J; Ingrama. V; Sakho-Jimbira, M; Levangad, P; Wiersum, F, 2013. Formalisation of charcoal value chains and livelihood outcomes in Central- and West Africa. Energy for Sustainable Development, Volume 17, Issue 2:95-105

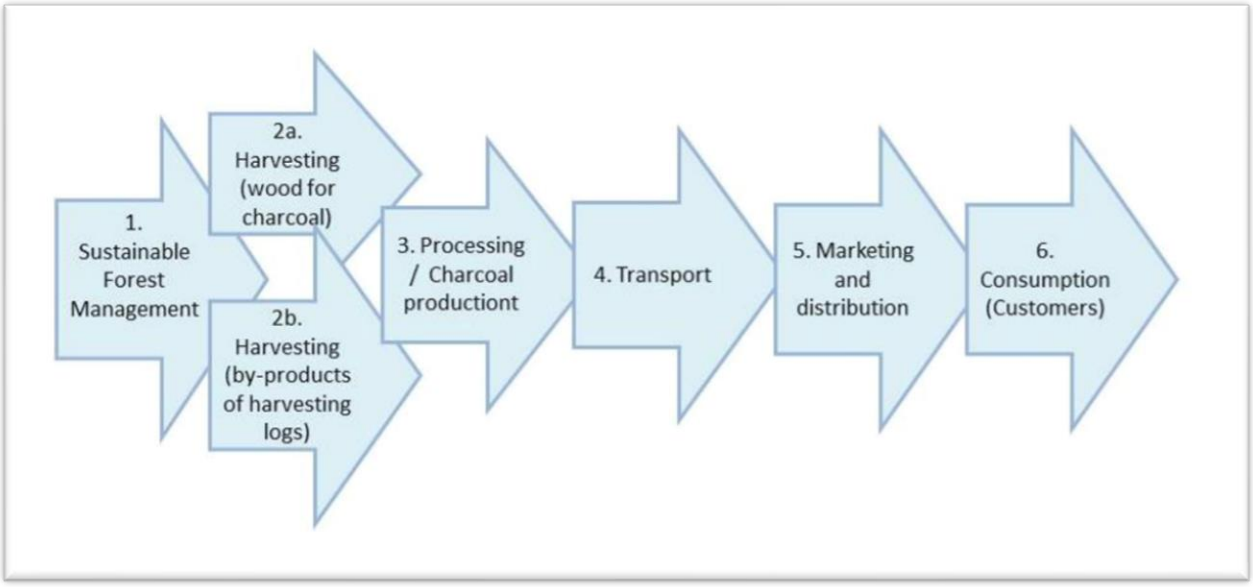

Figure 10: Sustainable Charcoal Value Chain[47]

Supply side interventions are aimed at managing forest resources for charcoal production to include: i) agroforestry, ii) woodlot management, iii) controlled exploitation of forestry resources, iv) improved carbonization skills and technologies. Demand side interventions include: i) promote use of improved cook stoves and briquetting, ii) create awareness on energy conservation, and iii) encourage use of eco-charcoal concept of certification.

The charcoal value chain is complex, comprising a wide range of actors and operators with varying interests and stakes (Figure 11). The World Bank Policy Note[48] about 'Transforming the charcoal sector in Tanzania' shows that the vast majority of charcoal comes from natural forests. Plantations, woodlots, or trees outside forests play only a negligible role in supplying raw material for charcoal production.

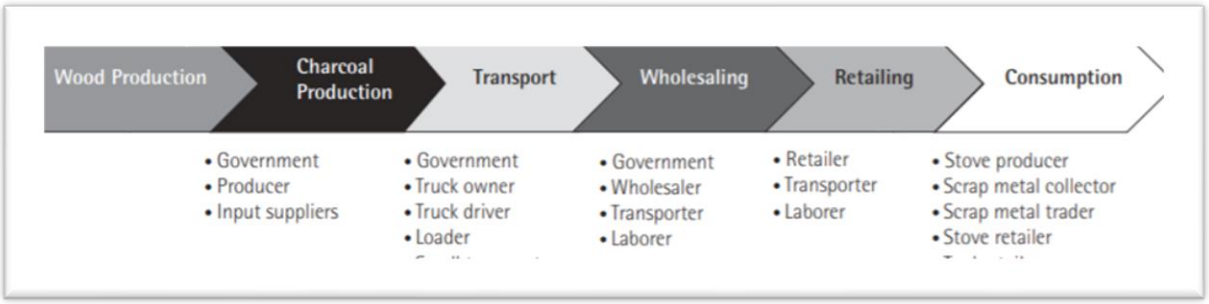

Figure 11: Beneficiaries in the charcoal value chain in Tanzania[48]

The majority of charcoal is sold to large or small-scale transporters. Some large-scale transporters are also wholesalers. These wholesalers then pass the charcoal on to smaller-scale retailers and consumers. Trade in charcoal is conducted by formal as well as informal

[47] MFA and MNRT, 2019. Forestry and Value Chains Development (FORVAC) 2018 – 2022: Programme Document

[48] WB, 2009. Environmental Crisis or Sustainable Development Opportunity? Transforming the charcoal sector in Tanzania. A Policy Note

actors. One commercialization chain begins with government-issued licenses for harvesting of wood from state forests to produce charcoal or to trade in charcoal. The product is transported and traded by officially licensed transporters and traders, who pay the necessary duties/cess and taxes (Figure 12).

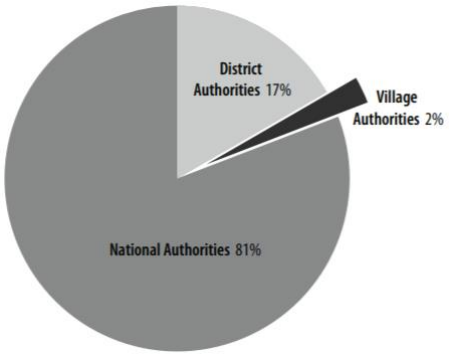

Figure 12: Retention of charcoal-related revenues, by level of government[49]

Under sustainable charcoal production from VLFRs, communities earn a reasonable amount of money for community development projects compared to what they earn from state forests (see Figure 12). This has been an incentive to communities to set aside part of their forest land as VLFRs for sustainable timber production as well as other products, e.g., charcoal (Figures 13).

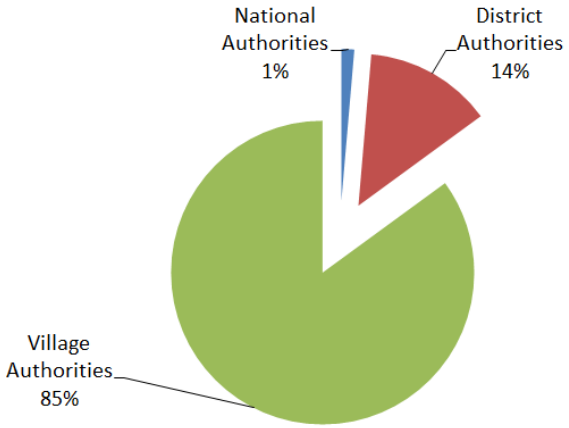

Figure 13: Retention of charcoal-related revenues for 70kg bag, by level of government (excluding dealer's annual registration fee)

A second, and larger, commercialization chain is undertaken without official licensing. Charcoal produced through this informal chain is transported and traded illicitly in an attempt to avoid authorities, taxation, and potential penalties.

[49] WB, 2010. Enabling Reforms: A Stakeholder-Based Analysis of the Political Economy of Tanzania's Charcoal Sector and the Poverty and Social Impacts of Proposed Reforms

Despite the involvement of a great number of people in the charcoal trade, profits are usually concentrated in the hands of a few intermediaries, mainly engaged as transport agents or wholesalers. Retailers in urban centers often women, receive a very small share of the final market price, while producers receive similarly small benefits. Communities whose forest areas are being harvested may receive no benefits whatsoever, as wood is generally harvested illegally or without direct payment. Looking across the whole value chain, on average, producers are able to capture around one-third of the final end price of charcoal, with transporters and wholesalers capturing around half (Figure 14).

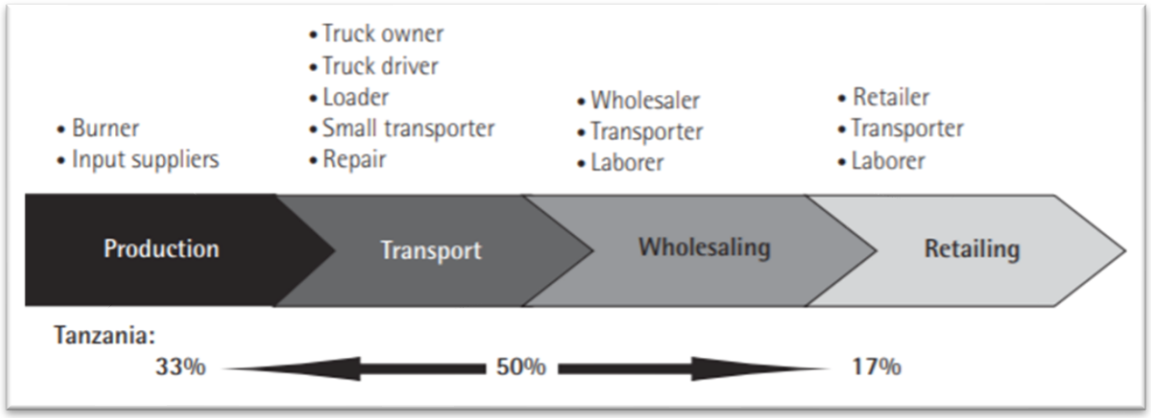

Figure 14: Distribution of Profits along the Charcoal Value Chain in Tanzania[48]

The failure of producers to capture a larger share of the market price may be due to several reasons: a) the supply of unskilled labor is large; b) independent producers are not organized and, thus, cannot exercise any negotiation power; and c) transport and large-scale wholesaling is organized by monopolistic-type market structures. At the same time, retailers are not organized and lack market influence. The reason that producers and retailers are unable to organize in interest groups or cooperatives is largely due to the fact that many operate illegally. Formalizing the charcoal value chain has the potential to provide new economic opportunities for rural households and national economy (Figure 15). Additionally, certifying charcoal production will promote equity in income sharing along the whole value chain[50].

[50] Kalonga, S.K; Kulindwa, K.A and Mshale, B.I. 2015. Equity in Distribution of Proceeds from Forest Products from Certified Community-Based Forest Management in Kilwa District, Tanzania. Small-scale Forestry 14:73–89 DOI 10.1007/s11842-014-9274-6

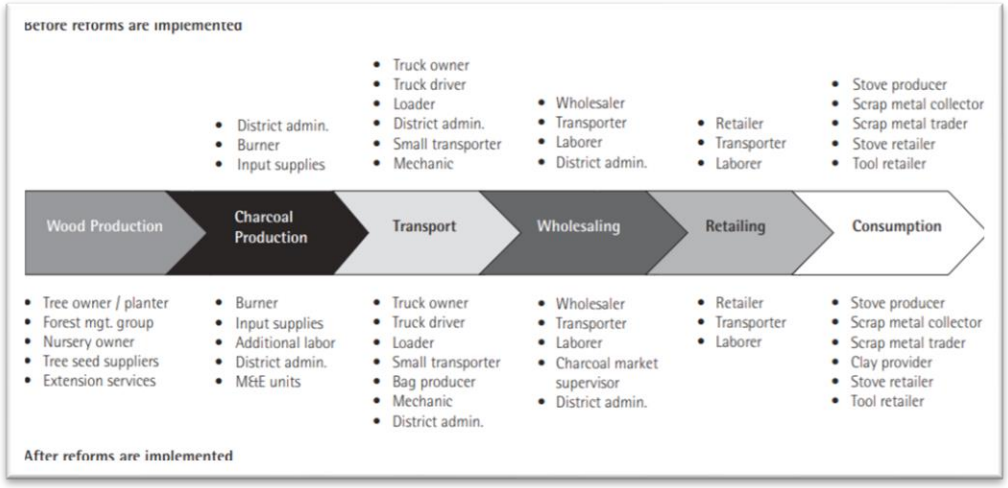

Figure 15: Potential new beneficiaries of these measures along the production–trade–consumption chain[48].

The critical factors in the production of charcoal appear to be the operational and supervision skills of the charcoal producer, the moisture content of the utilized wood, and the woodfuel species used (Figure 16). The production technology used is also important, but less so than often believed. The efficiency of the traditional kiln, if properly tended, appears comparable to that of improved kilns[42]. The more efficient the conversion process, the fewer the associated emissions to air, soil and water, and the subsequent impacts on the environment and labour conditions. Generally speaking, higher charcoal yields and lower emissions go hand in hand[42].

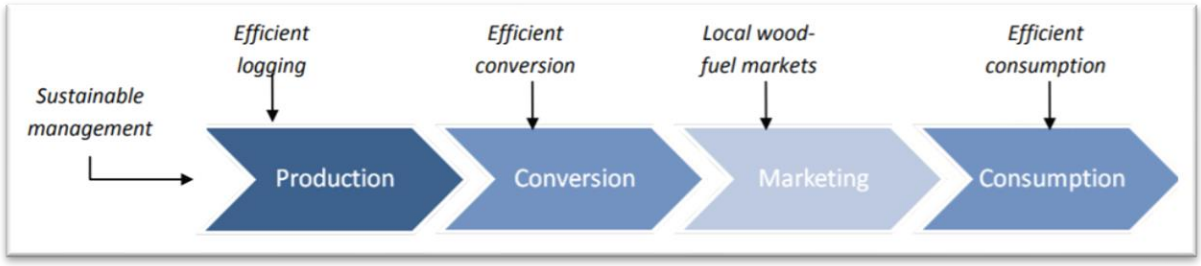

Figure 16: Modernization across the entire value-chain[51]

3.1.4 Sustainable Timber Value Chain

As noted earlier[48] that the vast majority of charcoal comes from natural forests. However, plantations, woodlots, or trees outside forests through afforestation and reforestation could serve as a major source of supplying raw material for charcoal production in Tanzania (Figure 17). Still in the process of harvesting and processing logs for timber (both natural and plantation forests), the remains (e.g., tree crowns, branches/twigs, off-cuts, etc) could contribute significantly to wood biomass for charcoal production.

[51] GTZ (2010), Wood Energy: Renewable, Profitable and Modern. A collection of talking points for lobbyists. Eschbron, German

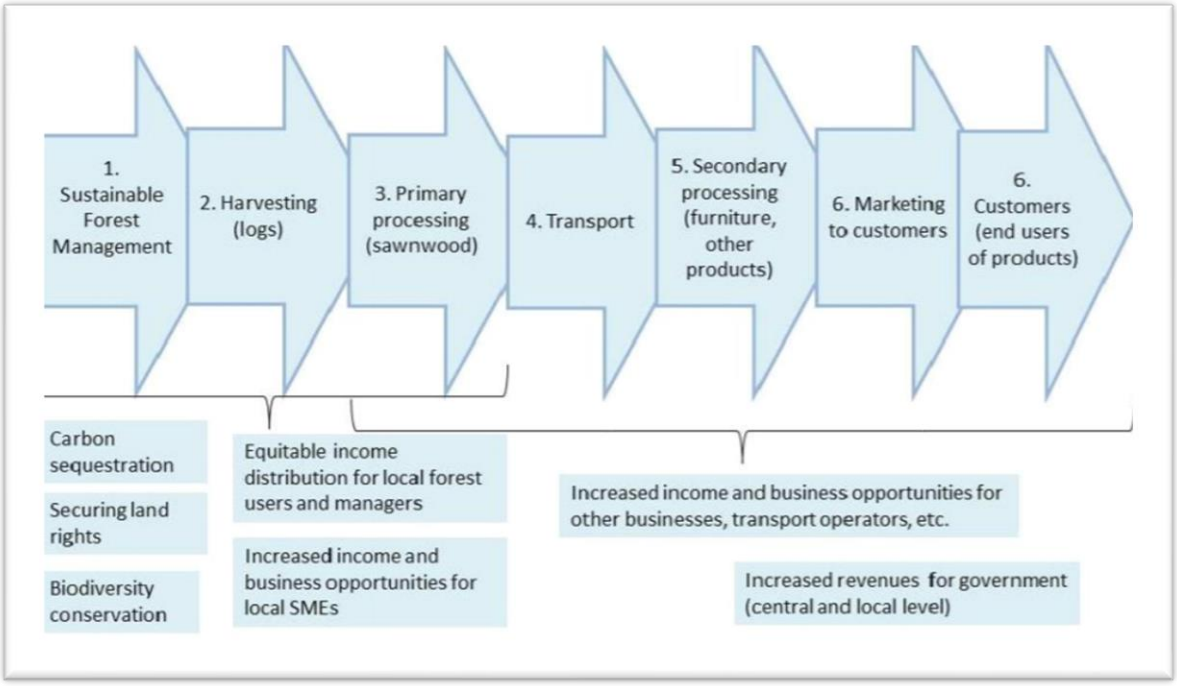

Figure 17: Sustainable Timber value chain in Tanzania[47]

3.2 SCP MODELS

This subsection provides an assessment of the existing SCP models from Tanzania and elsewhere in the region (e.g., Zambia, Kenya, DRC, Namibia) and their potential application across the value chain.

3.2.1 Tanzania: Kilosa SCP Project

A review of TFCG and MJUMITA, (2015)[52] reports on Sustainable charcoal production (SCP) model revealed that the Transforming Tanzania Charcoal Sector (TTCS) model aimed at establishing, a) a real-life, pro-poor, sustainable charcoal value chain that provides direct self-employment opportunities; b) contributes to investment in community development; and c) incentivizes more sustainable management of natural woodlands. Villages were assisted in integrating SCP into the management of their VLFRs. The TTCS model has demonstrated that an alternative scenario towards sustainability is possible through CBFM schemes under the Participatory Forest Management (PFM) approach. The project is implemented in the designated forest area according to the VLUP and a zonation of the VLFRs. The forest is divided into small portions (forest management units - FMUs) of 50 x 50 m (Figure 18a). Selective tree harvesting techniques is done using draft-game like harvesting system which is selective with a minimum tree diameter of 5 cm (Figure 18b)[53].

[52] TTCS, 2015. MJUMITA-Sustainable-Charcoal-Model-Leaflet-2015-FINAL
[53] TTCS, 2017. What makes sustainable charcoal, sustainable? Information Note

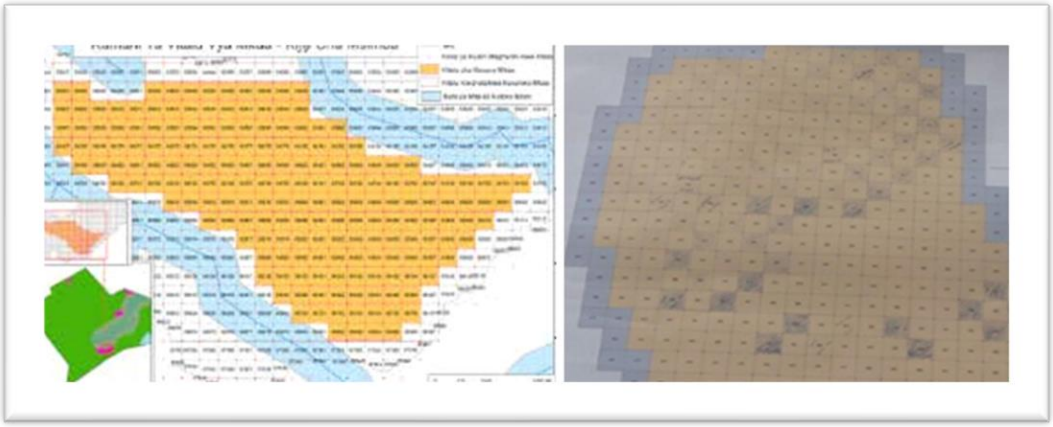

Figure 18a: Planned harvesting blocks Figure 18b Harvesting system

Selective tree felling for charcoal production is done in alternate manner to avoid leaving a block with larger contiguous cleared area (see Fig 17b). Criteria for selective tree not to fell and no go areas include: a) presence of timber species; b) habitat trees for bees and important birds; c) National protected trees, trees on steep slopes; d) water source and conservation areas, as well as e) trees < 5cm diameter at breast height. Each unit or coupe once harvested will be revisited again after 24 years. This rotation of 24 years helps forest recovery.

The SCP project uses new Improved Earth Mound Kiln (IEMK), which is more efficient than the traditional ones (Figure 19). The following steps are used in preparing the kiln for charcoal production: a) Arrangement of wood in rail-like structure; b) Arrangement of dried grassed on the top of the rail; c) Arrangement of small firewood on top of the grasses; d) Arrangement of the logs (well tighten); e) The kiln covered with soil; f) Put a chimney (locally called dohani) at the opposite corner to where the fire starts (the chimney facilitates the carbonization process where the heat inside a kiln rotates around it).

Figure 19: Improved earth mound kiln (IEMK) for charcoal production in Kilosa[54]

The IEMK is modified by limiting air supply thereby controlling inlet air and limiting the exhaust air to a single chimney (see Figure 19). The billets are closely stalked in order to reduce air spaces. With this type of kiln about 4 days are enough for the carbonization process to be completed which is an improvement from 10 days taken by the traditional earth kiln. With

[54] SDC, 2014. Transforming Tanzania's Charcoal Sector Life Cycle Assessment Component

better kiln management, IEMK could be a better option, and can achieve recovery rates between 20% and 30%. The charcoal from these kilns are also said to be of high quality. These IEMKs have been tested and are being adopted by many SCP projects including the Ruvu Fuel wood Pilot Project in the country.

From the Kilosa's project experience, the revenue collection and sharing involved a number of actors along the value chain (Figure 20).

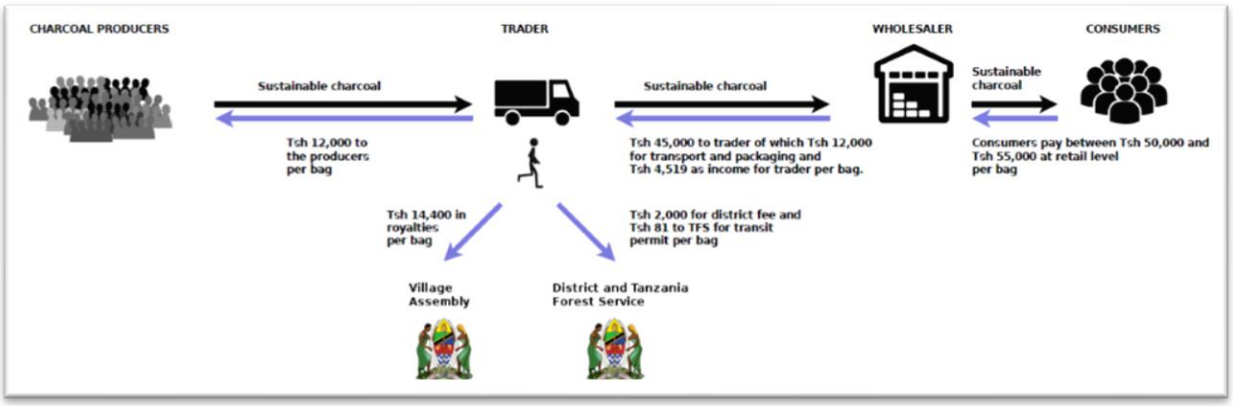

Figure 20. Flow chart of the sustainable charcoal value chain established during Phase 1 of the project[55].

A bag of charcoal produced from the SCP project in Kilosa weighs between 70 and 90 kg, depending on wood density processed. Such bag purchased by a trader from SCP project in Kilosa will cost a total of about TZS 33,000 per 70kg bag up to the market[55]. Notably, this charcoal competes with charcoal from unsustainable sources, which is still flooding in the market. Many traders prefer buying charcoal from unsustainable sources due to limited transparency and weak law enforcement. Since the sustainably produced charcoal by the communities are not certified and TBS standards are not complied with, it is imperative to note hear that certifying these operations and abiding to TBS standards will mitigate the challenges of unsustainable charcoal production and limited transparency and weak law enforcement.

The revenues collected as part of the project implementation are used for, a) 30-40% for forest management, e.g., forest patrol, village meetings, etc., b) 60-70% are used for community development projects, e.g., construction of village office, classrooms and water project, roads, school laboratory, doctor's house, etc. Despite the realized tangible benefits of this model, villages pursuing it experience a number of challenges including: a) Unclear policy directives on harvesting license and on checkpoints; b) Changing of the Village Natural Resource Committee (VNRC) due to change of village government; c) Forest encroachment for agriculture and Livestock grazing in the forest that destroy coppices, due to inadequate compliance with by laws; d) Presence of illegal charcoal producers in the market that cause unfair competition; e) Forest fires; f) Political influence; g) No reliable market for sustainable charcoal (competition with illegally produced charcoal).

Marketing campaign could, in collaboration with authorities and other stakeholders reverse the situation. The campaign (lobbying/advocacy) should involve collaboration with policy and

[55] TFCG, 2015. Transforming Tanzania's Charcoal Sector Phase 2: Consolidation and scaling-up for 4 years from 1st October 2015 & CoForEST Data, 2020

decision makers to make unsustainable charcoal NOT attractive through Law-Enforcement (e.g., packaging materials by TFS, weights by Weights and Measures Agency, LATRA on transport license, etc), establishing legal market centres, Incentive Schemes. Moreover, implementing capacity building programme (i.e., formal and informal training) on forest governance to local, government leaders and other interested and/or affected stakeholders.

3.2.2 Tanzania: Dar Sustainable Charcoal Project:

Back in 2010, WWF Tanzania office initiated pilot project to promote SCP in Rufiji and Kisarawe districts funded by DFID and Barclays Bank-Tanzania. The purpose was to reduce pressure on coastal forests caused by the inevitable increasing supply for charcoal to meet the ever-increasing demand for charcoal in urban areas particularly the Dar es Salaam city.

The project used two main approaches: a) Improve charcoal production efficiency by assisting charcoal producers to switch from the use of the traditional earth mound kilns which can only achieve 5-10 % recovery rate or efficiency rate, to adoption of half Orange Kilns (HOK) which boosts efficiency up to 40% hence reduce deforestation rate as well (Figure 21).

Figure 21: Half Orange Brick Kiln[56]

The HOKs, which were not movable, were slowly adopted by forest adjacent communities since construction of such kilns were costly and collecting logs and billets from felling site to the HOK was labor intensive. Finally, in a course of learning some challenges from the use of HOK, WWF adopted Improved Earth Mound Kilns (IEMK), which was an improved version of the traditional Earth Mound Kiln, this has a smoke chimney on one side of the kiln, and the

[56] Malimbwi, R.E and Zahabu, E.M, 2008. Woodlands and the charcoal trade: the case of Dar es Salaam City. Working Papers of the Finnish Forest Research Institute 98: 93–114

pilling of log billets is also more improved – which gives it more user friendly and an improved recovery rate of about 30% (see Figure 18). The most common value chain involved the following steps: cutting the trees, making charcoal with a very low recovery rate of less than 5% and finally selling to middlemen/business men, who later sell at retail prices in towns and cities.

The other successful initiative that was initiated and promoted by WWF was b) supporting project targeted villages with Village land use planning (VLUP), and establishment of Village Land Forest Reserves (VLFRs) with well-defined management plans, and delineating village lands for promoting tree planting of well selected tree species (*Senna siamea*, *Senna spectabilis*, *Acacia mangium*, Eucalypts etc) in selected villages. During implementation of this project, environmental education and awareness programme to both forest adjacent communities and decision makers was given due weight in order to achieve project buy-in. After the closure of the project, the charcoal value chain reverted to its former state and has remained pretty the same to date.

Dar charcoal project initiative tried to establish selling centres (i.e., outlets) and approached markets (supermarkets and Shopping Malls in Dar es Salaam city) but wasn't that successful due to the following challenges: a) Transportation of charcoal to urban centres faced enormous huddles at check - points, with less awareness on SCP initiatives; b) Corruption snags on transportation; c) Little awareness on sustainable charcoal to consumers and therefore not prepared to pay premium price; and d) Lack of policy backing and political will and commitment among the regulating authorities.

However, lessons from the Dar charcoal project are: a) the project received a lot of positive support from some of the stakeholders and partners particularly the civil societies and the Ministry of Energy and Minerals, and Vice President Office, with limited support from the Ministry of Natural resources and Tourism and respective District Councils, b) No support from businessmen who were used to trade on charcoal from unsustainable sources. But, generally, many stakeholders were very much concerned on the need to adopt SCP initiatives in order to serve the dwindling forests resources.

3.2.3 Zambia

Zambia is the first country in Africa to produce FSC-certified charcoal in late 1990s. The certification initiatives in Zambia begun with the hope that they would open export opportunities for timber, which is one of the natural resources found in abundance. Thus, the initiative has been a foreign market driven process. Ironically, the first certifications were of NTFPs, beginning in the 1990s with the organic certification of North Western Bee Products Ltd - NWBP's honey, which was the first of its kind in the world. This was followed by the Muzama Crafts Limited (MCL)'s certificate in 1998, which was the first FSC FM certification in Zambia and the Mpongwe Development Company (MDC) certification on organic wild mushrooms in 1999.

According to CIFOR, (2013) scoping study on charcoal production[57], the undocumented charcoal and timber trade nevertheless make meaningful contributions to livelihoods and national income, although often blamed as major contributors to Zambia's 0.3% per annum forest loss. The development, adoption and deployment of sustainable approaches

[57] Gumbo, D. J., Moombe, K. B., Kandulu, M. M., Kabwe, G., Ojanen, M., Ndhlovu, E. and Sunderland, T.C.H. 2013. Dynamics of the charcoal and indigenous timber trade in Zambia: A scoping study in Eastern, Northern and Northwestern provinces. Occasional Paper 86. CIFOR, Bogor, Indonesia.

embodying the relevance and roles of local-level institutions are likely to have meaningful impacts.

Two approaches or initiatives have been implemented in Zambia to promote sustainable charcoal production methods, namely, a) *Quotas system* - the system advocated on the need to specifying species to cut and quantities to produce. Monitoring of application of quotas is normally hampered by limited supervision and monitoring due to inadequate finances for reinforcement; b) *Promotion of improved kilns* to increase efficiency in producing charcoal. Improved kilns have been on pilot in most areas and are considered expensive to build especially the metal type. Transportation of logs to the kiln over time or the kiln to proximity of trees/ logs is costly and takes time as opposed to the earth kilns that are constructed at the point of logs harvesting.

The common on-going charcoal value chain in Zambia involves private individuals mostly illegally felling trees for charcoal production and selling. In the quota system, quotas are given to groups of producers like cooperatives and marketing is done at group level. Just like most of the countries in the region, Zambia has no specific policy on sustainable/renewable energy as it is currently part of a section in the Energy Policy.

Charcoal sector in Zambia continues to face some operational challenges including: a) Poor interpretation of the existing policy, implementation and monitoring by government agents; b) Limited space for effective stakeholder involvement in the sector; and c) poor capacity of local groups, cooperatives and individuals, hence challenges with negotiations and implementation, as well as increasing pressure from lucrative cross border trade in charcoal.

At the producer's level, relevant policies are largely unknown. Regulatory issues, such as pricing of licenses, points of issue and costs of license registration, as well as better organization of charcoal producers are not transparent. Current policies and institutional arrangements affecting charcoal production do not allow charcoal producers to organize themselves into groups or cooperatives. Correspondingly, communities or villages with forest resources suitable for charcoal production cannot exclude outside producers under the present law. However, the new Forest Act 2015, which provides for community participation in sustainable natural resources management including community forests as a strategy, remain the key opportunity to promote sustainable charcoal production in Zambia.

Most charcoal production reviewed by this study was traded and consumed in district centres and major towns across Zambia. There were claims that, as a result of higher prices paid in neighbouring countries, charcoal was moving across borders in haulage trucks and through cross-border traders. It can be learnt from here that there is a need for establishing sustainable charcoal market centres in urban centres where most of the charcoal, even in Tanzania, is consumed.

The study highlighted a broad array of state and non-state actors dominated by charcoal producers, government service providers, traders, transporters, retailers and vendors, some of whom have multiple roles in the value chain. Linkages within and between most non-state actors are largely based on cash payments.

3.2.4 Kenya

A review a study by ICRAF & SEI, (2014)[58] revealed that the charcoal sector in Kenya is ever growing along with urbanization, like in Tanzania. It can greatly contribute to the economic development, employment creation and the livelihoods of the population. However, inadequate coordination among different ministries and actors in regulating the sector results in low profits for producers, the majority of whom are resource-poor farmers in dry lands.

Charcoal production and trade has been legalized, with regulation and permits handled by the Kenya Forest Service (KFS)[59]. Despite this, a number of challenges remain: a) overlapping responsibilities among ministries across the charcoal value chain complicates its management and regulation, b) inadequate of awareness and protection of rights afforded by charcoal production and trade permits give leeway for corruption, particularly in transportation, c) most charcoal producers use inefficient traditional earth kilns, wasting 85-91% biomass. This puts additional pressure on the dry lands, which provide over 75% of the hardwood used to make charcoal, and d) farmers do not prioritize sustainable production of wood for charcoal due to low economic profits and non-compatible technologies in the absence of an enabling policy environment.

3.2.5 DRC: CBFF ECOmakala+

WWF – DRC has been executing this project: CBFF ECOmakala+, REDD+ Pilot Project surrounding the city of Goma and Virunga National Park[60]. The project aims at contributing to the reduction of deforestation and poverty in the Congo basin. The project implements the following activities: a) Establishment of 1,000 hectares of woodlots around the Virunga National Park to increase the supply of sustainable wood energy - the reforestation activities are executed in partnerships with smallholders, contributing directly to the reduction of poverty; b) Support to the production and commercialization of 4,000 improved stoves, which require half the charcoal of the traditional stoves - this contributes to a reduction in the demand of charcoal; c) Enhancement of the protection of the Virunga National Park against illegal charcoal production; d) Support to the formalization of tenure rights and mediation in case of land conflicts; e) Development of a REDD+ methodology; f) Establishment of necessary tools and financial and institutional mechanisms for REDD+ certification to sustain the project locally and in favour of local communities and authorities.

ECOmakala is the most reputable initiative on record to promote sustainable charcoal production in the DRC. The initiative has received global recognition to the extent that in 2016, it was awarded a Certificate on Energy Globe National Award, through Word Wide Fund for Nature (WWF – East DRC). The project advocates on sustainable charcoal production system using efficient kilns.

Usually charcoal value chain in DRC is quite informal, but this project is trying to define a clear charcoal value chain component in the project area. The marketing strategy follows stepwise approach as follows: a) A participatory process, which links the different stages: production, transportation and marketing; b) A process, which progressively builds sustainable understanding, communication and networks between stakeholders at different levels to enable a long-term ongoing learning process; c) A process, which strategically targets

[58] Miyuki Iiyama, Audrey Chenevoy, Erick Otieno, Teddy Kinyanjui, Geoffrey Ndegwa, Jan Vandenabeele, Mary Njenga, Oliver Johnson. 2014. Achieving sustainable charcoal in Kenya Harnessing the opportunities for cross-sectoral integration

[59] The Charcoal Regulations 2009 (section 59, Forest Act 2005) has extended the legal framework

[60] WWF, 2013. ECOmakala: Meeting energy needs, fighting poverty and protecting the forests of the Virunga National Park in North Kivu (DRC)

necessary external expertise as a complement to, rather than substitute for, the participatory process; d) A pro-poor process which includes, and where possible prioritizes, the needs of poor women and men throughout.

The success of ECOmakala project has been contributed by various elements including willingness of the government to formalize the charcoal sector, positive response towards promoting afforestation/reforestation initiatives that are working on producing woodlots for alternative sustainable charcoal production in the near future. Like many countries in the Eastern and Central African region, DRC also does not have a stand-alone or specific Policy on biomass energy, but reflected in other policies such as Energy and Forest policies and laws. Therefore, the key challenge facing initiatives to towards promoting sustainable charcoal production in the DRC in addition to the lack of biomass energy policy is unfavorable taxation regime which does not provide incentive for SCP.

3.2.6 Nambia

According to AFF study[61], FSC certification has been emphasised in Namibia since 1997 as a prerequisite for marketing Namibian charcoal in Europe. Namibia is in fact the country in the region after South Africa with the second highest number of FSC certificates. But also Namibia is among the three Africa countries that have made forest certification legal. Others are Uganda and South Africa.

Namibia is a vast but sparsely populated country where farming is the second most common occupation after mining. Livestock and cattle husbandry are the main sources of agricultural income, but with the drought, it has become difficult for farmers to find grazing areas and water for their livestock. However, some Namibian farmers learned to diversify their activities and during the dry season, they produce charcoal[62], deploying FSC certification standards, believing that FSC certification ensures responsible charcoal production[63], a rigorous system though. FSC certification of charcoal is an elaborate, time and resource consuming process, and goes beyond the certification of the wood from which it is produced.

Namibia now has 1.6 million hectares of FSC-certified forest areas managed by landowners and managers. Institutionally, they have a national association of charcoal producers, a number of charcoal producer's firms/companies with varying trade names. They have an FSC group scheme certificate which is managed by one company, i.e., Group Scheme Manager[63] (Figure 22). Interview with the Manager revealed what they are good at and what makes them better to serve as the manager are: a) Using the Group Scheme software to run large group schemes at a national level; b) Keeping it super simple for small holders; c) Ensuring that it remains cost effective - low cost solution, based on economies of scale; d) Deep FSC knowledge tied into the team that has a combined experience of 60 years of auditing for certification various bodies in over 60 countries; and the technical forestry knowledge tied up in the team.

[61] AFF, 2019. The State of Forestry in Africa: Opportunities and Challenges, Nairobi, Kenya. 186 pp.
[62] https://fsc.org/en/newsfeed/from-bush-to-charcoal-the-greenest-charcoal-comes-from-namibia
[63] SGS QUALIFOR, 2019. Forest Management Certification Report: CMO (Namibia) (Pty) Ltd

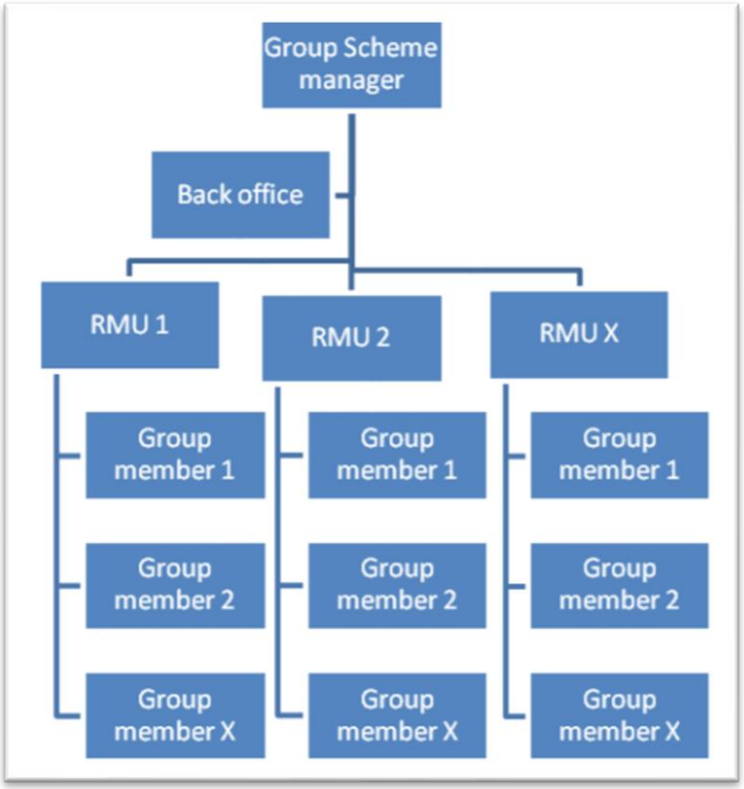

Figure 22: The organizational structure of the Group Scheme[63]

The charcoal is made from the harvesting of bushes that invade the savannah. They are unwanted because of their rapid spread and negative effects on local ecosystems, negatively impacting biodiversity, threatening species and absorbing scarce groundwater. Charcoal production contributes to clearing the bush. This helps to restore the ecosystems of the area which has been affected by generations of human activities, but also improve wellbeing and economic condition of the actors along the value chain[64]. According to the Namibia Charcoal Association[64], the charcoal value chain in Namibia (Figure 23) is well organized and the bush harvesting process is firmly regulated by Namibian forestry and environmental policies.

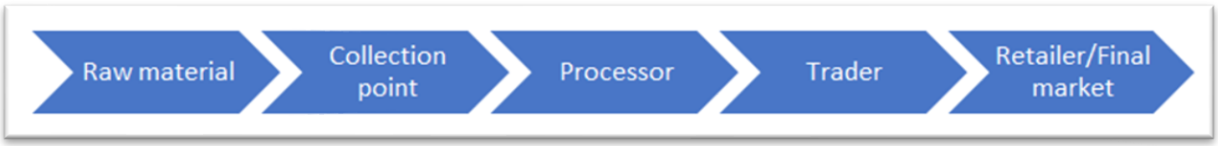

Figure 23: Typical supply chain for certified products[65]

The charcoal industry in Namibia has grown to accommodate a network of stakeholders, including:

Producers: There are around 650 charcoal producers in the country. Most producers are commercial or emerging farmers, who organize charcoal production on their land. They employ or sub-contract charcoal workers (harvesters and burners) and pay them per tonne of charcoal produced. The charcoal is then sold to a processor/trader. A growing number of

[64] NCA, 2018. Namibian Wood Charcoal: A triple win for the Namibian environment, the country's economy and international consumers.
[65] CMO, 2018. *Unlocking the green economy* by linking sustainable suppliers with responsible buyers.

producers have obtained Forest Standard Certification, committing to environmentally appropriate and socially beneficial production in line with the internationally recognized standard. The industry has an increasingly diverse representation among producers, with roughly half of the producers being emerging farmers from economically disadvantaged groups, who are diversifying their income sources while fighting bush encroachment.

Harvesters and Burners: The actual charcoal burning supports approximately 6,000 workers, making the charcoal sector one of the largest employment generating sub-sectors of the Namibian economy.

Processors and Traders: Currently, there are about 13 charcoal processors in Namibia who purchase charcoal in bulk, process it and distribute it to different clients and markets. They refine the product according to the technical parameters agreed with their international clients such as carbon fixation, ash content, volatile matter and moisture content[66] (Table 1).

Table 1: Typical characteristics of good-quality charcoal[66]

Ash content	5 per cent
Fixed carbon content	75 per cent
Volatiles content	20 per cent
Bulk density	250-300 kg/m³
Physical characteristics	Moderately friable

Agents and Distributors: Importers in buyer countries play an important role in marketing Namibian charcoal. Most importers warehouse Namibian charcoal and distribute it to retail outlets in the UK, Portugal, Cyprus, Greece, Poland, Germany, Belgium and France.

Charcoal that is sold in Tanzania and across the region is rarely FSC-certified (with the possible exception of South Africa), as few charcoal users demand for it.

3.3 ECONOMIC, ECOLOGICAL/ENVIRONMENTAL AND HEALTH IMPACT OF CHARCOAL PRODUCTION

FAO, 2010 study on 'Criteria and indicators for sustainable woodfuel' discloses that charcoal is often an important commodity produced by the rural poor to meet domestic energy and economic needs[67]. For many urban poor, charcoal provides a reliable, convenient and accessible source of energy for cooking at a stable cost. In addition, the charcoal trade provides small-scale retail opportunities for many people, including women and young people. A large number of people are employed in the various phases of charcoal making and distribution, including: collection; sizing the wood; the preparation of kilns for converting wood to charcoal; loading the wood into kilns and unloading charcoal after conversion; unloading, bundling, packaging and transportation; and marketing.

[66] Habitat, 1993. Application of Biomass-energy Technologies
[67] FAO. 2010. Criteria and indicators for sustainable woodfuel, Forestry Paper 160

Woodfuel (charcoal, firewood), and other traditional fuels are the main energy sources in Tanzania[68] (Figure 24). Its use is growing in absolute terms due to the increase in population (see Figure 1). Charcoal production has far-reaching impacts extending across a range of social and environmental issues[69]. This includes health problems associated with air pollution, environmental change associated with greenhouse gas emissions and the depletion of local forests and woodlands[70].

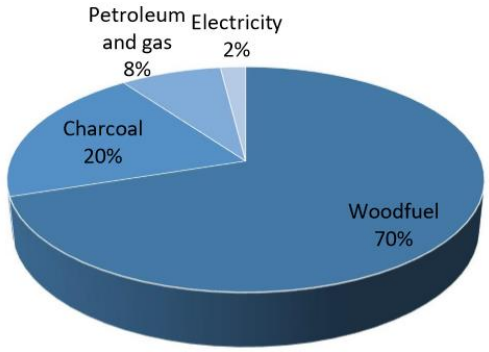

Figure 24: The proportion of national energy demand in Tanzania[71].

A study about the cost of air pollution in Africa[72] reveals that the majority of people in the rural areas suffer every day with difficulty in breathing, chronic respiratory diseases and stinging eyes. Young children and their mothers suffer the most and die because of indoor air pollution that comes from burning charcoal and firewood inside their homes. The indoor air pollution and inefficient household energy practices are significant obstacles to the achievement of the sustainable development goals. In addition, need for traditional biomass energy is a reason for the over exploitation of forests leading to deforestation and consequently forest and land degradation through firewood extraction and cutting down of trees for charcoal production (see Figure 1). The unsustainable harvesting of the resource results in environmental effects such as net carbon-dioxide emissions. The pyrolysis of the raw material produces incomplete combustibles such as methane, which has a higher global-warming impact than carbon dioxide - to the extent that the main global-warming impact of the charcoal cycle may result from feedstock pyrolysis and not from the burning of the charcoal itself[42]. Another pollutant produced in the charcoal-making process is charcoal dust, a black powdery residue that disperses quickly into the air and can cause respiratory illnesses[67] .

The World Health Organization (WHO) states that air pollution is the largest single environmental health risk, causing millions of deaths annually around the globe[73]. A study contacted in Tanzania concluded that around 26,000 Tanzanians died in 2013 prematurely

[68] NBS (National Bureau of Statistics).2017a. Energy Access Situation Report, 2016. Dar es Salaam, Tanzania: National Bureau of Statistics
[69] Zorrilla-Mirasa, P; Mahamaneb, M; Metzgera, M. J; Baumertb, S; Vollmera, F; Catarina Luzd, A; Woollena, E; Sitoeb, A. A; Patenaudea, G; Nhantumboc, I; Ryana, C.M; Patersona, J; Matedianec, M.J; Ribeirob, N.S; Grundye, I.M. 2018. Environmental Conservation and Social Benefits of Charcoal Production in Mozambique. Ecological Economics 144:100-111.
[70] FAO. 2010. Criteria and indicators for sustainable woodfuel, Forestry Paper 160.
[71] MEM, 2014. Biomass Energy Strategy (BEST) Tanzania: Tanzania Biomass Energy Strategy and Action Plan. CAMCO Clean Energy (Tanzania) Limited. Final Report
[72] Mwema and Gheewala. 2011. A Review of Biomass Energy Dependency in Tanzania, Energy Procedia, 9:338-343
[73] World Bank. 2019. Tanzania: Country Environmental Analysis – Environmental Trends and Threats, and Pathways to Improved Sustainability. 2019. Washington, DC: World Bank

from causes attributable to particulate matter (PM) air pollution[74]. Most of these deaths (over 22,000) were caused by household (indoor) air pollution, which is associated with the widespread use of solid biomass/woodfuel (firewood and charcoal) as domestic energy source. Poor housing conditions, with limited ventilation, and traditional, inefficient cook stoves compound the problem. Global estimates suggest the impact of air pollution caused by PM is high in Tanzania[16]. These mortality figures are higher than those of neighbouring countries (Table 2). In economic terms, this costed the country around $11 billion in 2013.

Table 2: Premature deaths from PM Pollution in Tanzania and other countries 2013

COUNTRY	AMBIENT PM POLLUTION	HOUSEHOLD AIR POLLUTION
Tanzania	3,845	22,729
Kenya	3,952	15,440
Mozambique	1,117	11,750
Uganda	5,933	16,630

A review of a study by FAO[75] acknowledges the role of charcoal production in land and forest degradation that its impact on forests is significant for several reasons. The charcoal-making process is resource-intensive as the harvesting of the feedstock is often concentrated in small areas over a short period of time. Contrary to fuelwood users, charcoal producers often target specific species, and the concentrated exploitation of a few species can adversely affect biodiversity. The continued use of natural forests unsustainably for charcoal production represents a threat to the future of the resource, especially in situations where there is high demand and a lack of sustainable forest management practices.

In many countries in the region including Tanzania, charcoal is largely a 'hidden' sector, getting little policy attention[42]. Thus, its role in the national economy is almost always overlooked, and as a result its actual and potential contribution to economic development is systematically underestimated. When considered in energy policies by governments at all, woodfuel (including charcoal) is often deemed a 'backward' and ecologically risky energy source, which use should be discouraged - despite its socio-economic considerations, i.e., the fact that in many cases it may provide energy for more than 80% of a country's population and employment to many.

[74] Roy, R. 2016. The cost of air pollution in Africa. OECD Development Centre Working Papers No. 333, OECD Publishing, Paris, https://doi. org/10.1787/5jlqzq77x6f8-en
[75] FAO. 2010. Criteria and indicators for sustainable woodfuel, Forestry Paper 160

4) Policy and Legal Framework Analysis

The Constitution of the United Republic of Tanzania[76] reiterates about every person's duty to protect the natural resources of the United Republic. The development of the forest sub-sector, including charcoal is planned within the enabling existing policy and legal framework of Tanzania. These statutes are hereunder analysed to provide for relevance with charcoal:

4.1 Policy and Strategy Analysis

National Energy Policy (2015)

The policy is operationalized by the Ministry of Energy. With regards to charcoal, the policy states 'the government shall promote renewable energy sources and sustainable use of biomass for power generation'. Despite the fact that it is the main source of energy for majority of households in Tanzania, domestic use of biomass energy is not encouraged. Article 3.1.6 states 'the government shall enhance fuel switch from woodfuel to modern energy and facilitate adoption of appropriate cooking appliances to promote alternatives to woodfuel'. It is evident; therefore, that this policy does not set appropriate conditions for widespread adoption of biomass energy, rather it shows pathways for alternative sources of cooking energy, i.e., electricity, natural gas and liquefied petroleum gas (LPG). In turn, this promotes conservation and end-use technologies in order to save resources: reduce rate of deforestation and land degradation, and minimizing threats on climate change. A Renewable Energy Fund has been provided for in the Energy policy. One of its possible uses could be to meet cost of mainstreaming certification of charcoal.

While the policy recognizes that woodfuel is the most widely used form of energy in Tanzania; fails to provide policy objectives or statements so as to offer national guidance on woodfuel sustainability

National Energy Policy Implementation Strategy (2018-2025) - Draft

The Ministry of Energy developed its strategy in 2018 to implement the National Energy Policy of 2015. Section 3.1.6 sets an objective of improvement of life through use of modern fuels. The implementation strategy does not explicitly provide room for use of biomass energy technologies; instead it provides room for fuel switch that is substituting solid biomass energy to its alternatives (biogas, liquefied petroleum gas and natural gas). The strategy encourages public awareness on the use of modern fuels, instead of solid biomass energy for cooking solutions. The strategy sets precedency that by 2025; at least 4% of the households should be using biogas for cooking.

National Environment Policy - NEP (1997)

The NEP provides an overall means of ensuring that natural resources are soundly managed, and of avoiding exploitation in ways that would cause irreparable damage and social costs. The NEP seeks to provide the framework for making the fundamental changes that are needed in order to incorporate environmental conservation into, and mainstreaming of decision making. The NEP seeks to provide guidance and planning strategies in determining how actions should be prioritized, and provides for the monitoring and regular review of policies, plans and programs. It further provides for sectoral and cross-sectoral policy analysis, so that

[76] Sub Articles 27(1) and 27(2) of The United Republic of Tanzania' Constitution, 1977 (as amended)

compatibility among sectors and interest groups can be achieved and the synergies between them exploited.

With reference to energy, the NEP article 56 states, 'the main objective of the policy is the sound management of the impacts of energy development and use in order to minimize environmental degradation'. Specifically, the policy aims at a) the minimization of woodfuel consumption through the development of alternative energy sources and woodfuel energy efficiency; b) promotion of sustainable renewable energy resources; c) assessment and control of development and use of energy; and d) energy efficiency and conservation.

Vice President's Office – Medium Term Strategic Plan 2016 – 2021

The division of environment of Vice President's Office (VPO) has several functions, among them is to develop, coordinate and assess the implementation of strategies and plans to address the cross-cutting challenges related to environmental management and promote the integration of environment in other sector development frameworks. Their strategic plan does not directly address energy issues; rather it presents activities related to environment from the environment division.

The VPO is currently implementing a project namely Lake Nyasa Sustainable Land Management, which began in 2018 and it will be implemented until 2021. The project has two components, namely sustainable charcoal production and the use of efficient biomass cook stoves. This project is being implemented in five (5) district councils of Kyela (Mbeya), Ludewa and Makete (Njombe), Nyasa, and Mbinga (Ruvuma). Each district has allocated 3 villages where the project is implemented. The project also aims at training cook stove producers on commercial production of improved cook stoves based on government-approved standards for commercial purposes.

National Forest Policy (1998)

The overall objective of the National Forest Policy is to enhance contribution of forest sector for the sustainable development of Tanzania together with conservation and management of Tanzania's natural resources for the benefit of the present and future generations. Moreover, the policy a) recognizes farmland trees as a major source of firewood for rural communities; b) singles out deforestation due to charcoal production, agriculture expansion, overgrazing, wildfires and overexploitation of other wood resources as the major problem facing the forest sector; c) recognizes government failure to protect forest reserves due to inadequate resources and recommends collaborative management initiatives as possible solution; d) recognizes the contribution of woodfuel to the energy balance and its dwindling supply. Consequently, the policy encourages tree planting for woodfuel, use of efficient conversion technologies and promotion of affordable energy alternatives as strategies to address the woodfuel crisis.

The policy, however, acknowledges that the efficient wood conversion technology and methods are currently scarce. A significant amount of woodfuel is also wasted as coordination between logging companies and woodfuel suppliers is non-existent. Article 4.2.1.2 of the policy states 'the establishment of private woodlots and plantations for woodfuel production will be encouraged and supported through research, extension services and financial services'. The policy provides a direction that dissemination of information on appropriate technology on woodfuel production and use will be enhanced. Private investment in establishing woodfuel plantations will be promoted by introducing appropriate credit systems.

The use of alternative affordable sources of energy will be promoted through research and extension.

Tanzania Forest Services (TFS) Agency Strategic Plan (2020-2025)

The strategic plan developed by the agency looks broadly on the forestry sector in general, and points out that over dependence on woodfuel as a main source of energy causes immense pressure on forests. The strategy assumes that the presence, availability and use of alternative sources of energy will relieve the pressure to our natural forests. The strategy does not explicitly mention how biomass energy and technologies are going to be handled, provided that it has programmes on dissemination of charcoal and woodfuel improved stoves.

TFS, in collaboration with Netherlands Development Organization (SNV) has been implementing biomass stoves dissemination project in the Eastern Arc Mountains in Morogoro region. The project aims at helping conserve the rainforests of the Eastern Arc Mountains, by reducing forest encroachment caused by neighbouring communities.

Small and Medium Enterprises Development Policy (2002)

The policy aims at transforming the predominantly agricultural economy to a semi-industrialized economy. On environment perspective, the policy statement states that 'the government will ensure that environmental considerations are given due emphasis in all SME development intervention'. Article 65 (IV) states that the policy aims at facilitating production of technologies which apply renewable energy. As far as biomass energy is concerned (briquettes, pellets and bioethanol) this policy statement is applicable to the energy sector as well.

National Agriculture Policy, 2013

The policy calls for timely delivery and efficient use of energy inputs, including renewable energy sources into agriculture. It emphasizes the need for agricultural sector to collaborate with forestry in environmental conservation programmes. It specifically singles out tobacco production as a cause of deforestation and encourages tobacco farmers to plant trees to meet their woodfuel requirement for tobacco curing. *The Agricultural Sector Development Strategy* (URT 2001) developed to implement the policy. It advocates the use of animal manure for biogas production and planting of nitrogen fixing trees in agroforestry systems in order to increase agricultural production and provide firewood to rural communities.

National Land Policy, 1995

The overall aim of this policy is to promote and ensure a secure land tenure system, encourage optimal use of land resources and facilitation of broad-based social and economic development without upsetting or endangering ecological balance of the environment.

National Health Policy, 2017 (draft)

The policy objective is to reach all households with essential health services attaining the needs of the population, adhering to objective quality standards and applying evidence-informed interventions through resilient systems for health. Specifically, the policy focuses on promotion of better health through health education with a focus on disease specific prevention, nutrition, sanitation, and environmental issues. Main tools for health promotion included dissemination; sensitization and advocacy efforts adapted to local needs, informed community participation, awareness on environmental health, life style and health, occupational health and enhanced understanding of the role of nutrition in wellbeing.

Occupational Health and Safety: Occupational health is considered to be multidisciplinary, aiming at promotion of health and protection of workers. Various assessments conducted in 2016 among health care workers indicated that the prevalence of HIV was 13% higher than the general population of 5.1%. Despite substantial efforts to address occupational health in the country, still workers are faced with a multitude of health hazards, due to inadequate awareness among workers in various sectors and enforcement of laws and regulations governing occupational health services. *Environmental Pollution Control and Climate Change:* Environmental factors such as air pollution, unsafe disposal of waste, smog, and leaded gasoline use have handy effects on human health and survival. The government has invested notable efforts in addressing these factors including initiating community awareness programmes, enactment of the *Public Health Act - 2009* and drafted regulations on management of wastes including disposal of human remains. It is laudable that 78% of healthcare facilities have the capacities to minimize human exposure to toxic elements such as mercury that has been used for the long time in medical diagnostics. On the other hand, management of waste in urban is a serious public health problem as only 50% of waste generated is effectively managed.

Transportation Policy 2003

The policy describes how the transport sector will contribute to national goals and objectives and facilitate the optimal development of the national economy. The vision of the policy is 'to have efficient and cost-effective domestic and international transport services to all segments of the population and sectors of the national economy with maximum safety and minimum environmental degradations'. The demand for transport services has grown rapidly in line with the economic and social development activities of the country. Transport provides the arteries for development providing the channels and linkages between areas of production and markets and facilitates the movement of inputs and outputs throughout the economy. Transport services are critical to all aspects of economic and social development and are a vital ingredient to the attainment of the SDGs.

Objective for an environmentally sustainable transport system is to obtain sustainable transport. It requires transport to be in accordance with a policy on sustainable development, meeting the needs of the present generation and generations to come. Thus, it involves harmonizing environmental, economic and social objectives within the transport sector. Means of environmental objectives are actions geared towards restricting the utilization of non-renewable resources, preventing the deterioration of the renewability of renewable resources, preventing harmful effects of transport on human health or ecosystems and taking measures to counter negative environmental impact. Achievements in this field, however, greatly depend on technological developments.

Sustainable Industrial Development Policy, 1996

The objectives of the policy include: overall contributions towards human development and the creation of employment opportunities; economic transformation in order to achieve sustainable economic growth; external balance of payments; environmental sustainability; and equitable development.

The mission of the industrial sector in the 1996–2020 period is two-fold: a) to contribute towards the achievement of the overall national long-term development goals as contained in the Development Vision 2025; b) to enhance sustainability in the development of the sector.

Goal towards which the industrial sector will be geared include human development and creation of employment opportunities, economic transformation for achieving sustainable economic growth, environmental sustainability and equitable development.

Moreover, as far as health is concerned, the protection of the environment from environmental degradation, which includes poor solid waste management, air pollution from uncontrolled industrial emissions is important for the well-being of the people (Article 4.3.10). Although the Renewable Energy is important in industrial development, the policy is silent on the promotion and adoption of Renewable Energy and technological development; and control for emissions from industries.

National Population Policy, 2006

The objectives of the policy are to provide a framework and guidelines for integration of population variables in the development process. It provides guidelines that determine priorities in population and development programmes as well as strengthening the preparation and implementation of socio-economic development planning.

The main goal of the policy is to direct development of other policies, strategies and programmes that ensure sustainable development of the people. The specific goals of this policy are to contribute to the following: a) Sustainable development and eradication of poverty; b) Increased and improved availability and accessibility of high quality social services; c) Attainment of gender equity, equality, women empowerment, social justice and development for `all individuals; d) Harmonious interrelationships between population, resource utilization and the environment.

The overriding concern of the population policy is to enable Tanzania achieve an improved standard of living and quality of life for its people. Important aspects of quality of life include good health and education, adequate food and housing, stable environment, equity, gender equality and security for individuals.

Energy and mineral resources are important components of the resource base. The major energy resources are biomass, hydropower and coal. However, the policy acknowledges that the natural resource base is continuously deteriorating due to inadequate integration of environmental concerns in the human, technological and planning processes. The policy advocates for the promotion of the use of other energy sources to reduce pressure on biomass energy sources.

National Human Settlements Development Policy, 2000

The policy has two main objectives: a) To promote development of human settlements that are sustainable; b) To facilitate the provisions of adequate and affordable shelter to all income groups in Tanzania.

Specifically, the policy aims at protecting the environment of human settlements and of ecosystems from pollution, degradation and destruction in order to attain sustainable development. Some of specific policy statements related to poverty eradication, building in unplanned settlements, planning standards and regulations and urban economy are: The government shall promote, a) small scale building material industries; b) labour intensive projects e.g. during the provision of infrastructure in human settlements; c) earmarking of special areas within neighbourhoods for informal sector activities; d) Small–scale industries for building materials at the community level shall be promoted; e) Private and popular or informal sectors shall be encouraged to engage in the production of building materials by

giving them incentives; f) Building and construction standards shall be revised so that they become functional and performance based rather than prescriptive.

Tanzania's human settlements are classified as urban settlements with a high population density, scattered agricultural villages with a low population density and sparsely populated pastoral villages[77]. The development of human settlements in the country has not been sustainable because it has not combined socio-economic development with environmental conservation and protection. The policy recognizes the need for standards, and it provides supportive environment for the development of microeconomic enterprises/informal sector activities, e.g., charcoal sub-sector for this case.

4.2 LEGISLATION ANALYSIS

Environmental Management Act - EMA (2004)

This statute has been enacted to provide for legal and institutional framework to: a) serve the purpose of ensuring sustainable management of environment; b) outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; c) provide basis for implementation of international instruments on environment; d) provide for implementation of the National Environment Policy; e) provide for continued existence of the National Environment Management Council as well as; f) to provide for establishment of the National Environmental Fund.

Chapter 64 of the Act states that the Minister shall, in consultation with Minister responsible for forestry or as the case may be, 'energy', promote the use of 'renewable sources of energy' by: a) promoting research in appropriate renewal sources of energy; b) creating incentives for the promotion of renewable sources of energy; c) promoting of policies and measures for the conservation of non-renewable sources of energy; d) taking measures to encourage the planting of tree and woodlots by individual users, institutions and by community groups.

Under this Act, biomass energy is not encouraged or promoted, only renewable energy is mentioned. Therefore, the EMA does not cater for biomass energy.

Rural Energy Act (2005)

The Act gives mandate to the Rural Energy Agency (REA) to execute modern energy projects in mainland Tanzania. This Act, interprets that 'Modern energy' means energy that is based on petroleum, electricity or any other energy forms that have commercialized market channels, a higher heating or energy content value than traditional biomass fuel, and that which may be easily transported stored and utilized. Taking into account this definition, the Rural Energy Act of 2005, does not cater for biomass energy at all, it rather caters for fossil fuels (petroleum products) and electricity.

The Forest Act (2002)

The Act[78] provides for promotion and enhancement of the forest sector's contribution to the sustainable development of Tanzania together with conservation and management of natural resources for the benefit of present and future generations; while, ensuring ecosystem stability

[77] URT, 2015. Ministry of Lands, Housing and Human Settlements Development: Habitat III National Report Tanzania

[78] Section 3(a) and (c) of The Forest Act, Act No. 14 of 2002 (as amended)

through conservation of forest biodiversity, water catchments and soil fertility. The Act as a whole does not have any clauses or provisions related to energy, biomass energy or any other forms of energy. However, it has few sections that affect/impede the implementation of sustainable charcoal production with local communities/villages. The forest policy, 1998 opened the window for community participation in forest co-management. It inspired the Forest Act 2002, which provides the legal provisions for co-management and the establishment of Village Land Forest Reserves (VLFRs). The VLFRs are established on village lands through a process that entails first the formation of a community-based organization (CBO) and develop a land-use plan to be utilized as a tool to ensure local communities derive socio-economic development through sustainable utilization of forest resources.

i) Royalties as forest revenues can be inefficient and lack transparency:

Part X of the Act refers to financial provisions, wherein section 78 provides the Minister the power to set and collect royalties. In determining the level of royalties, in connection with any particular produce, the Minister must consider: a) the potential market value of the produce; b) the accessibility of the produce; c) the Profitability of the enterprise, due regard being paid to the expenses and capital investment of the enterprise; and d) principles of sustainability in connection with harvesting of the produce. In reality, royalty rates are reviewed after every two years by a committee in the MNRT. The committee, rather than observing the criteria referred to in the law, usually just raises the royalty rate without looking at prevailing market conditions[79].

ii) There are no provisions for royalties to be re-invested in village land forests:

According to Section 54 sub-section 2, article *b*, of the Act, any fees, royalties or other imports are owed to the Government of Tanzania. This provision means that all royalties are central government revenues and cannot be paid to district or village governments. These sub national levels of government can only benefit from cess but not from royalties directly. Section 78, sub-section 3, further provides that no royalties shall be required for the harvesting or extraction of forest produce within a village forest reserve or a community forest reserve, by the resident of the village or the members of a group. It has been argued that village forests being exempted from royalties has resulted in a lack of TFS attention. However, the establishment order makes it clear that the TFS mandate is over central government forests. Even if royalties were paid by villagers to TFS, a mechanism for reinvesting in forest management in villages would still be lacking.

iii) Inadequate protection and arbitration of disputes:

Under Part VII of the Act are several provisions referring to the trade of forest products. Specifically, section 63 provides for the Minister, by order published in the gazette, to prohibit or restrict the movement of forest produce, both within Tanzania and from Tanzania. Under article *e* of the same section, before issuing the ban the Minister must regard such factors as the sustainability of forests and the welfare of those obtaining a livelihood from the trade, as it will appear to be relevant and appropriate. In reality, charcoal bans are routinely issued by authorities other than the Minister responsible for forests, and without any publishing in the government gazette. Livelihoods of traders are rarely considered and compensation is usually not forthcoming, even to traders with valid permits and licenses as issued by government

[79] Kalonga, S.K; Kulindwa, K.A and Mshale, B.I. 2015. Equity in Distribution of Proceeds from Forest Products from Certified Community-Based Forest Management in Kilwa District, Tanzania. Small-scale Forestry 14:73–89 DOI 10.1007/s11842-014-9274-6

officers. Traders who feel that their trade disputes with government are not subject to objective arbitration are more likely to participate in opportunistic charcoal practices that are not aimed at sustainability.

The Forest Policy, Act and regulations aim to oversee/control charcoal production and trade in the country. However, many charcoal actors along the chain have little knowledge on laws and regulations regarding charcoal production and trade. For monitoring purpose charcoal production and trade records supposed to be kept through established data base. However, the Forest Policy, Energy Policy, Environmental Policy and Land Policy and LATRA regulations contradict on issues of sustainable charcoal production and trade. The policies and regulations need to be harmonized in order to make charcoal sub-sector sustainable.

Districts are supposed to have a harvesting plan and Forest Management Plan (FMP). Many districts have forest harvesting plans but are not specifically for charcoal production. Charcoal producers and traders supposed to have licenses but many operate without the required documents with exception of large-scale producer. Some weakness of the laws mentioned include double penalty i.e. excess charcoal is impounded and fined.

Still there is no clear defined and separation of roles between DFOs and DFMs, beyond the TFS being given powers over the hammer. Registration and issuing permits still continues under DFOs and almost all extension is carried out by DFOs. There remains confusion within MNRT about how it wishes to maintain control over regulations while understanding the need for checks and balances within the system. The Forest regulations 2019, GN #417, section 10.-(1) states '*the Chief Executive shall provide guidelines for methods of charcoal production which are efficient, significantly offsets carbon dioxide, reduces deforestation and ensures eco-system resilient to climate change'*. This is a recommendable effort by the government, however; implementation of the same has been slow. So far no guidelines have been published causing chaos to charcoal producers about compliance with the law.

The Village Land Act 1999

The Village Land Act is a statute enacted to provide for the management and administration of land in villages and for related matters.

Land legislation doesn't recognize sustainable forest management:

The Act, in part II, which outlines the fundamental principles of the land policy, under article *f* of section 3, states that 'land is to be used productively and that any such use must comply with principles of sustainable development'. At the same time, the Act, under part IV, section 14, requires any forest area, in order to be recognized, must be lawfully declared to be a forest reserve. These statements in the Land Policy and the Act have been interpreted by many to lower the status of forests on village lands that are not in village forest reserves. It is perceived by many that forests on village lands, outside reserves, are deemed to be unproductive lands and can lead to appropriation of that land. As a result, villagers feel encouraged to clear these forested lands and to cultivate them as a way of showing that they are being used productively, thereby confirming their right to occupy them.

Without legislation that specifically recognizes sustainable forest management as a productive land use, villagers will prefer to clear forests and cultivate or construct buildings on the land as a way of claiming their rights of occupancy over these lands.

The Land Use Planning Act of 2007

The Act provides for procedures for the preparation, administration and enforcement of land use plans; to repeal the National Land use Planning Commission Act and to provide for related matters.

Weak provisions for enforcing land use planning laws:

Under section 57, sub-sections 1 and 2, of the Act of 2007, the National Land Use Planning Commission (NLUPC), in consultation with relevant land use planning authorities, is identified as having responsibility to monitor and evaluate all land use and environmental phenomena with a view to making assessment of any possible change in the environment and the possible impacts. The legislation provides for the NLUPC and district councils, as land use planning authorities, to monitor adherence to land use plans. However, both of these institutions are typically not in a position financially to fulfill this mandate. Furthermore, the law does not specify what penalties can be taken by the NLUPC and district councils against a village, or villages that do not comply with a village land use plan. The weak monitoring and enforcement of land use plans by a national authority are seen by many as a major reason why forests on village lands cannot be protected effectively. Although, Village Land Use Plans are supported by bylaws that are enforceable in a court of law, without additional and regular monitoring of adherence by a national body, they are deemed to be largely insufficient.

The Local Government Finances Act, 1982

The Act makes provision for sources of revenue and the management of funds and resources of Local Government Authorities and for matters connected or incidental to securing the proper collection and sound management of finances in the local government system.

Insufficient provision for funds to support forest extension by districts:

The Act, 1982, under part II, which refers to the sources of revenue of district councils, under section 7, sub-section 1 article *r*, revenues, funds and resources of a district council are defined to consist of moneys derived from fees for forest produce and licenses accruing to the district council under section 10 of the Forest Act. Under article *g* of the same section, district councils are allowed all moneys derived from any cess payable on any agricultural or other produce produced in the area of the district council. Finally, sub-section 3 and 4 require that all revenues of a district council, unless otherwise stated, be paid into the general fund of the district council. District councils can only charge cess on forest produce but cannot receive funds directly from forestry royalties.

Because the district cess for forest produce has been set at only 5%, and because all the cess funds must be paid into the council's general fund and cannot be earmarked for the district's forest department, the result is that the district is constantly underfunded for forest extension activities. This is unfortunate because districts are responsible for providing extension services and supporting forest management on all forested areas on village lands. In the absence of financial incentives to district councils, probably generated in the form of a share of royalties or new taxation on the sales of forest produce, in order to invest in supporting sustainable forest management at village level, it's unlikely that non-reserved forested lands will come under improved management. Harvesting for timber and charcoal will continue to be produced under conditions of informality and even illegality. District councils cannot generate sufficient revenues from cess to pay for the costs of expanding PFM. Experience shows that even the cess payments, once paid into the district's general funds, are not reinvested in forestry activities.

The Land Act, 1999

The Act is a piece of legislation providing for the basic law in relation to land other than the village land, management of land, settlement of disputes and related matters. The Act recognizes that land has value. In addition, the Act provides mechanisms for regularizing informal settlements. However, the Act has been criticized because it places excessive land regulatory powers on the President, the Minister of Lands and the Commissioner of Lands. Besides this, some critics argue that the Act has failed to recognize and adopt/adapt some of the popular land management processes that are taking place in informal settlements, such as informal land subdivisions.

Local Government District Authorities Act (Act No. 7 of 1982)

The Act has been enacted to make better provisions for, and to consolidate laws relating to, local government, repeal the Local Government Ordinance, repeal certain other written laws and provide for other matters connected with or incidental to the organization of local government in Mainland Tanzania.

The Standards Act, 2009.

The Act provides for the promotion of the standardization of specifications of commodities and services, to re-establish the Tanzania Bureau of Standards and to provide better provisions for the functions, management and control of the Bureau, to repeal the standards Act, Cap.130 and to provide for other related matters.

The Bureau is the custodian and an overseer of observance of standards in Tanzania. One of the functions of the Bureau is to a) undertake measures for quality control of commodities, services and environment of all descriptions and to promote standardization in industry and trade; b) approve, register and control the use of standard marks in accordance with the provisions of this Act; c) act as the custodian of the National Measurement Standards of weights and measures and from time to time adjust, replace or cancel any standards where the adjustment, replacement or cancellation is necessary for the maintenance of conformity to the international standards; d) prepare, frame, modify or amend National Standards; and e) assist the Government or any other person in the preparation and framing of standards.

In the performance of its functions the Bureau provides for the health, safety, environment and general welfare of the people of the United Republic. The Bureau has Technical Committee (TCs) for standard development and Inspectors for enforcement of the standards for compliance. However, the Act emphasizes more on compliance with standards than enforcement. The latter is done by TBS, but mainly done with other government's departments and agencies for the products falling under their jurisdiction. The key government challenge with enforcement has been inadequate capacity both technically and financially.

5) Status of forest certification in TZ and the region: gaps, challenges and opportunities

5.1 STATUS

Studies by African Forest Forum (AFF) during the implementation of a project entitled '*Strengthening Sustainable Forest Management in Africa*'[80] found that, at regional level, the Forest Certification (FC) initiatives started in 2002 in Eastern Africa[81]. The objective of the initiatives was to facilitate, analyze and document a process by which stakeholders would formulate and agree on a regional capacity building strategy in FC promotion. However, in addition to the regional initiatives, certification initiatives at individual countries' level emerged over time in the region, mainly led by development partners, NGOs and private sector. Private forest companies in Tanzania started the initiatives of forest certification (FC) at individual companies' level through their own efforts in the late 1990s. The initiatives from private sector included those by the Kilombero Valley Teak Company (KVTC).

The early FC initiatives in Tanzania were further taken up by the WWF Tanzania in early 2006 for standard development. The process started by carrying out potential stakeholders' identification and analysis at national level. This was then followed by a national stakeholders' workshop in January 2006 to raise stakeholders' awareness about FC, and the process of developing a national standard for Tanzania. During the workshop, an Interim Steering Committee of 10 members was selected to take the lead in the FC process and initiate raising the awareness of stakeholders about FC. In June 2008, the Interim Steering Committee organised another national stakeholders' workshop, which aimed at a National Working Group (NWG) formation for standard development. It was agreed in this workshop that the NWG should work on a zero draft standard and consult throughout the country by visiting all the zones of the country. The national standard development process was registered by FSC International in 2008. The government has been and continue to be involved in the FC process. The engagement in this process brought together and continues to bring together interested and affected parties from respective government MDAs, private sectors, NGOs/civil society and community based organisations.

In July 2009, the FSC national draft standard of Tanzania was in place. The draft was again sent out for stakeholders' comments from July-December 2009. Field testing of the draft before submission to FSC International for approval took place in November 2011. When the draft was ready for submission to FSC International for approval, FSC international had released new Principles and Criteria - P & C (Version 5) whereby all the countries with FC national standards were required to harmonise their standards to conform to this version. To take up this new assignment, the NWG was, then, transformed into a Standard Development Group (SDG) and registered by FSC PSU in October 2012. The SDG worked on the transfer process to harmonise the national draft standard with the new FSC P & C (Version 5), with financial support from WWF Tanzania. This transfer took place in line with the new International Generic Indicators (IGIs) review process. The draft National Forest Stewardship Standard (NFSS) was finalized and approved by FSC International in July 2018[82]. WWF Tanzania is the leading organisation supporting/facilitating the FC process in Tanzania. At the

[80] Teketay D., Mbolo A. M. M., Kalonga S. K. and Ahimin O. 2016. Forest certification in Africa: achievements, challenges and opportunities. African Forest Forum, Nairobi, Kenya. 157 p.
[81] Owino, F. 2003. Some opportunities and bottlenecks for forest certification in Eastern Africa. XII World Forestry Congress, 2003 Quebec City
[82] https://fsc.org/en/newsfeed/tanzania-launches-fsc-national-forest-stewardship-standard

moment, WWF Tanzania is working with MNRT/FBD to have a formal launch of the NFSS and possible adoption by TBS.

Since early 2000s, FSC has been the only FC scheme engaged in certification in Eastern Africa. Therefore, FSC has the experience and understands the forest management conditions in Tanzania and the region. The first FSC certificate in Tanzania was awarded in 2007. Since then, the trend of Forest Management (FM) certified area has been increasing, particularly during the last four years (Figure 25).

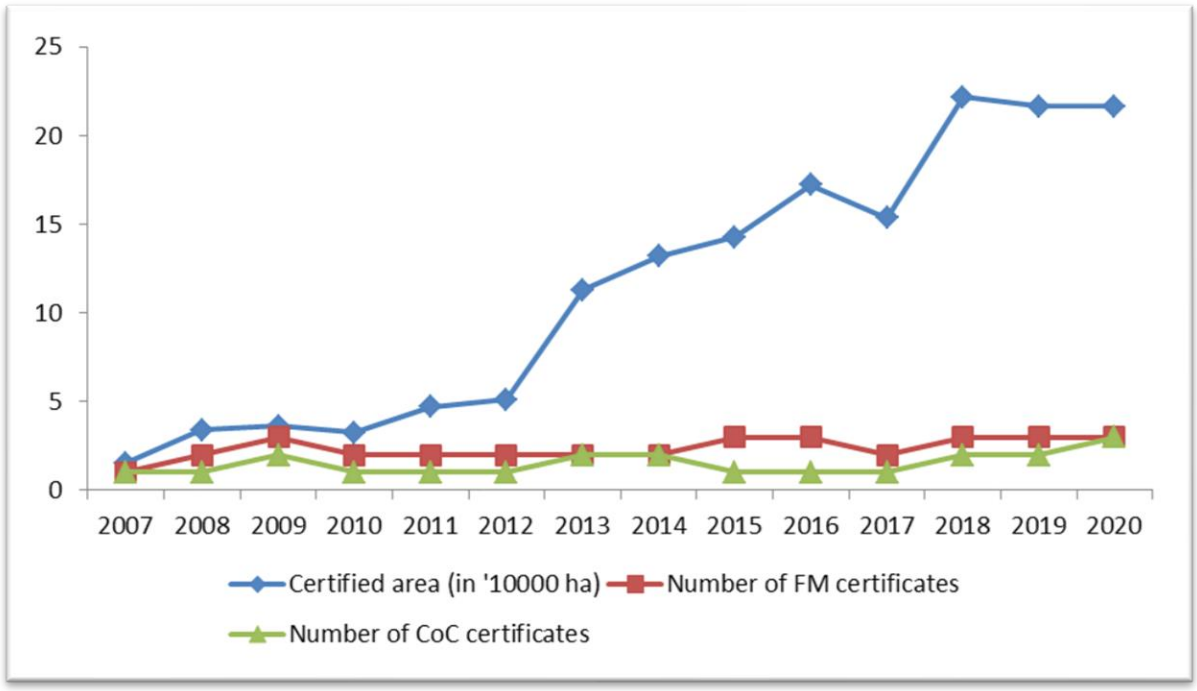

Figure 25: FSC-certified area, FM and CoC certificates in Tanzania

Currently, there are 3 Forest Management (FM) certificates with 216,317 ha certified and 3 Chain of Custody (CoC) Certificates[83]. The FSC-certified areas (FM certificates) include exotic hard and soft-wood plantations belonging to Green Resources Ltd (GRL) and New Forests Company (NFC) Ltd in the southern highlands, as well as community natural forests (i.e. miombo woodlands) of the southeastern Tanzania under the coordination of Mpingo Conservation Development Initiative (MCDI) as the FSC Group Scheme Manager.

Under MCDI's facilitation, sales of timber in VLFRs account for more than 90% of the total annual revenues[84]. The revenues are far higher in FSC-certified forests than in non FSC-certified forests (Figure 26). This is a significant amount earned by communities, and it is a notable motivation for them to maintain FSC certificate and manage sustainably all forests under their disposal.

[83] FSC, 2020. FSC: Facts and Figures
[84] WWF, 2020. Assessment of Community-Based Forest Resources Economies and Business Model for Communities with Village Land Forest Reserves in the Ruvuma Landscape, Tanzania

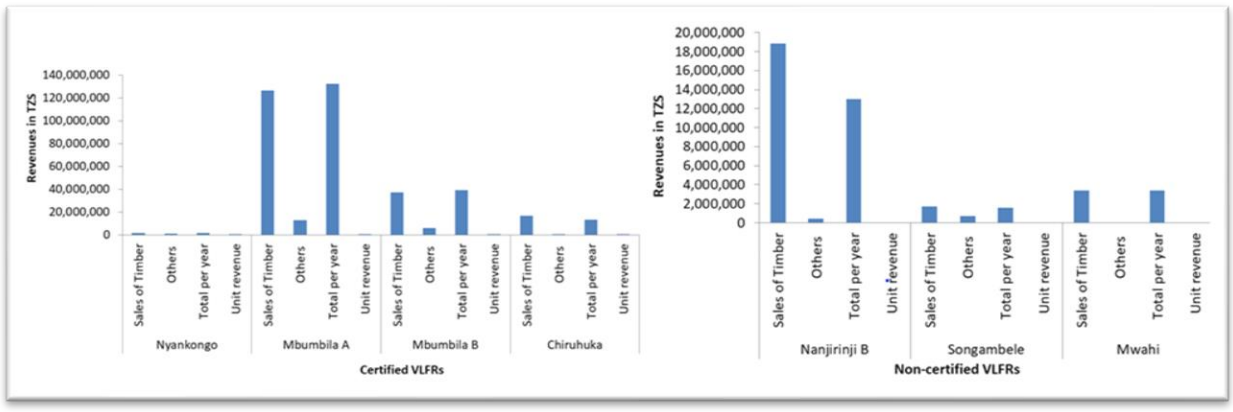

Figure 26: Revenue earned in FSC-certified and non FSC-certified VLFRs in Kilwa[84].

The CoC certificate holders are GRL, MCDI and Tractors Ltd (i.e., Mkaa Endelevu). The forest products certified under CoC were mainly timber, wooden products and charcoal briquettes. There are no certificates for lump charcoal and certified forest ecosystem services (e.g. Carbon, Biodiversity, Watershed, Ecotourism, etc.) in Tanzania. There are several operations undergoing the process of certification. There are on-going initiatives with the Tanzania Tree Growers Association Union (TTGAU) with support from Participatory Forestry Programme – Phase II (PFPII) to certify woodland management for timber and lump charcoal production. FSC-certified community forests, coordinated by MCDI are piloting the benefits of certified forests delivering forest ecosystem services to communities.

5.2 GAPS, CHALLENGES AND OPPORTUNITIES

Stakeholders' consultation/interviews and review of relevant documents exploring stakeholders showed that, there are some gaps, challenges and opportunities. Generally, the main gap in Tanzania was inadequate capacity for FC. This was characterised by lack of locally-based accredited certification bodies (CBs), and also inadequate systems to inspect and evaluate FM against agreed standards. There was also an inadequate public education and awareness on FC. However, it was noted that the awareness and appropriate capacities are more with the NGOs/CSOs, followed with the respective government MDAs and private sector (Figure 27).

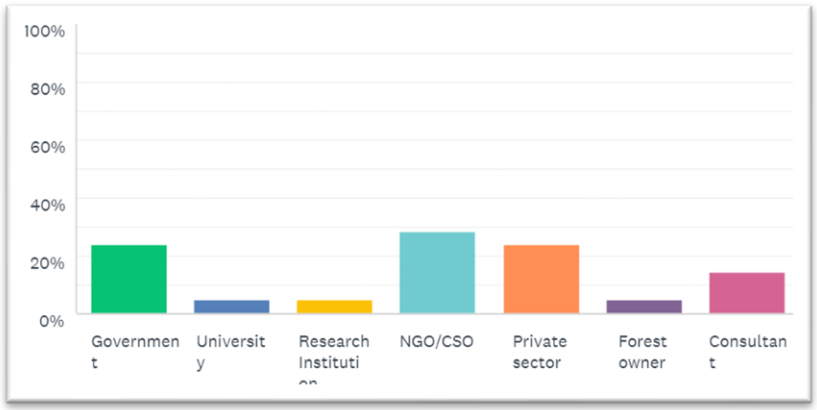

Figure 27: certification awareness and capacity: Source: Own survey data

The private sector and NGOs/CSOs legal entities in Tanzania, have been promoting FC since 2000s; however, their pace is slow due to limited human and financial resources. The

inadequate and unethical implementation of policy and legal framework for SFM (inadequate political will, corruption and tax evasion) was another challenge. A study by WWF Tanzania[84] reports that the awareness of communities about certification is low to the majority of the villagers (Figure 28), indicating that there will be a need for sensitization/awareness raising and capacity building programme to communities where the charcoal certification and standards will be implemented.

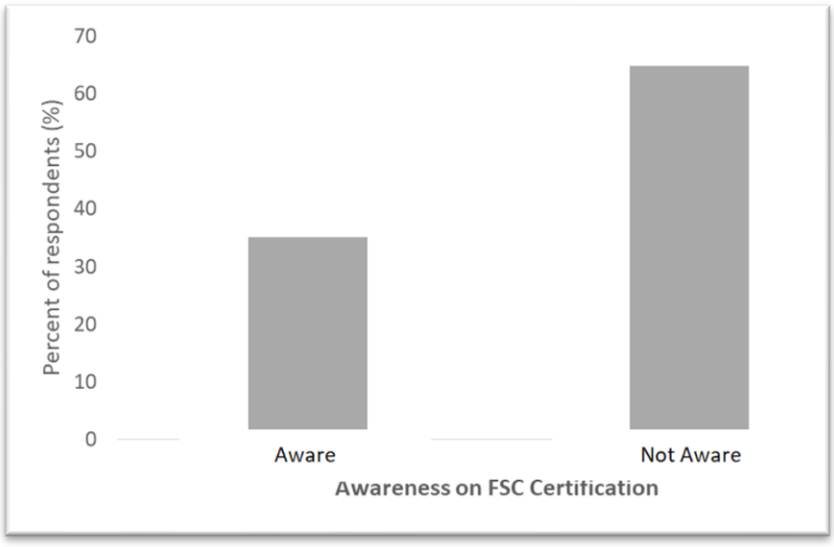

Figure 28: Villagers awareness of forest certification

The certification enables businesses and consumers to make informed choices about the forest products they buy, and drive positive change by engaging the power of market dynamics i.e. supply and demand[85]. There were no specific markets and marketing structures for certified forest products in Tanzania due to inadequate consumers' awareness and no preference for certified forest products. This means that customers do not differentiate between certified and non-certified forest products in the market, and normally go for products with low prices. There are some markets established in Europe and America (e.g. *MCDI, Mkaa Endelevu by Tractors Ltd, etc*). However, these are dominated by a few buyers who are aware of what certified forest products are, and, hence, control the market, resulting in no competition and even not paying for price premiums to producers[86].

Furthermore, the consultation/interview established that there is growing interests for buying certified forest products (Figure 29). This provides an entry-point for marketing certified timber, charcoal, etc. However, the FSC Global Market Survey[85] revealed that some of the international stakeholders in the construction and furniture industry indicated that it was difficult to state the extent to which they would procure certified products from certified forests, and that their decisions would depend on the market dynamics.

[85] FSC, 2012. FSC Global Market Survey
[86] Kalonga, S. K., Kulindwa, K. A. and Mshale, B. I. 2015. Equity in Distribution of Proceeds from Forest Products from Certified Community-Based Forest Management in Kilwa District, Tanzania. Small-scale Forestry, doi 10.1007/s11842-014-9274-6: 1-17.

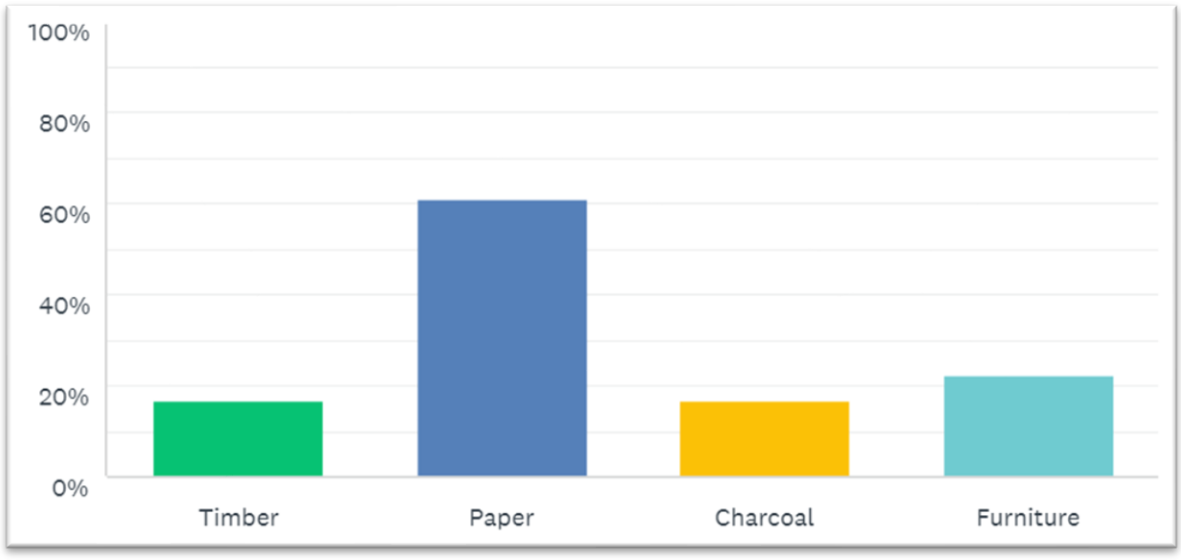

Figure 29: Interests for buying certified forest products. Source: Own survey data

Moreover, in the absence of a price premium, certification costs serve principally as a barrier to markets wishing to source certified products[87]. Another study in Tanzania by Makonda (2012) on markets for *Dalbergia melanoxylon* Guill. & Perr. (Mpingo) and related products revealed that there are potential international markets for wood and carvings in India, America, United Kingdom, China, Germany, Italy, Kenya and South Africa. Other products, including charcoal could make use of this opportunity to enter into these markets in future.

There are some development partners (e.g. World Bank-funded projects) showing interest in buying timber from certified forests for donor-funded projects[88]. These interests provide a good entry-point for introducing supportive policies to promote procurement of certified forest products in the region, and could be extended to big companies, central and local government programmes, and the rest of the development partners that are supporting countries in the region. This approach will most likely spur the markets for certified forest products. The main task here is to influence policies in public procurement to ensure that all government and non-government projects buy from certified sources.

FC is an expensive venture, with high initial and up-keep costs[18] (Figure 30). However, these costs and associated benefits vary with forest types, forest owners/managers and, thus, cannot be generalized. The costs of FC are prohibitive for smallholder commercial forest owners and private natural forest owners[86].

[87] Wong, J. 2005. SWOT analysis of the forestry sector in Wales: Forest Management of the overall project. Wild Resources Limited.
[88] WWF. 2011. Potential for FSC Forest Certification in Uganda Kampala: WWF Uganda Country Office, Kampala

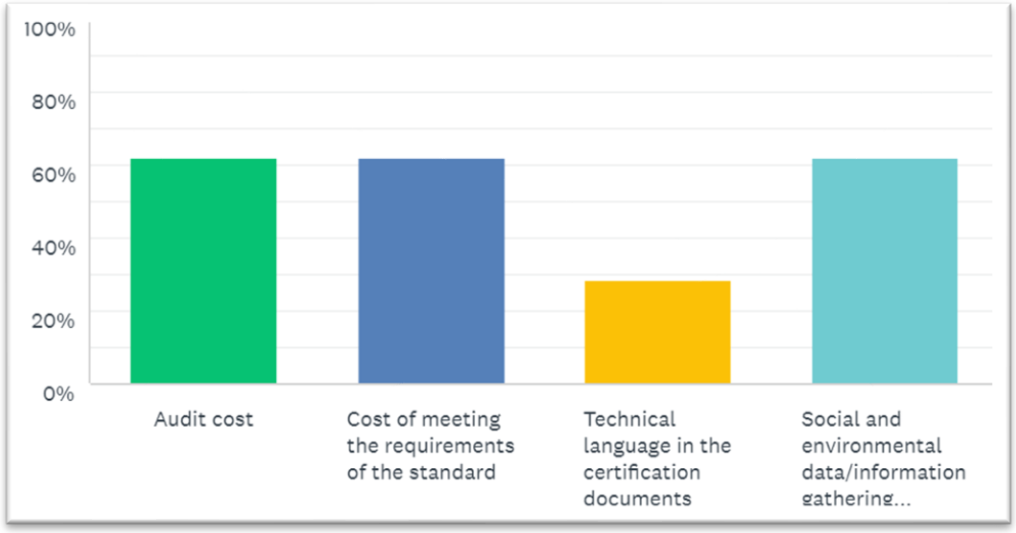

Figure 30: Certification costs. Source: Own survey data

Some of the approaches recommended to reduce FC costs, include the following, in the case of the smallholder forests (including communities), to gain economies of scale (costs sharing), it is desirable to adopt the group certification approach using the simplified FSC standard for Small, Low Intensity Managed Forests (SLIMFs) certification. For the natural forests, it may be desirable to adopt the modular approach (MAP) as guided by FSC MAP. This will make it possible to train people, change attitudes, and generate confidence along the certification process through adaptive management. The use of locally-based accredited CBs and standards to certify operations in the region, instead of the use of CBs from abroad are also recommended.

FC will, possibly, achieve its goal once government accepts FC standards as minimum forest management standards in her own relevant pieces of legislation. The government, then, would say that in order to receive a licence to operate in the forest industry, one needs to submit an annual audit report from CBs. This would really sort things out and it would also create a level playing field between formal and informal industries/markets. In the process, the costs of certification would go down since competition would be stimulated.

5.3 ADOPTION OF FSC CERTIFICATION STANDARDS FOR TIMBER: LESSONS FROM TANZANIA (E.G., MCDI) AND THE REGION.

In developing countries, environmental issues are increasingly gaining attention due to the degradation of environment, climate change, and continued deforestation[89]. Also an increase in socioeconomic importance of forests for green growth and economy[90], necessitates that forests are responsibly managed so as to provide incentives to their custodians to achieve the three pillars of sustainable development, i.e. social, ecological and economic balance. Forest certification, in particular the deployment of community group forest certification scheme, is a possibility to realize this outcome.

Communities are good managers of the forest estates at their disposal. The linkage between forest certification and communities is important because forest communities are increasingly

[89] NYDF Assessment Partners. (2020). Balancing forests and development: Addressing infrastructure and extractive industries, promoting sustainable livelihoods. Climate Focus (coordinator and editor). Accessible at www.forestdeclaration.org.
[90] Muthoo, M. 2012. Forest certification and the green economy. Unasylva (FAO) 63:17-23

becoming major stewards of the world's forests, especially in tropics, as it enhances the chance to alleviate poverty[91]. This has been exemplified by MDCI. Since 2004 MCDI, previously known as the Mpingo Conservation Project (MCP) has been developing an approach to CBFM which focuses specifically on sustainable management of high-value hardwood timbers, working in the miombo woodlands on communal village lands. The aim was to conserve endangered forest habitats in East Africa by promoting sustainable and socially equitable harvesting of valuable timber stocks, and with a particular focus on African Blackwood, *Dalbergia melanoxylon* Guill. & Perr., which is used for making clarinets, oboes and bagpipes. In March 2009, MCDI was awarded the first certificate by FSC for community-managed natural forests in the African continent.

Among the benefits communities enjoy include earnings from the sale of FSC-certified African Blackwood, *Dalbergia melanoxylon* Guill. & Perr., and other miombo spp, domestically and abroad. The revenue is used to facilitate community related development projects such as schools, health and water. This has been made possible through forest certification which creates an enabling environment for markets access that recognize good stewardship and reward it accordingly (Figure 31).

Figure 31: Forest certification creates new markets access. Source: Own survey data

The certificate is a group certificate, meaning that the actual forests are managed by group members, in this case - the communities, and the certificate manager - MCDI, manages the relationship with FSC International and also supports the communities logistically so that they comply with FSC standards. The communities in Rufiji, Kilwa, Liwale and Tunduru, as forest managers, are practicing CBFM through the application of FSC standards to reduce pressure on forest resources which is high in the area by creating alternative of livelihood to communities through sustainable timber harvesting (i.e. selective logging) and carbon credits.

The MCDI is the legal person who holds the certificate on behalf of the entire group, and designated as the FM Certification Group Manager (Figure 32). MCDI is responsible for managing external relations on behalf of the Group. In particular it makes efforts to find buyers for FSC-certified timber from group members' forests and, where appropriate, assist these customers to obtain FSC Chain of Custody certificates in order to maximise the benefits of certification. In fulfilling this role MCDI has exclusive rights to sell timber from members' forests,

[91] Molnar, A, 2003. Forest Certification and Communities: Looking Forward to the Next Decade. Forest-Trend, Washington, D.C

but provides a sales route for those members who wish it. In addition fulfils the role of Group administrator. That is to say MCDI is be responsible for administering the Group, ensuring the Group meets all requirements to get and then retain an FSC Forest Management Group Certificate, advising and supporting group members, and following up on Remedy Instructions that are issued to individual members. In fulfilling this role MCDI follows the rules and procedures set out and keep complete records of all such official activities it carries out in relation to the management of the Group.

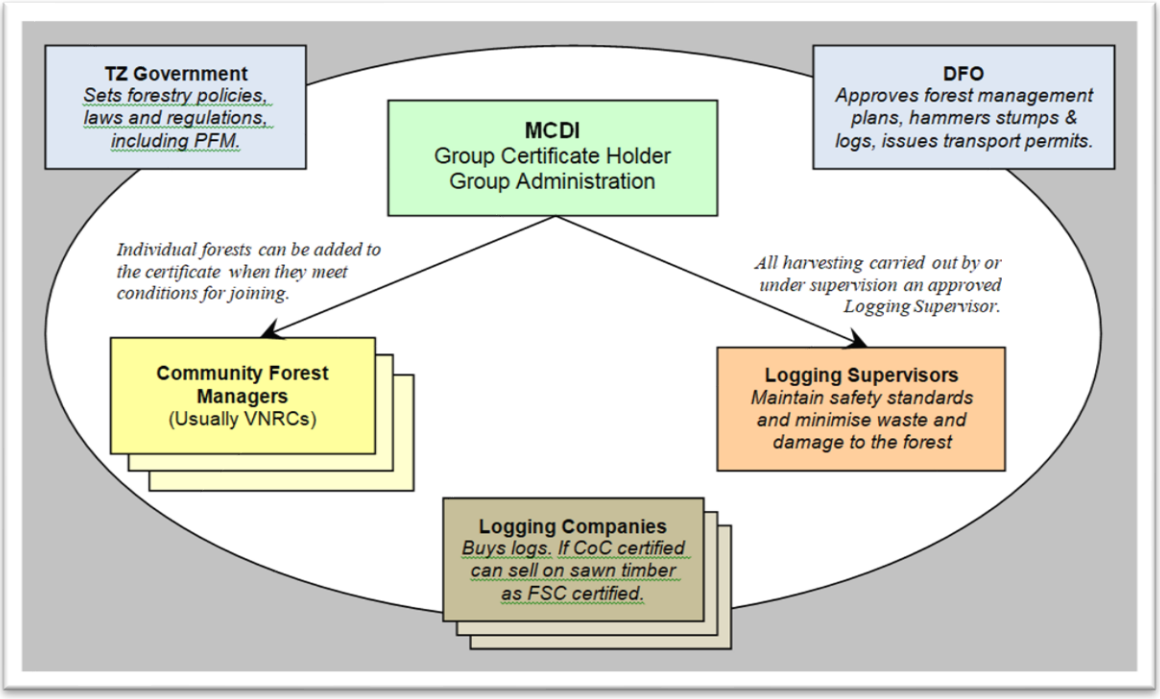

Figure 32: FSC Group Certification Scheme – MCDI[92]

Individual Community Forest Managers apply for one or more forests under their control to join the group when they meet the conditions for joining. Membership is voluntary. However, members of the group, Forest Managers must follow the Rules of Group for all forests subject to the membership agreement, and follow any Remedy Instructions issued to deal with deviations from the rules. Forest Managers can remove any forests of theirs from the group subject to the stipulations herein of the minimum period of membership.

The main use of the FSC-certified community forests and the open access forests is commercial timber production. These forests are also used for grazing and supply of subsistence and cash from forest products including fuelwood, construction materials and medicinal plants.

The MCDI and communities are implementing certification in these forests as a strategy for controlling legal harvesting and monitoring illegal harvesting which is rampant in these areas, to enhance communities' livelihoods and control deforestation and forest degradation[93]. At the same time, certification has brought a keen awareness of the social issues related to forestry, i.e. better communication mechanisms exist between foresters, their rural neighbours, and employees[93]. This means that FC focuses not only on ecological aspects of harvesting for

[92] MCDI Tanzania Community-Managed Forests FSC Group
[93] Kalonga S. K and Kulindwa, K. A, 2017. Does forest certification enhance livelihood conditions? Empirical evidence from forest management in Kilwa District, Tanzania. Forest Policy and Economics 74:49-6

timber production; but also includes social and economic issues during forest management[94]. FC also works toward ensuring that economic and social benefits of well managed forests are shared equitably throughout the forest products value chain[86]. The social impacts of FSC include material benefits for workers such as good working conditions, employment of local workers with higher wages, health insurance and improved workers' training[95] (Figure 33). At community level, indirect benefits included community-based projects, such as infrastructure development, including rural roads construction, schools, health centres and water supply. FC initiatives, among others, are to enhance greater market security (domestic and international markets) and hopefully generate higher prices for forest products for forest owners, managers and timber dealers as a market incentive (e.g. price premium) and driver of certification[96]. Such markets provide reliable incomes to forest owners/managers and local suppliers, in addition to providing opportunities for expansion.

Figure 33: Other benefits of certification. Source: Own survey data

On the contrary, the perceived market advantage of obtaining FC has not materialised to the degree some certificate holders expected[86] (see Figure 31). From a market perspective, certification should lead to a price premium, which could pay for the incremental cost of good stewardship by forest managers, and for the certification costs[97]. However, certificate holders are not receiving price premiums for their forest products[16]. Given that some of the incentives, including price premiums for forest products are not implemented, the result is high transaction costs; in particular FC costs remain high for smallholder forests[86] (Table 3). It is still very difficult for small scale operations to be certified due to the high costs associated with the certification process and the intensive levels of administration and management required from mostly illiterate forest managers[86]. To private companies, FC has been a business risk that

[94] Duchelle, A. E., Kainer, K. A. and Wadt, L. H. O. 2014. Is Certification Associated with Better Forest Management and Socioeconomic Benefits? A Comparative Analysis of Three Certification Schemes Applied to Brazil Nuts in Western Amazonia. Society and Natural Resources 27:121-139.
[95] Cerutti, P., Lescuyer, G., Tsanga, R., Kassa, S., Mapangou, P., Mendoula, E., Missamba-Lola, A., Nasi, R., Eckebil, P. and Yembe, R. 2014. Social impacts of the Forest Stewardship Council certification: An assessment in the Congo basin, Center for International Forestry Research (CIFOR), Bogor
[96] Quaedvlieg, J., Roca, G. and Ros-Tonen, M. A. 2014. Is Amazon nut certification a solution for increased smallholder empowerment in Peruvian Amazonia? Journal of Rural Studies 33:41-55
[97] Meijaard, E., Wunder, S., Guariguata, M. and Sheil, D. 2014. What scope for certifying forest ecosystem services? Ecosystem Services. http://dx. doi.org/10.1016/j.ecoser.2013.12.008i.

has to be undertaken in order to safeguard the market share, but there is no guarantee that certification will bring increased cost-effectiveness.

Table 3: Average annual forest revenue and forest management expenses* for 14 FSC-certified VLFRs for the three year period from 2015-16 to 2017-18[98]

	Forest Revenue *			Forest Management Expenses *		
	Timber Sales	Other Sources	Total	VNRC	MCDI	Total
Kikole	$ 5,580	$ 861	$ 6,440	$ 1,794	$ 5,829	$ 7,623
Kisangi	$ 5,446	$ 854	$ 6,300	$ 2,830	$ 9,428	$ 12,258
Likawage	$ 15,223	$ 21	$ 15,244	$ 7,072	$ 23,255	$ 30,327
Liwiti	$ 9,101	$ 241	$ 9,342	$ 2,574	$ 6,693	$ 9,266
Machemba	$ 7,089	$ 644	$ 7,733	$ 1,259	$ 16,282	$ 17,541
Mandawa	$ 4,998	$ 246	$ 5,244	$ 2,839	$ 11,063	$ 13,902
Mchakama	$ 2,634	$ 10	$ 2,644	$ 851	$ 34,270	$ 35,121
Nainokwe	$ 4,253	$ 117	$ 4,370	$ 1,984	$ 16,959	$ 18,943
Namatewa	$ -	$ 171	$ 171	$ 98	$ 18,615	$ 18,714
Nanjirinji A	$ 62,500	$ 4,119	$ 66,620	$ 19,468	$ 42,219	$ 61,687
Ngea	$ 5,610	$ 346	$ 5,957	$ 2,417	$ 20,979	$ 23,396
Nyamwage	$ 241	$ 784	$ 1,025	$ 750	$ 4,851	$ 5,601
Sautimoja	$ 1,312	$ 360	$ 1,672	$ 1,386	$ 6,772	$ 8,158
Tawi	$ -	$ 217	$ 217	$ 175	$ 5,551	$ 5,725
Average	**$ 8,856**	**$ 642**	**$ 9,498**	**$ 3,250**	**$ 15,912**	**$ 19,162**
Total	**$ 123,988**	**$ 8,991**	**$ 132,979**	**$ 45,496**	**$ 222,766**	**$ 268,262**

* Forest revenue includes income from sale of timber and other sources associated with the VLFR. Forest expenses include all costs related to the creation and on-going management of the VLFR, but exclude community transfer payments.

5.4 FSC CERTIFICATION LINKAGES AND CONSIDERATIONS APPLICABLE TO SUSTAINABLE CHARCOAL

5.4.1 Linkages

Over the last few decades, sustainable energy production, including charcoal, has gained increased attention on the global arena[99]. The International Panel of Climate Change (IPCC) has concluded that global warming is a fact and that a reduction in greenhouse gas emissions is imperative, and that sustainable development pathways may offer mitigation strategies linked to climate change and contribute to a reduction of vulnerability[100]. Certification standards is one these pathways.

In the Eastern Africa region there are currently few existing energy production alternatives for the fast growing population (see Figure 1). Woodfuel, i.e., firewood and charcoal, is the main source of the population's energy consumption and important bases of income for the population as well. Out of these two traditional sources of biomass energy, charcoal consumption is expected to increase (see Figure 2) while woodfuel is believed to have reached

[98] Frey, G., Charnley, S and Makala, J. 2020. The Costs, Benefits, and Sustainability of Community-based Forest Management and Certification for Community Forest Enterprises in Southeastern Tanzania
[99] Helsing, L. 2011. Certification of sustainable charcoal: Implementing a certification process for Vi Agroforestry farmers, Uppsala
[100] IPCC, (2007). Climate Change 2007: Synthesis Report, Valencia, Spain, p. 61.

a peak[101]. However, the charcoal production in Tanzania and the region is often unregulated or forbidden, and there are few investments made in order to make production more efficient[102]. In addition to this, is the population which is predicted to increase in number which will cause a greater demand for energy from charcoal (Table 4), resulting in increased pressure on the environment including deforestation, forest/land degradation and release of greenhouse gases.

One method/approach that may reduce these negative impacts is deployment of certification standards that embrace SFM practices through CBFM approaches. The certification systems for sustainable forestry management have a long history[103]. This is recognized by stakeholders as the standard Forest Management criteria can be fulfilled through a number of accepted certification schemes such as Forest Stewardship Council (FSC)[21].

Table 4: Projected Household Cooking Energy Demand for Tanzania: 2012 to 2030 (in millions of people)

Energy Source	2012	2018	2020	2025	2030	2030
Wood	32.3	37.1	38.9	43.7	49.0	67.0%
Charcoal	11.3	13.9	14.9	17.7	21	28.7%
Biogas	0.1	0.1	0.1	0.1	0.1	0.1%
Kerosine	1.0	1.2	1.3	1.6	1.9	2.6%
LPG	0.08	0.1	0.1	0.1	0.1	0.1%
Electricity	0.2	0.2	0.3	0.3	0.4	0.5%
Others	0.1	0.1	0.1	0.2	0.2	0.3%
Total	44.9	52.9	55.8	63.9	73.2	100.0%

Source: TaTEDO[104]

It has been stated that charcoal sub-sector has a potential to contribute to sustainable development but that this must not be presupposed[105]. The charcoal sub-sector development is believed to increase as an intended strategy to shift to renewable energy sources, as well as due to population growth and a shift to modern technologies[106]. This increase is the driving

[101] Cunningham, A. German, L., Paumgarten, F., Chikakula, M., Barr, C., Obidzinski, K., van Noordwijk, M.,de Dam, Jungingera, Faaija, Jürgensb, Bestb, Fritschec, (2008). Sustainable trade and management of forest products and services in the COMESA region: an issue Paper, Bogor, Indonesia: Center for International Forestry Research (CIFOR), p.25.
[102] Mugo, F. and Ong, C. (2006). Lessons of eastern Africa's unsustainable charcoal trade. ICRAF Working Paper no. 20. Nairobi, Kenya. World Agroforestry Centre, p.14.
[103] Sophie Higman, S; Mayers, J; Bass, S; Judd, N; Ruth Nussbaum, R. 2005. The Sustainable Forestry Handbook: a practical guide for tropical forest managers on implementing new standards. IIED, Earthscan Publication, London
[104] TaTEDO, 2016. Financing and Scaling Up Alternatives to Unsustainable Charcoal Production and Use. Policy and Fiscal interventions: VPO Stakeholders Workshop on Reducing Unsustainable Charcoal Consumption in Tanzania.
[105] Helsing, L. 2011. Certification of sustainable charcoal: Implementing a certification process for Vi Agroforestry farmers, Uppsala.
[106] Buchholz et al., (2007), p. 6085.

factor for initiatives for a certification process[107]. However, concerns have been lifted that the charcoal sub-sector expansion is moving too rapidly (as energy and income source) and that implementing a certification scheme is necessary before expanding the industry[105]. It has been observed further that the governments in the region are often promoting charcoal production as source of revenue to people and national economy without emphasizing certification systems or the identification of relevant principles and criteria for sustainable charcoal production[49].

In order to have an impact on sustainable development, charcoal will have to ensure that communities and SME are benefiting. These benefits include environmental and agronomic improvements as well as wellbeing improvement and livelihood support, of which are well covered in the certification system[108].

5.4.2 Considerations

According to study on the 'Overview of recent developments in sustainable biomass certification', there are five possible approaches recommended for implementing a charcoal certification system[107] (Figure 35). The approaches differ in degree of optionality and targeted end-users. Certification system for charcoal needs to include certification systems for forest management and chain of custody[107].

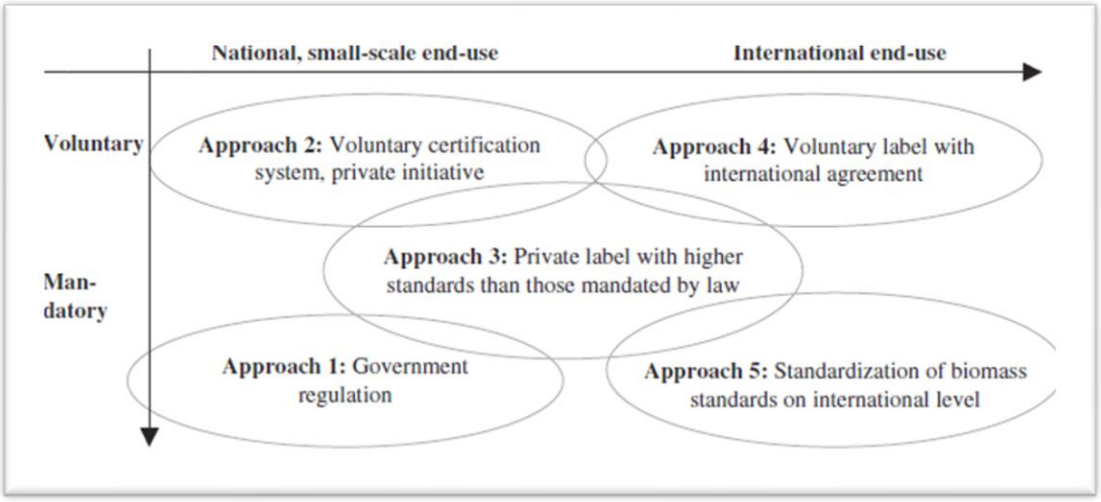

Figure 35: Possible approaches for an implementation of charcoal certification and standards

Approach 1: Government regulation for biomass (minimum) standards. The approach is based on a government legal framework for biomass minimum standards, possibly combined with incentives and disincentives to non-compliant actors. It matches with the promotion and use of Tanzania Bureau of Standards (TBS) standards related to charcoal (e.g., TZS1312:2010 & TZS473:2019), whether community, private sector or public forests, combined with reporting obligation for environmental and social sustainability issues with a view to improve performance over time. TBS could take lead in this process, with support from key actors in the sector.

[107] Dam, Jungingera, Faaija, Jürgensb, Bestb, Fritschec, (2008). Overview of recent developments in sustainable biomass certification, Biomass and energy 32, s. 749-780.
[108] Buchholz, T. Volk, T.A. Luzadis, V. (2007), A participatory systems approach to modelling social, economic, and ecological components of bioenergy, Energy policy 35, p.6085.

Approach 2: Voluntary certification system, bottom-up approach. In this approach, a group of governments' MDAs, companies, and other interested parties voluntarily adopts standards and certification schemes, as e.g., the FSC Group certification schemes could be a starting point. It matches with the promotion and the adoption of FSC-NFSS for all forest management operations, whether community, private sector or public forests, combined with reporting obligation for environmental and social sustainability issues with a view to improve performance over time. The NFSS is setting minimum standards for forest management/harvesting practices for producers/processors/traders of forest produce, including charcoal. Relevant in this approach is to see which player can take the lead in the process. Also, time and interest is needed to introduce and implement standards. Recommend Private sector to take lead in the process with support from government MDAs. Existing instruments or organizations can be used to push the process, e.g., Development partners, NGOs/CSOs, etc are relevant players in this process.

Approach 3: Private label with higher standards than those mandated by law. As part of a voluntary certification scheme, it would be possible to develop an eco-label for those biomass related products that meet higher than those mandated by law. Object of certification is a governmental regulation for biomass minimum standards combined with a set of private standards. Higher standards or special cases are based upon voluntary agreements of biomass producers, e.g., a label from the Tanzania sustainable charcoal production association. The latter would include companies in the chain of custody whose statutes or internal regulations contain several biomass standards and being based upon goodwill. In this approach, there are several institutions that can take care for the certification of biomass: governmental institutions (certification with regard to governmental guidelines) or private certification institutions (governmental guidelines combined with stricter private guidelines). TradeMark East Africa and TBS could work together in this approach.

Approach 4: Voluntary charcoal label combined with international agreement. Promoting international general agreements on well-functioning global markets for charcoal. These agreements could be established through written general guidelines or 'codex of behaviour' for direct actors involved. Voluntary Partnership Agreement (VPA) and Forest Law Enforcement, Governance and Trade (FLEGT) guidelines could be ideal approach to be considered for this approach.

Approach 5: Standardization of charcoal minimum standards on international level. An option to regulate sustainable charcoal standards internationally in a legally binding form would be through adopting a multilateral environmental agreement (MEA) or by integrating the standards into existing international agreements or standards. Further step of refinement of these standards can take place to regional level with regard to objectives and conformation to the regional legal framework. This regulation can go beyond the minimum criteria of the international agreement and concrete instruments can be applied.

It should be noted, however; that during the transition phase towards charcoal certification, complications due to limited resources and knowledge may occur for stakeholders. Therefore, it is suggested that assistance and capacity building need to be provided throughout this phase. To develop a charcoal certification system from already existing certification system, e.g., FSC-NFSS to be adopted by TBS could facilitate the transition. One of the best approaches suggested is to review existing Forest Management Plans (FMPs) and develop new FMPs that provide for charcoal as one of the forest products stated in the forest management objectives in line with the existing FSC-NFSS for Tanzania.

5.5 CERTIFICATION PROCESS:

The products and processes certification schemes cover vary, however the procedure of certification follows the same structure[105]. Certification is a process where a third party evaluates and assures that a product or process is consistent with requirements defined in an existing standard[109]. Helsing (2011)[105] outlines certification aspects to be further considered in the process:

Standards and principles: Certification schemes are constructed around a number of general principles. These are defined in standards which are qualitative and/or quantitative technical requirements for the specific product or production process. When standards have been determined, it is possible to apply for certification. The CB will thereafter determine whether or not the applicant can receive the certificate or label associated with the certification scheme. The CB acts as a third party and should be accredited by an authoritative body to do this.

Validation and verification: The process of monitoring and evaluation within the certification system requires adequate indicators. In addition to this, do suitable control and monitoring procedures as well as documentation systems, increase the reliability of the system. Indicators should be chosen so that they are 'enforceable in practice, easily comprehended and controlled without generating additional costs'.

Stakeholders: A number of stakeholders can be identified in the development of certification scheme (see Annex 5). This high involvement could potentially be explained by a power perspective. By influencing certification processes, stakeholders may gain power and status by a process occurring outside the democratic arena. Key stakeholders in a certification process include: a) Government MDAs; b) Intergovernmental organisations; c) Private Sector/Companies (covering different producers, trade and industry); d) Non-governmental organisations (NGOs)/ Civil Society Organisation (CSOs); and e) International bodies and initiatives, including DPs.

Governments hold a key role in providing policy instruments that support sustainable management and consumption, and certification schemes could be regarded as an incentive for market change. Furthermore, governments may provide the market with finances and public education. *Intergovernmental organisations*, such as the UN, have the potential to work as a neutral forum where other stakeholders may discuss and negotiate. From the *international bodies'* viewpoint, certification could help promote sustainable management and sustainable consumption. For *companies* and producers, certification provides an 'instrument for environmental marketing, risk management and market access' as well as information about origin and raw material, including the production processes. *NGOs/CSOs* contribution to the certification process is mainly through providing information about impacts of products and how these meet standards. Additionally, NGOs/CSOs could provide instruments for sustainable management and they could also put pressure on the industry to change to sustainable products and processes, by promoting implementation of a certification scheme.

There is a substantial risk that financial reasons may be a hindrance for certification for small producers, e.g., communities and tree growers. This however, may be solved by group certification. Group certification can for example include cooperation regarding documentation and contact with certifiers.

---

[109] Lewandowski och Faaij, (2006). Steps towards the development of a certification system for sustainable bioenergy trade, Biomass and Bioenergy 30, pp. 83–104

5.6 FOREST PRODUCE STANDARDS (COMPULSORY AND VOLUNTARY)

Although a number of initiatives are under way, there are limited TBS forest produce national standards in Tanzania. The Ministry of Natural Resources and Tourism (MNRT) through TFS, TBS and partners are taking lead in the process of sectoral standard development, with the aim of introducing standards to control illegal felling of trees so as to enhance responsible forestry[110]. The TBS has already prepared the standards for forest products (e.g., Timber Structure Standards) and that further process to verify and test the standards, and then approval is in progress before they are released for use. The TBS in collaboration with the TFS and partners are working to make sure they set proper standards that will meet international requirements for forest products.

5.7 WHAT IS A STANDARD?

In Tanzania, Tanzania Bureau of Standards (TBS) is mandated to deliver quality products that include standards and quality assurance services by meeting and even exceeding customers' requirements, under the Standards Act No. 2 of 2009. According to the TBS' Handbook[111], a standard is a *set of technical definitions and guidelines, 'how to' instructions for designers, manufacturers, and users, aiming at promoting safety, reliability, productivity and efficiency in almost every industry*. A Tanzania Standard is a document approved by the TBS Board of Directors that provides, for common and repeated use, rules, guidelines or characteristics for products and services and related processes or production methods, aimed at the achievement of the optimum degree of order in a given context. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method. Standards, therefore, help to make sure that products and services are fit for their purpose and are comparable and compatible.

The Bureau has an established national standardization system through which standards are formulated. This system is based on the '*consensus principle*' which works through the use of technical committees. The latter are supervisory committees commonly known as Divisional Standards Committees. These committees draw members from all stakeholder groups including industries, government MDAs, academic/research institutions, business organizations and consumers. The standards cover various sectors of the economy including food and agriculture, chemicals and medical devices, textiles and leather, electro-technical, mechanical and metallurgy engineering, civil engineering and construction, environment, mining and minerals and general standards. ***The standards formulated are voluntary, however; if a standard covers a product that can affect health, safety, the environment or can have significant impact to the national economy, such standard is published as a compulsory standard***.

5.8 PROCESS OF STANDARDS FORMULATION:

Any interested stakeholder, consumer organizations, industrial units, industry-associations, professional bodies, members of Tanzania Bureau of Standards (TBS) and members of its technical committees may submit proposals to TBS for establishing a standard or for revising, amending, or cancelling an established standard by making such request in writing. The work of formulation of standards on any specific subject shall be undertaken when the Divisional Committee concerned is satisfied as a result of its own deliberations or on investigation and consultation with concerned interests that the necessity for standardization has been established. When the subject has been so investigated and the need established, the Divisional Committee concerned shall assign the task of formulating the standard to an

[110] https://www.ippmedia.com/en/business/tfs-set-introduce-standards-curb-wanton-felling-trees
[111] The Tanzania Bureau of Standards: Handbook, 2019.

appropriate Technical Committee or the Director General shall appoint a new Technical Committee for the purpose.

A draft standard prepared and duly approved by a Committee is issued in draft form and widely circulated amongst the various interests concerned for critical review and suggestions for improvement. Special attention is given to multidisciplinary areas such as energy conservation, environmental protection, rural development and safety. The appropriate Technical Committee thereafter finalizes the draft standard giving due consideration to the comments that may be received. After approval by the specific Committee, the draft standard is submitted to TBS Board of Directors for approval as Tanzania Standards for publishing in the National Gazette by the Ministry for Industry and Trade.

5.9 BENEFIT OF STANDARDS:

Standards are a powerful tool for supporting innovation and increasing productivity - Effective standardization promotes forceful competition and enhances profitability. Standards allow a company to: a) Attract and assure customers; b) Demonstrate market leadership; c) Create competitive advantage; d) Develop and maintain best practices; and e) Comply with national legislations.

Standards are a powerful marketing tool - Compliance with Tanzania Standards is an effective means of differentiation in a competitive marketplace. In addition, manufacturing products or supplying services that conform to appropriate standards maximizes their compatibility with those manufactured or offered by others, thereby increasing potential sales and widespread acceptance. As consumers become better informed about their choices, conformity to recognized standards becomes increasingly important.

Standards are a respected badge of quality - Certification marks are earned by businesses whose products and practices consistently prove conformity to relevant standards. These marks (such as the Tanzania Standards Mark of Quality) are easily recognizable and act as badges of quality, safety and performance. Moreover, advantages of using products with TBS Mark include:

- *To the purchaser/consumer*: a) Assures that the product is safe for particular use; b) Reduces price of products due to competition; c) Assures health and safety; d) Increases quality of the product; and e) Protects the environment.
- *To producer/manufacturer*: a) Increases ability to compete with others; b) Brings more customers and increases market access; c) Removes the disturbance of testing products based on customers' requirements; and d) Protection on competition with substandard products.

Standards can strengthen infrastructure - Standardization can deliver measurable benefits when applied within the infrastructure of a company itself. Effective communication along the supply chain and with legislative bodies, clients and customers is good business. Business costs and risks can be minimized, internal processes streamlined and communication improved. Standardization promotes interoperability, providing a competitive edge necessary for effective worldwide trading of products and services.

The TBS Standards Development Work Programme Bulletin[112], reports that, there are nine supervisory technical committees (Divisional Standards Committees). The technical committees relevant to forestry and charcoal sub-sector include:

a) Mechanical Engineering Divisional Standards Committee (MEDC).

MEDC–Cooking stoves and Charcoal

b) Building and Construction Divisional Standards Committee (BCDC).

BCDC–Sawn timber, saw logs and wood based components

BCDC 12–Timber structures

c) Chemicals Divisional Standards Committee (CDC)

CDC19 – Bioenergy

d) Environmental Management Divisional Standards Committee (EMDC)

EMDC –Forestry

The results of the TBS technical standards work are published as Tanzania National Standards. It is the policy of TBS to adopt other regional and international standards when they are found to be applicable to the Tanzanian situation. The list of published Tanzania standards is given in the Catalogue of Tanzania Standards which is available online on TBS website, (http://www.tbs.go.tz/standards/).

5.10 STATUS OF CHARCOAL STANDARDS IN TZ: GAPS, CHALLENGES AND OPPORTUNITIES

The charcoal production and consumption process is disastrous to the environment and hazardous to the health of producers and consumers. It is inevitable to have TBS compulsory standards to cater for the same.

5.10.1 Status

Analysis of the TBS standards' catalogue disclosed that there are two sets of gazetted standards related to charcoal production and consumption/use.

- TZS 473: 2019: Biomass Cook stoves

The domestic biomass cook stove has been a common cooking stove used in Tanzania. The qualities of these products have been varying at large extent, resulting to the variations on their performance. Basing on this fact and issues of protecting the users against inferior products and assisting manufacturers to produce quality products. This Tanzania Standard was revised in 2010 and was useful only for the charcoal as a fuel. This was done for the purpose of ensuring the availability of quality domestic charcoal cooking stoves to the users.

The standard has been revised to take into consideration of all types of biomass fuels, durability, safety and emission issues which were not included in the previous version. This Tanzania Standard is a revision of the first version finalized in 2010. This second edition cancels and replaces the first edition TZS 473: 2010 which has been technically revised (Annex 4). During the preparation of this Tanzania Standard, assistance was derived from the following standards:

[112] TBS-Standards Development Work Programme Bulletin, 2020

a) US 761:2017, Biomass stove specification, published by Uganda Bureau of Standards; and
b) IWA 11:2012, Guidelines for evaluating cook stove performance, published by the International Organization for Standardization (ISO).

The *scope* of this Tanzania standard specifies the classification, technical requirements, performance requirements, safety requirements, test methods and inspection procedure of biomass cook stoves. This standard is applicable to cook stoves using solid biomass in its natural or densified form. The latter is derived from densified biomass, i.e., inter solid biomass made by mechanically compressing or binding small particles biomass or binding thermally into a specific size and shape such as cubes, pressed logs, pellets or briquettes.

According to this standard, the Biomass stoves are classified as W-XX-Y, where:

a) W represent fuel type (for example C for charcoal, B for briquettes, among others);
b) XX represent nominal cooking power of the stove, kW; and
c) Y specifies class in accordance with Table 5.

Table 5: Performance indicators of biomass stoves

Class	Efficiency, η_c %	Emission factor		Safety %	Durability %
		PM2.5 mg/MJ	CO g/MJ		
Class 1	>50	<60	<5	≥95	≥94
Class 2	41 - 50	60 - 90	5 - 8	76 - 94	80 - 93
Class 3	30 - 40	100 - 250	8 - 12	≥75	70 - 79
Class 4	20 - 29	251 - 350	12 - 16	50 - 64	60 - 69

NOTE – The values are determined in accordance with the test methods in the annexes (Annex D for safety and Annex E for durability). These values should be corrected to nearest whole number

Basic requirements of the stove – they must have good finish without burrs (rough or sharp edges) or rust outside. Whereas, the manufacturing requirements must include:

a) The stove or any of its parts may be manufactured using different materials and/or methods.
b) Castings must have a good finish and without cracks, stomata (holes) and sand holes.
c) Weldments must be flat and uniform without perforations and slag stomata.
d) Stamped parts must have a good finish without cracks, wrinkles, flashes and burrs.
e) Sheet metal surfaces and edges shall have a good finish without cracks, wrinkles, bumps and any type of imperfection.
f) Riveted pieces must be firmly attached and the rivets must not be loose and/or skewed. Rivet heads must be smooth and must not protrude.
g) Ceramic parts must have a good finish without cracks and voids.
h) For stoves made of different parts such as ceramic core and a metal cladding, the parts must be firmly assembled.
i) The stove must be have made from metal sheet having a thickness not less than 0.65 mm (22 g).

The performance requirements of this standard include, a) the cooking power must not be less than the stove nominal value when tested in accordance with Annex B; b) the stove must have a minimum efficiency of 20 %, maximum PM2.5 of 350 mg/MJ, maximum CO emission level of 16 g/MJ, minimum safety of 50 % and minimum durability of 60 %.

Whereas, the safety requirements include, a) When the stove is in use, the surface temperature must be less than 50 °C when tested in accordance with Annex D; b) the stove must be stable on a flat surface and must score a minimum of 0.94 when tested in accordance with D.1.2; c) Surfaces which in normal use have to be touched for short periods e.g. handles, the difference between maximum temperature and air temperature must not exceed 38 °C when tested in accordance with Annex D.1.7; d) Flames touching the cooking pot must be concealed and not able to come into contact with hands or clothing; e) Flames or fuel must not protrude from any fuel loading area, storage container, or flow-pipes during use; f) If the cook stove with a chimney fails a test in D.1.8 (a), a shield must be employed to increase safety. The chimney shielding must pass the test in D.1.8 (b); g) for a stove with a chimney, the chimney must exit outside the dwelling, and ensure the smooth flow of exhaust; h) for a stove with a chimney, it must be made from either mild steel plate with minimum thickness of 1.2mm or stainless steel of 0.5 mm or any other equivalent materials and there must be no smoke leakage; and the stove with electrical fans must have electricity safety controls.

In terms of durability requirements, when subjected to the durability test, as specified in Annex E, a) the stove must maintain its basic structure and stability and must not have broken parts, cracks and warping; and b) the cook stove must have a lifespan of at least 2 years under normal use and a warranty of 1 year must be given.

- TZS 1312:2010: Wood charcoal and charcoal briquettes for household use (under review)

This Tanzania Standard aims at addressing the safety related characteristics for wood charcoal used for heating and cooking (Annex 5). During the preparation of this Tanzania Standard, assistance was derived from the following publications:

a) US 765: 2007, Wood charcoal and charcoal briquettes for household use, published by Uganda National Bureau of Standards;
b) SANS 1399: 2008, Wood charcoal and charcoal briquettes for household use, published by South African Bureau of Standards.

The scope of this Tanzania Standard specifies requirements for charcoal that is derived entirely from wood, in lump or briquette form that is intended for household use. Specifically, the wood used to produce charcoal must be such as to be acceptable, and the type of product must be either the charcoal must be in lump form or briquette form, as required (see annex A) or additives and foreign matter. Lump charcoal must be free from additives and foreign matter. In the case of charcoal briquettes, a binder may be used. The binder shall be such as to be acceptable.

The physical requirements include the shape and size of briquettes, and must be such as to be acceptable. For example the sieve analysis

Lump charcoal: When lump charcoal is tested in accordance to clause 5.2, not more than 5 % (by mass) shall be retained on a test sieve of aperture size 50 mm, and the quantity that passes through a test sieve of aperture size 9.5 mm must not exceed 5 % (by mass).

Charcoal briquettes: When charcoal briquettes are tested in accordance with 5.3, the amount that passes through a test sieve of aperture size 9.5 mm must not exceed 2.5 % (by mass).

The Resistance to dropping: When an unopened container of charcoal or charcoal briquettes is tested in accordance to clause 5.4, the proportion of the contents that passes through a test sieve of aperture size 9.5 mm must not exceed 7.5 % (by mass) in the case of lump charcoal, and 5 % (by mass) in the case of charcoal briquettes.

The Chemical requirements include:

a) Moisture content: When determined in accordance with 5.5, the moisture content of charcoal and charcoal briquettes must not, unless otherwise agreed upon (see A.2 (a) of annex A), exceed 10 %.,

b) Volatile matter content: When determined in accordance with 5.7, the volatile matter content of charcoal must not, unless otherwise agreed upon (see A.2(b) of annex A), exceed 20 % in the case of lump charcoal, and 27 % in the case of charcoal briquettes;

c) Ash content: When determined in accordance with 5.8, the ash content of charcoal must not, unless otherwise agreed upon (see A.2(c) of annex A), exceed 5 % in the case of lump charcoal, and 13 % in the case of charcoal briquettes.

d) Fixed carbon content: when determined in accordance with 5.9, the fixed carbon content of charcoal must, unless otherwise agreed upon (see A.2(d) of annex A), be at least 75 % in the case of lump charcoal, and 60 % in the case of charcoal briquettes.

This Tanzania Standard requires the following in terms of 'Packing and marking'

a) Packing: Lump charcoal and charcoal briquettes must be packed and sealed (i) in multi-wall paper bags or in corrugated board containers, as required (see A.1(b) of annex A); and ii) in units of 2 kg, 3 kg, 4 kg, 5 kg, 10 kg or 25 kg, as required (see A.1(c) of annex A).

Marking: Each container must be legibly and indelibly marked with the following information:

i) the manufacturer's name or trade name or trade mark;

ii) the description of the contents of the container, i.e. 'Lump charcoal' or 'Charcoal briquettes';

iii) the batch identification or the date of packing (which may be in code);

iv) the net mass of the contents; and

iv) any additional information, as required (see A.1(d) of annex A).

It should be noted that the TZS 1312:2010 is under review. Basically, the process for review has been concluded, waiting for the approval by the TBS Board of Directors. There could be an opportunity by TFCG to share comments with the technical committee before approval.

5.11 GAPS, CHALLENGES AND OPPORTUNITIES

The supply and demand interventions are important to ensure that there is sustainable biomass production for charcoal. Sustainability standards both certification and TBS standards are important. However, there are a number of challenges to achieve the same: a) Inadequate capacity of MNRT to enforce laws for SFM practices; b) TBS standards are sold hindering application and enforcement; c) Limited TBS capacity to enforce compliance with compulsory standards; d) Testing fess, for instance, cook stoves is prohibitive to innovators who have no capital, hence slowing down innovation and adoption of technology; and the TBS Act is not clear on who is responsible for enforcement.

In addition, there are other challenges including low public awareness on using certified products, which hinders the Bureau's efforts to eradicate sub-standard products from the market, the Bureau is doing its best by providing education in various media outlets like radios, televisions, newspapers, magazines and through various exhibitions and campaigns to make

sure that each and every individual is reached out. As one of its initiatives, the Bureau has established new zonal offices to make sure that people are reached more easily. Also, community radios are used in various regions for awareness programmes. The Bureau also has a HOTLINE (0800110827) through which the general public can call for free to report anything suspicious.

Moreover, it is observed and recommended that making standards as a source of revenue for TBS discourages voluntary as well as compulsory compliance. Compulsory standards should be public documents (free access). However, in addressing the issue of inadequate capacity of MNRT to enforce laws for SFM practices and limited TBS capacity to enforce compliance with compulsory standards, it is recommended to develop a special programme for a) government (MNRT/TFS, TBS) on law enforcement, e.g., Forest Act and its regulations (2002), and TBS compulsory standards enforcement; b) the general public about compliance with compulsory standards.

6) Awareness and willingness of stakeholders about charcoal certification and standards

6.1 Relevant stakeholders' analysis: their influence and role in charcoal certification and standards.

The list of potential stakeholders that will drive the charcoal certification and standard development process (Annex 5).

6.2 Perceptions/opinion, attitudes and engagement of stakeholders and government in Charcoal certification and standards

The stakeholders from government MDAs, Local government's representatives, development partners, NGOs/CSOs and private sector were asked what they do related to FC to understand their perceptions/opinion and attitudes about certification and standards (See Annex 2). Most of the responses (see Figure 27) showed that stakeholders were aware of a) certification and standards and they were involved in the implementation of SFM practices, and hence contributing to improvement of forests economic return and livelihoods; b) Marketing of forest products that increase sales and prices of these products; c) Good governance which aim at promoting public awareness about the need for SFM; and d) Self-esteem promotion, as part of those contributing to forest conservation efforts. These responses indicate that there is a positive perception towards certification and standards among government MDAs, NGOs/CSOs and private sector in the country and they are aware about forest certification schemes.

And that certification and standards provide various advantages that attract or would attract more participation of stakeholders in sustainability practices. Stakeholders acknowledged the fact that the certification and standards give assurance that forest management activities are environmentally appropriate (i.e. protecting and maintaining natural communities and high conservation value forests), socially beneficial and economically viable (see Figure 33). The stakeholders; however, did not appreciate the voluntary regulatory role certification and standards have in contributing to responsible management and use of forest resources. Alternatively, they recommended the need for complimentary compulsory standards from TBS (Figure 35).

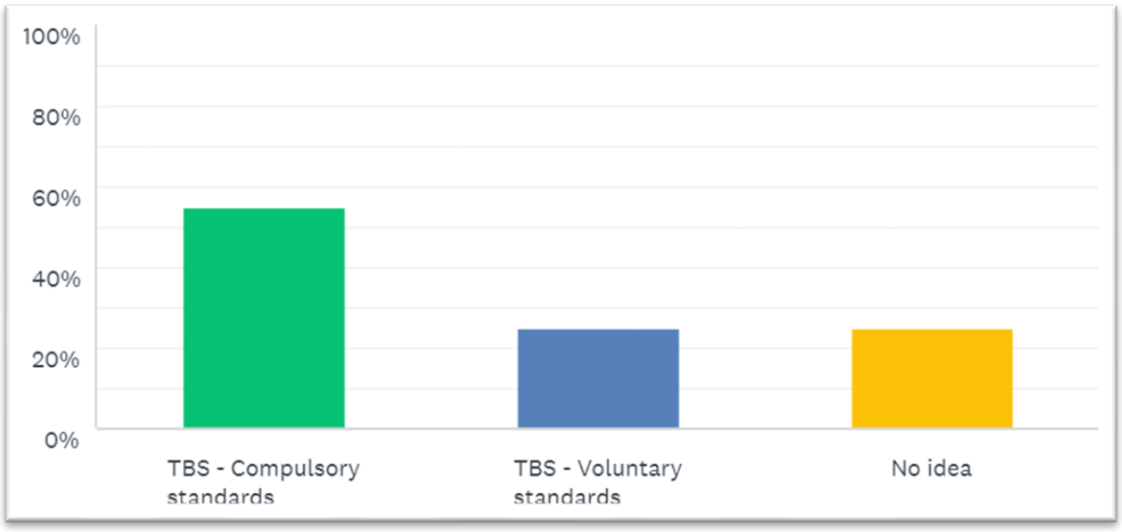

Figure 35: Complementary standards to certification. Source: Own survey data

In many cases, the most immediate benefit of certification for forest managers is the streamlining of forest operations due to improvements in efficiency and greater control of production processes[37]. Although experience has shown that certified forest products do not always obtain higher prices compared with uncertified products, certification and standards may be essential for maintaining access to some markets and a valuable tool for positioning products in the marketplace (see Figure 31). Certification and standard can help boost the public image of companies – both those that pursue certification in their own operations, and those that purchase only certified products (see Figure 33).

Stakeholders such as forest owners, entrepreneurs, associations and timber companies may voluntarily decide to apply for certification. They may do so in expectation of better prices for their products, to maintain or increase access to markets for their products, to improve their public image, and to achieve social and environmental goals (see Figure 33). Forest certification is a market mechanism to promote the sustainable use and management of forests and to identify sustainably produced products for the consumer. Consumers concerned about social and environmental issues are expected to give preference to products carrying such a label, and they may also be prepared to pay higher prices for them. Forest managers may be motivated to pursue certification for various reasons, ultimately leading to improvements in the quality of forest management and an increase in the extent of well-managed forests (see Figure 33). Certification and standards provide players with a way of measuring their own activities' performance, with the reward being a certificate to prove that they are maintaining sustainable levels of forest management.

7) Conclusions

This report generates evidence-based recommendations about how charcoal standards and/or certification could contribute to improving the economic, environmental and health outcomes of the charcoal value chain.

Charcoal production and trade in Tanzania is informal and unregulated resulting to inequity in income distribution, environmental and health impacts along the value chain, among other challenges. Charcoal certification and standards could serve as an incentive to communities to practice sustainable forest management in their forests for sustainable development. In practice, however; there is inadequate sustainable forest management in Tanzania that provide for sustainable charcoal, which could determine the criteria and indicators for sustainable management of forests for biomass production. Remarkably, the on-going Forest Management (FM) certificates, i.e., FSC-certified forests by MCDI in the communities of Rufiji, Kilwa, Liwale and Tunduru, and New Forests Company plantations in Kilolo district, and Green Resources Ltd in Mufindi district are exceptional. Nevertheless, a chain of custody (CoC) certification system needs to be in place to prove the sustainability of forest produce (timber, charcoal, etc) from the source to the end user. It should be noted that an establishment of the forest certification system with chain of custody is an expensive undertaking not only to establish, but also to keep up, though at least some premium is paid by buyers for the sourced forest produce.

Tanzania with support, primarily from WWF Tanzania, has developed the FSC standard for the country. The Tanzania national forest stewardship standard (NFSS) has been approved by FSC International and now plans are underway to be adopted by the Tanzania Bureau of Standards (TBS). With the FSC - NFSS in place, there is an avenue to practice SFM practices by abiding to the criteria and indicators prescribed in the NFSS. This rigorous certification scheme requires third party auditing and is based on ten principles covering social, economic, ecological and cultural issues; and includes managerial aspects as well as environmental and social requirements. The certification system will add value to the charcoal production process, and thus enhance the sustainability of the initiative.

There is, however; a large amount of illegal charcoal entering the markets, which means that certified charcoal, cannot compete in the market. The lack of market knowledge and relationships is one of the factors contributing to this unfair competition. The market for FSC-certified timber, charcoal is currently small in Tanzania and customers are scarce. There is a good market for certified charcoal from countries in Europe, e.g., UK and German, but these countries also require a very high quality that is not currently available in country. Yet, the country does not allow exportation of lump charcoal.

Due to lack of market knowledge, there is a need for market information systems for FSC-certified forest products/services in Tanzania. This would help to get a reliable source of information for those markets which recognise and promote responsible forest management and reward it accordingly. This information is important to all interested and affected parties and case studies would provide good marketing material. Despite the importance of communicating such information to stakeholders, systems to cater for this are not in place in the country. This means that there is no market information system for FSC-certified forest products/services in the country that can inform producers and consumer groups of the economic, environmental and social benefits certification brings. In the international markets where certified forest products have reliable markets, there are still limited marketing information systems linking the owners and primary producers and the traders in these markets. This also inhibits the development of such markets in Tanzania and the region.

It should be noted that, what underpinning the illegal charcoal, among others, is that the charcoal industry is largely unregulated and hence informal. This often means that rural communities do not reap the full benefits of the industry because of unethical trading practices. With regard to the coverage of the charcoal sub-sector in forest policies, the situation is not much better. National forest policies tend to emphasize forest use for timber production, but not for charcoal production. The sub-sector is informal, almost totally unregulated, and open to any and all who wish to participate in it, characterized by very weak governance and weak law enforcement, and it is almost a free access to wood resources resulting into forest degradation. Generally, raw materials for charcoal production are illegally and unsustainably harvested, mainly from miombo woodlands without payments being made for the raw material, and licenses and levies largely evaded. The production is associated with inefficient, ineffective kilns and utilization technologies. Significant changes need to be introduced to regularize and legalize this sub-sector.

Charcoal production is therefore denied the comprehensive treatment it deserves in both the forestry and energy sectors. Where policies exist they often lack coherence. For example, although there are policies/legislation in Tanzania promoting sustainable farm forestry/woodlots for charcoal production and improved charcoal stoves, lump charcoal export is illegal[113].

A perception that charcoal production is a poor man's business, considered 'dirty' and economically unattractive. Charcoal production is a business that forces poor people to sacrifice long-term considerations (health, environment, livelihood security, etc.) for scanty short-term income. The poor are also powerless in the sense that they cannot defend their vital interests *vis-à-vis* more powerful stakeholders of the charcoal supply chain. They are not organized in most cases, and thus avail of little, if any, bargaining power, and virtually no access to investment capital.

On the other hand, Tanzania has a unique opportunity to convert its large biomass resource base potential into a sustainable and renewable energy asset through the deployment of certification standards. Good policy and legal framework is a key to unlocking and exploring this opportunity. Forest certification system, a) is voluntary and an important tool to certify that forests are managed sustainably; b) requirements seem to be very close to legislation; c) is an important business to business tool; d) could be an innovative tool that can serve many new services, such as: ecosystem services, e.g., CO_2; reporting on SDG's; UNFF goals, etc.

Reducing unsustainable charcoal production and use is one of the greatest challenges of our time, and it is clear that wood charcoal will continue to be the leading fuel in urban areas for decades to come. Thus, government and key stakeholders need to promote and facilitate transition from current reliance on unsustainable charcoal, to a mixture of clean cooking fuels including sustainable certified charcoal. Such transition should enhance the empowerment of the village communities and promote industrial and economic development in the informal economy, transforming it to formal economy. Success will require strong leadership, commitment, close participation and collaboration from national and local governments, private sectors, NGOs/CSOs, Development Partners, etc in the development and implementation of charcoal certification and standards.

[113] Executive Order No. 3 of 2002 of the Export Control (Prohibition of Exports)

8) Recommendations

The social and ecological sustainability of natural resources and their capacity to support human communities is actually dependent on a range of institutions society uses over time. Sustainability; however, requires building compatibility between social-ecological systems to enhance adaptive capacity. There is a need for a broader, more inclusive vision to create mechanisms that would allow interaction between various stakeholder groups and sectors that influence forests and the forest-dependent poor. The FSC under its forest certification scheme, being a stakeholders' organisation is suggested as the best suited mechanism to enhance SFM for the benefit of both present and future generations with respect to forest resources use, including charcoal, in improving rural livelihoods of forest-dependent people and forest ecosystems. Forest certification being a voluntary set of standards, and presence of national standards (NFSS), is strongly recommended. However, they should be implemented or work hand-in-hand with TBS compulsory standards in the process of enhancing sustainable charcoal production in Tanzania.

8.1 POLICY AND PRACTICE FOR SUSTAINABLE CHARCOAL VALUE CHAIN

Policy issues: In Tanzania and other countries that were reviewed, forest policies emphasize forest use for timber production, and energy policies focus on fossil fuels. Where policies exist they often lack coherence. In Tanzania, the forest policy, 1998 opened the window for community participation in forest co-management. It inspired the Forest Act 2002, which provides the legal provisions for co-management and the establishment of Village Land Forest Reserves (VLFRs). The VLFRs are established on village lands through developing a land-use plan. The plan is utilized as a tool to ensure local communities derive socio-economic development through sustainable utilization of forest resources.

The Village Land Act 1999, in part II, which outlines the fundamental principles of the land policy, under article *f* of section 3, states that 'land is to be used productively and that any such use must comply with principles of sustainable development'. At the same time, the Act, under part IV, section 14, requires any forest area, in order to be recognized, must be lawfully declared to be a forest reserve. These statements in the land policy and the Act have been interpreted by many to lower the status of forests on village lands that are not in village forest reserves. It is perceived by many that forests on village lands, outside reserves, are deemed to be unproductive lands and can lead to appropriation of that land. As a result, villagers feel encouraged to clear these forested lands for agricultural development as a way of showing that they are being used productively, thereby confirming their right to occupy them. Without legislation that specifically recognizes sustainable forest management as a productive land use, villagers will prefer to clear forests and cultivate or construct buildings on the land as a way of claiming their rights of occupancy over these lands.

There are no specific or clear policy and legal framework for biomass energy in Tanzania. Even the existing policies such as the National Energy Policy and National Forest Policies are silent on how can sustainable charcoal production (SCP) initiatives be initiated and promoted in the country. Even though the National Biomass Energy Strategy was developed back in 2015 in Tanzania, corresponding action plans have not been prepared to date, and therefore the strategy has not been put into practices since then. The Forest Policy, Act and Regulations (*GN #417*) aim to control charcoal production and trade in the country. However, many charcoal actors along the chain have little knowledge on laws and regulations regarding charcoal production and trade. The Forest Policy, Energy Policy, Environmental Policy and Land Policy and LATRA regulations contradict on issues of sustainable charcoal production and trade. Thus, clear, integrated policies are needed to avoid such contradictions and to enable the development of urgently required, coordinated approaches to sustainable charcoal

production deploying certification and standards. National 'energy, forest and environment' policies should be harmonized to foster inter-institutional collaboration, the transfer of technology and capacity building. In addition, a coherent certified wood biomass and charcoal production action plan coordinated by a central institution could be developed and embedded in to the *National Forest Strategy*.

The role of charcoal in land degradation and deforestation: The impact of charcoal production on forests is significant for several reasons. The charcoal making process is resource intensive as the harvesting of the raw material is often concentrated in small areas over a short period of time. Charcoal producers often target specific species, and the concentrated exploitation of a few species can adversely affect biodiversity. This represents a threat to the future of the resource, especially in situations where there is high demand and a lack of sustainable forest management practices. To halt this situation, FSC certification and TBS standards are inevitable in the process of charcoal production.

Environmental and climate issues: A significant portion of wood used for charcoal production is harvested unsustainably, with emissions of greenhouse gases to the atmosphere. On the other hand, if the wood for charcoal production is grown and harvested sustainably, charcoal has the potential to help mitigate climate change. Charcoal production results in the formation of by-products that are disastrous to the environment (e.g., methane) and health (e.g., Carbon monoxide, particulate matter) of the people. These by-products of kilns and pits are usually released into the atmosphere and pose an air pollution problem. The local impacts of this pollution may be reduced by establishing efficient and effective kilns TBS standards, the use of cleaner, more efficient technologies in charcoal production could also have huge health benefits.

Preferably, of all the models reviewed, the TTCS model implemented by TFCG/MJUMITA complemented with certification and standards during charcoal production process is recommended to be deployed for the charcoal certification. Additionally, the TFCG team with key partners should plan to visit Namibia[114] to learn on how certified charcoal is produced.

There is also a need for the Forest Law Enforcement, Governance and Trade (FLEGT) - system to be used by Tanzanian charcoal trading. The aim is to improve governance and reduce illegal logging by strengthening legal forest management, improving governance and encouraging trade in legally sourced charcoal. The ultimate aim of the FLEGT is to support country's and stakeholders' efforts to combat illegal logging by preventing illegal timber from entering the EU market through bilateral trade agreements called Voluntary Partnership Agreements (VPA). The FLEGT and VPA are tools to operationalize and enforce certification standards compliance.

Sustainable charcoal production, i.e., certified charcoal needs a balance between the supply and demand to be in place. While the deployment of FSC-NFSS will improve the sustainable biomass production on the supply side; on the demand side, stakeholders should explore and identify appropriate charcoal kiln technologies, that charcoal trade would be licensed/certified to encourage sustainable production, that improved stoves and charcoal kiln programmes would be expanded and that the ***use of these charcoal kilns would be mandatory for producers.*** Since there exists cook stove standards (TZS1312:2010), strongly recommended that TBS should develop kiln specification standards. Production done sustainably will contribute to making charcoal trade formal and taxable and therefore provide the government

[114] http://www.xinhuanet.com/english/2020-06/09/c_139126425.htm

with a source of revenue. Making it a formal business allows a discussion concerning charcoal production within a policy framework. It will be required of producers that raw materials for charcoal production originate from a source that is contributing to a sustainable environment, i.e., certified source. Notably, permits will not be issued until certain pre-conditions are met by the producers.

Woodfuel need explicit recognition and a key place in the policies and strategies of Tanzania, and that a policy and legal framework is required to guide the sustainable development and growth of this sub-sector. Significant changes need to be introduced to make wood based energy more modern, more efficient, sustainable, and cleaner in both production and use. Need to be formalized into the economy so as to continue as an important source of economic livelihoods to thousands of Tanzanians.

It is obvious that the use of more efficient improved cook stoves and alternative energy sources for cooking and heating would serve our forests. Additionally, development of integrated forest management plans that involve all key players in order to optimize economic, environmental, social and cultural values of forests would be extremely important to mobilize collective responsibility. Improved methods for charcoal processing should be used in order to rationalize exploitation of resources. But also, charcoal packaging and labeling should be standardized to enable control of revenue leakages through the enforcement of the TZS1312:2010 TBS standards. Furthermore, charcoal trading should be streamlined into formal charcoal market centers to promote revenue collection and avoid unnecessary burden to consumers.

To achieve formal sustainable charcoal production, certification and standards will enhance compliance. However, government leadership and commitment is crucial, including: a) Political will from the government and support from the highest levels of the government; b) Bringing the charcoal sector to the top of the national development agenda; c) Government needs to adopt strong governance and effective regulatory frameworks and invest in individual and institutional capacity building at all levels; d) Establish a Biomass Energy Agency (BEA) for coordination, management, and promoting the sub-sector and ensure sustainability of supply and use; g) Establish National Sustainable Charcoal Production (SCP) Association that could work closely with the BEA. Presently, there is very limited development financing in the charcoal sector, though has a revenue of more than USD 1 billion per year. The Environmental Trust Fund, Renewable Energy Fund and Tanzania Forest Fund (TaFF) could be used here to co-finance initial capital for equipment and technology development.

To achieve a vibrant and certified charcoal programme, fiscal interventions recommended would include, but not limited to, a) regulatory and tax framework are key to successful sustainable charcoal production, and that costs of charcoal need to reflect its true value from raw materials to taxes; b) to curb unsustainable charcoal, it will be necessary to introduce charcoal taxation system where sustainably produced and biomass based alternatives are less taxed; c) establish fixed certified charcoal market trading centers (depots) in rural and urban areas - it will be easier to collect and verify tax compliance; d) establish charcoal development, monitoring and control agency/unit to oversees charcoal development, its flows, collect taxes with adequate funding and manpower; e) establish a sustainable charcoal and alternatives fund or levy, from licenses on charcoal producers; and f) re-invest collected fund in promotion of sustainable charcoal production and use including forest management, kiln technology development and improved cook stoves.

8.2 CERTIFICATION AND STANDARDS OPTIONS FOR CHARCOAL IN TANZANIA

As a demand-driven system, certification and standards rely to a large extent, and by concept, on the consumption of products. The more certified products are sold and consumed, the higher the interest for market partners to demand more FSC certified and TBS licensed materials with the effect of more certified forest area and products and compliance with TBS standards. Based on a review of the literature and policies, and experiences in other countries and in other value chains in Tanzania, charcoal certification and standards implementation process should consider:

1) Group certification scheme – learn from MCDI's experience with certified timber, etc. But also their experience with NFSS for timber and the group scheme as well. TFCG to initiate the certification process, applying stepwise or modular approach.

2) TFCG model be linked up with the Namibia for learning and connecting with market

3) NFSS be complemented with TBS compulsory standards, i.e., TBS to adopt FSC-NFSS in the first place, and then develop specific standards for kiln specification, to include charcoal production process, quality/health aspects, etc. TFCG to make formal application to TBS for the development of kiln specification standards. FBD/WWF to liaise with TBS about NFSS adoption.

4) Revise existing FMPs and develop new ones to provide for charcoal as one of the products. For plantation - utilize all the biomass from pruning, non-commercial thinning, and for natural forests – use all biomass available after harvesting logs (crown, branches, twigs, etc), sawmilling processes, etc as raw materials for charcoal production.

5) In collaboration with key partners (TFS, Weights & Measures Agency, LATRA, TAREA/SNV, NEMC, etc), operationalize the TZS1312:2020 and TZS473:2019 TBS standards

6) Develop and launch charcoal certification and standards sensitization and awareness campaign. This should include policy reform to create enabling environment for the promotion of SFM and SCP in the VLFRs and state forest reserves. MJUMITA to take lead, in collaboration with partners (TFCG, FBD/TFS, TBS, LGAs, WWF, Soil Association, AFF, TradeMark East Africa, etc)

7) Revise and Update the FSC-NFSS to accommodate sustainable charcoal production indicators. The Standard Development Group to take lead, in collaboration with partners (TFCG, WWF, FSC Africa, etc)

8.3 FURTHER RESEARCH ON CHARCOAL CERTIFICATION AND STANDARDS (FOR YEAR 2)

It is recommended to conduct an 'Applied Research' during Year 2 to establish facts that will respond to specific challenges of our time with regard to certified charcoal production from VLFRs under CBFM approach.

Proposed title: Implementing CBFM certification process for Tanzania

Main objective:

To explore, understand and quantify the various advantages, disadvantages and lessons learned of existing '***certified***' charcoal and ecosystem services, e.g., carbon, projects in the region and around the globe.

Specific objectives:

- To analysis of the Strength, Weakness, Opportunities and Challenges (SWOC) of the sub-sector

- To understand the sensitivities around what makes investment into the sub-sector socially, economically and environmentally feasible
    - Certification standards principles, criteria and indicators, and processes
- To develop recommendations on what is required to make the sub-sector more socially, economically and environmentally attractive
    - Opportunities and challenges
    - Institutional and legal framework, i.e., enabling environmental (policy and regulation)

Annexes

Annex 1: Key list of documents reviewed

1	**Policies:**
	National Environmental Policy, 1997
	National Agriculture Policy, 2013
	National Forest Policy, 1998
	National Land Policy, 1995
	National Health Policy, 2007
	Transportatation Policy
	National Energy Policy, 2003
	Sustainable Industrial Development Policy, 1996
	National Population Policy, 2006
	National Human Settlements Development Policy, 2000
2	**Other documents and literature:**
	TFCG Project documents
	Transforming Tanzania Charcoal Sector (TTCS)
	Charcoal manuals
	Annual reports
	CoForEST project
	TBS compulsory standards
	MNRT - Charcoal Taskforce report
	FSC - National Forest Stewardship Standards for Tanzania Mainland
	PEFC Standards
	The forest certification handbook
	Forest certification in Africa: achievements, challenges and opportunities
	Introduction to Forest Certification Schemes. Tropical Forestry Handbook
	Confronting Sustainability: Forest Certification in Developing and Transitioning Countries
	Biomass Energy Strategy (BEST) Tanzania
	Related journal papers and books, etc