Promoting Sustainable Charcoal Production and Marketing in Kenya: A Comparative Analysis through Participatory Market Mapping

Prepared for PISCES by Practical Action Consulting Eastern Africa

FINAL REPORT

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<tr>
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<th>Full Form</th>
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<tbody>
<tr>
<td>ACTS</td>
<td>African Centre for Technology Studies</td>
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<tr>
<td>CARPA</td>
<td>Christian Agricultural and Related Professionals Association</td>
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<tr>
<td>CBO</td>
<td>Community Based Organisation</td>
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<td>CFA</td>
<td>Community Forest Association</td>
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<td>CODCA</td>
<td>Community Driven Commercial Afforestation</td>
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<td>Department for International Development</td>
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<td>Policy Innovation Systems for Clean Energy Security</td>
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<td>PMM</td>
<td>Participatory Market Mapping</td>
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<td>PMSD</td>
<td>Participatory Market Systems Development</td>
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<td>RAID</td>
<td>Rachar Agroforestry Initiative for Development</td>
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<td>Research Project Consortium</td>
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<td>Value Chain</td>
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Executive Summary

Policy Innovation Systems for Clean Energy Security (PISCES) is a five-year research project funded by the Department for International Development of the United Kingdom (UK). Project implementation started in July 2007 and will end in June 2012. The purpose of the project is to increase available knowledge and understanding of policy relevant trade-offs between energy, food and water security for livelihoods in relation to bioenergy. PISCES is implemented by a Research Project Consortium (RPC) whose members include African Centre for Technology Studies (ACTS, lead) Kenya; Practical Action Consulting (PAC) UK, Eastern Africa, and Sri Lanka; University of Dar es Salaam (UDSM), Tanzania; M.S. Swaminathan Research Foundation (MSSRF), India; University of Edinburgh (UoE), UK. Bioenergy has become one of the most dynamic and rapidly growing sub-sectors of the energy economy internationally, and, in the form of biofuels, has attracted the interest of investors and policy makers worldwide. For rural communities, in the form of biomass, bioenergy remains the foundation of the most basic energy access.

National energy consumption statistics for Kenya show biomass to be the most widely used energy source at about 68%, followed by petroleum products at 22%, electricity 9% and other forms of energy at 1%. Charcoal is used by 82% of urban and 34% of rural households in Kenya. The charcoal industry employs over 700,000 people who support over two million dependants. Despite charcoal being an important energy source, its production and transportation still faces numerous challenges, and its true value is not captured in the national economic statistics. The charcoal industry has continued to have a low profile, and this has made it difficult to access funds for investing in product development, a crucial first step towards commercialisation.

The Energy Act and Policy, the Forest Act and Draft Forest Policy recognize charcoal as an important source of energy and make provisions for its sustainable production, commercialization and utilization. In addition, the Ministry of Forestry and Wildlife has developed and gazetted subsidiary charcoal legislation to ensure these policies are acted upon. Despite all efforts made so far, the provisions of these policies and legislation are not known to the key value chain actors. The result is that all actors continue to operate just as they did before the policies and legislation were enacted.

Effective commercialisation of the charcoal industry requires that gaps along the charcoal value chain be identified and interventions are made to address them. Generating reliable information to feed into policy review and decision making towards the improvement of the industry (such as identifying areas that need attention along the charcoal value chain and developing best practice) are important ways of contributing to the enhancement of the charcoal value chain. Kenya looks forward to developing all forms of energy needed to power Vision 2030 and charcoal is a key energy resource; both in complementing efforts to improve livelihoods and for the national economy. Elevating the charcoal sub-sector to becoming a vital income earner in the country does require the promotion of suitable models for sustainable charcoal production and marketing.

Practical Action Consulting (PAC) in East Africa organised a two-day workshop through PISCES to facilitate the Participatory Market Mapping (PMM) of charcoal production and marketing in Kenya. The workshop compared two case studies on charcoal production and marketing in Kitui and Bondo districts, located in Eastern and Nyanza provinces of Kenya respectively, with the following objectives:

(a) Facilitate sharing and cross learning between charcoal value chain actors in Kitui and Bondo

(b) Develop skills in value chain mapping to improve understanding of opportunities and constraints in charcoal value chain

(c) Create networks and linkages among charcoal value chain actors to form a strong base for collaboration

(d) Identify strategies for strengthening charcoal value chains in the two districts
The workshop applied a PMM approach, which is one of the tools used in Participatory Market Systems Development (PMSD), a conceptual framework developed by Practical Action to analyse markets. The PMM exercise also drew upon findings from field research to enable the development of a strategy to strengthen the charcoal value chain in Kitui and Bondo. Workshop activities included the presentation of 2 case studies on charcoal production and marketing in Kitui and Bondo, a field visit to Musaki Enterprises in Kitengela to learn about sustainable charcoal production and marketing; participatory market mapping exercises and a review of how knowledge is acquired and shared. This was followed by brainstorming sessions to identify gaps and discuss ways in which to improve sustainable charcoal production and marketing in Bondo and Kitui districts and to develop a strategy to address some of these gaps.

Workshop participants, comprising 29 men and women from 9 different institutions, included charcoal producers, transporters, and retailers from Kitui and Bondo districts; representatives from the Ministries of Energy, Environment and Education, Provincial Administration, Kenya Forest Working Group (KFWG); PISCES partners and collaborators. Three models of charcoal production, transportation and marketing were reviewed:

1] The Bondo CODCA Group Model
2] The Kitui Group Model
3] The Kitengela Individual Model

After 2 days of deliberations, the participants concluded that:

- Charcoal is very important for income, employment, energy supply and the national economy. Because of the perceived illegal status of the product, very few institutions are willing to provide credit for the Value Chain (VC) actors, and there is a need to support sustainable production of charcoal as a legal and acceptable business like any other.
- The Energy and Forestry Policies and Acts have legalized its sustainable production but the key actors are not aware of this.
- Charcoal is currently produced unsustainably from naturally growing trees while it can be produced sustainably from trees specifically planted for this purpose. There is a need to change farmers’ attitudes to support tree planting for charcoal production and to support and contribute to current government efforts to implement charcoal regulations, through collaborative activities by stakeholders including line ministries, Non Governmental Organizations (NGOs), communities and local associations, among others.
- Conversion from wood to charcoal is currently very inefficient, estimated at 10% efficiency instead of the potential 30-45%. Use of improved kilns and further research on the appropriateness of charcoal production from acacia in Kitui are ways in which efficiency and sustainability can be increased.
- Many players are involved in regulation of the charcoal industry but their roles are not clear. There is need to harmonise the conflicting roles of Local Authorities (LAs) and government in the regulation of charcoal production, marketing and transportation, among others.
- The sector has many unchecked official taxes as well as money extracted in bribes that lead to low profitability, hence making it unattractive to many potential investors.

Participants recommended the initiation of a process to reverse these negatives impacts through:

- Creation of sufficient awareness among all key VC actors about the existing policy environment.
• Formation of strong Charcoal Associations to amplify the voice of the VC actors and enhance efficiency in its trade. The 2 groups were encouraged to start with the resources which they have and expand with time.

• Mobilisation of resources for investment in the sub-sector especially in the production of sufficient wood through sustainable management of wood resources.

• Reduction of the legal taxes and the number of regulators.

• Elimination of illegal taxes.
1 Introduction

1.1 Overview of PISCES and PMM Workshop

Policy Innovation Systems for Clean Energy Security (PISCES) is a five-year research project funded by the Department for International Development (DfID) of the United Kingdom (UK). Project implementation started in July 2007 and will end in June 2012. The purpose of the project is to increase available knowledge and understanding of policy relevant trade-offs between energy, food and water security for livelihoods in relation to bioenergy.

PISCES operates under the following principles:

- Livelihoods are contingent on Food, Water and Energy Security
- Bioenergy is the pivotal issue intersecting these issues
- It is vital to look at Bioenergy holistically
- There is a need for better data and an improved framework for decision making on Bioenergy issues

PISCES defines Bioenergy as follows:

- **Bioresources**: Natural biomass such as wood and charcoal
- **Bioresidues**: Agricultural residues such as maize stalks/cobs, bagasse, sawdust, rice husks & animal residues such as livestock manure
- **Biofuels**: Crops grown for fuel (biofuel crops) such as Jatropha, Croton and Sweet Sorghum grown specifically to produce biodiesel and bioethanol

In addition, the following Research Questions are being addressed under the PISCES Energy Access and Delivery Theme:

1. How can poor people’s access to bioenergy be created and sustained alongside access to food and water?
2. What models of financing, incentives and capacity development can create, sustain and scale-up access to bioenergy for poor communities?
3. How can sustainable supply and value chains be enabled and regulated for delivery of bioenergy to poor communities while minimizing negative impacts on food and water resources?
4. How can policy and institutional set-ups strike a balance between community participation and innovative leadership in bioenergy service provision development?
5. What are the trade-offs and impacts between centralized versus decentralized bioenergy service delivery in providing sustainable improved energy access for the poor?

1.2 The PMM Workshop, Objectives, Methodology, Participants and Expectations

Sustainable charcoal production and marketing is of critical importance in providing energy, assisting poor producers to earn sustainable livelihoods, while at the same time protecting the environment. A case study on charcoal production and marketing by farmers in Bondo district was produced under the FAO case study series on small-scale bioenergy initiatives. Another study was carried out to assess the impact of charcoal production and marketing on livelihoods of small-scale producers in Kitui district.

PISCES organized a two-day workshop on Participatory Market Mapping (PMM) of Charcoal Production and Marketing to generate information to answer question three, i.e., “How can sustainable
supply and value chain be enabled and regulated for delivery of Bioenergy to poor communities while minimizing negative impacts on food and water resources?"

The workshop provided an opportunity to compare the two case studies and draw together lessons on how sustainable charcoal production and marketing can be used to create sustainable livelihoods and at the same time provide sustainable bioenergy for households in both rural and urban areas of Kenya.

The specific workshop objectives were to:

a. Facilitate sharing and cross learning between charcoal value chain actors in Kitui and Bondo;
b. Develop skills in value chain mapping to improve understanding of opportunities and constraints in the charcoal value chain;
c. Create networks and linkages among charcoal value chain actors to form a strong base for collaboration;
d. Identify strategies for strengthening the charcoal value chains in the two districts.

The topics covered during the two days were:

- Overview of PISCES
- Charcoal production and marketing in Kitui and Bondo – presentation of two case studies
- Field visit to Musaki Enterprises to learn about sustainable charcoal production and marketing
- PMM exercises and review of how knowledge is acquired and shared
- Brainstorming sessions to develop strategies for improving sustainable charcoal production and marketing in Kitui and Bondo districts
- Agreement on a way forward strategy

The workshop methodology was based on comparative analysis of charcoal production through Participatory Market Systems Development (PMSD), which is a conceptual framework, and Participatory Market Mapping (PMM), which is one of the tools used in the process. The workshop process included plenary presentations and discussions, group discussions and feedback, plenary summaries of strategies for enhancing charcoal production and marketing, conclusions and recommendations. Appendix 1 shows the workshop programme.

Stakeholders and partners in the charcoal sector, including representatives from Bondo and Kitui, representatives from the Ministries of Energy, Education and provincial administration among others attended the PMM workshop. Table 1 below shows workshop participants by category and number of representatives while Appendix 2 shows the full lists of the workshop participants.
Table 1: PMM workshop participants by category and number of representatives

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of representatives</th>
</tr>
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<tbody>
<tr>
<td>1. Charcoal producers and sellers from Kitui and Bondo districts (including CBO members/smallholder farmers, charcoal transporters, brokers and retailers)</td>
<td>9</td>
</tr>
<tr>
<td>2. Ministry of Energy (MoE)</td>
<td>2</td>
</tr>
<tr>
<td>3. Ministry of Environment and Mineral Resources (MEMR)</td>
<td>2</td>
</tr>
<tr>
<td>4. Ministry of Education</td>
<td>1</td>
</tr>
<tr>
<td>5. National Environment Management Authority (NEMA)</td>
<td>1</td>
</tr>
<tr>
<td>6. Provincial Administration</td>
<td>4</td>
</tr>
<tr>
<td>7. Kitui County Council</td>
<td>1</td>
</tr>
<tr>
<td>8. Kenya Forest Working Group (KFWG)</td>
<td>1</td>
</tr>
<tr>
<td>9. PAC in Eastern Africa and PISCES partners and collaborators</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>29</strong></td>
</tr>
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Following the presentation of workshop objectives, participants were asked what they expected to get from the workshop. The main participant expectations were to:

a. Understand how the recently approved regulations will affect sustainable charcoal production and marketing;

b. Share ideas on sustainable charcoal production and set achievable targets;

c. Get ideas on potential sources of funding for promoting sustainable charcoal production and marketing in Bondo district;

d. Learn more about the role and responsibilities of Local Authorities (LAs) in sustaining charcoal production and marketing;

e. Identify policy gaps in charcoal production and marketing that need to be tackled;

f. Understand how to link the charcoal business with financial institutions so that they can get credit like any other business;

g. Learning and sharing knowledge between Kitui and Bondo charcoal producers for mutual benefit.

It was noted that there was a lot of convergence between workshop objectives and the expectations of participants. It was stressed that the overall objective of the workshop was to enable participants to learn and share knowledge on sustainable charcoal production and marketing. This would enable them to come up with practical strategies that they would start to implement immediately after the workshop to improve the charcoal Value Chain (VC) for their benefit.
Opening Remarks

On behalf of the Ministry of Energy, Mr Eric Akotsi, Acting Director, Renewable Energy Department of the MoE, thanked PAC, through the PISCES project, for organising the workshop and participants for availing themselves.

Following are key issues highlighted in the opening speech:¹

- Stakeholders in the charcoal industry are all aware of the importance of charcoal in the national economy, as a form of energy, particularly at the household level.
- The national energy consumption statistics still show biomass to be the most commonly consumed form of energy at about 68 percent, followed by petroleum products at 22 percent, electricity at 9 percent and other forms of energy one percent. Charcoal is used by 82 percent of urban and 34 percent of rural households in Kenya.
- The charcoal industry employs over 700,000 people who support over two million dependants. Charcoal is therefore a very important energy source in Kenya, but in spite of its importance as a product, it still faces numerous challenges along its value chain.
- The MoE supports initiatives to develop charcoal as an important source of domestic energy. The Ministry’s energy centres also promote various types of energy saving cook stoves, improved charcoal kilns and fast growing tree species.
- Charcoal regulations have been formulated, and this demonstrates the governments’ commitment to regulate the industry.
- Commercialisation of the charcoal industry requires that the gaps along the charcoal VC be identified and deliberate interventions made to address them.

¹ Appendix 3 shows the detailed opening speech.
Case Studies of Charcoal Production and Marketing in Bondo, Kitui and Kitengela

2.1 Charcoal Production and Marketing in Bondo: Community Driven Commercial Afforestation

The following are key issues highlighted during a presentation on Charcoal Production and Marketing in Bondo:

- **Project Summary:** The project, which focuses on growing acacia trees for charcoal, was initiated by Youth to Youth Action Group (YYAG) and Thuiya Enterprises Ltd. in September 2002. Project beneficiaries include farmers, households, charcoal producers, transporters, wholesalers, retailers, Community Based Organisations (CBOs) and Kenya Forestry Research Institute (KEFRI).

- **Project Implementation:** YYAG sensitized and mobilized farmers interested in planting trees for charcoal on a commercial basis while Thuiya Enterprises Ltd. provided funding for the Charcoal Contract Farming Project. A 6-year cycle was recommended to ensure maturity of trees. Farmers were also given 1 beehive for every 500 trees planted. Harvesting of trees for charcoal started in 2008 and it emerged that 6-year old acacia trees produce heavier charcoal than 4-year old acacia trees. After seeing the final product and believing that acacia trees can be planted for charcoal, more farmers are now interested in planting and managing acacia trees for charcoal. The promoted *Acacia polyacantha* species are indigenous to the area so other farmers have started managing their naturally grown trees for charcoal production.

- **Sustainability of the Project:** The market focus and integrated design of the project is evolving into a self-sustaining initiative. This involves initiating co-benefit activities such as bee keeping that runs concurrently with the main project to keep some income coming while the trees are growing. The number of beehives will be increased to at least 1 for every 100 acacia trees.

- **The Market:** The main market chain actors in this initiative are: farmers, charcoal processing CBOs, transporters, urban depot wholesalers, urban retailers and urban households, hotels, colleges and schools as consumers.

- **Enabling Environment:** The market for charcoal is large. The external market is lucrative but the producers cannot export freely and benefit from charcoal since it is a regulated product. There are no developed standards for charcoal. Charcoal from very light tree/shrub species such as cypress is sold at the same price as the charcoal from very dense wood like the acacias. This limits the participation of the private sector interested in contracting charcoal producers. Only those individuals and communities with secure land tenure can engage in growing of trees for production of charcoal.

- **Support Services:** KEFRI and Moi University are undertaking the necessary research to advise on optimal spacing, wood yields and efficient production of charcoal. The main source of market information is Christian Agricultural and Related Professionals Association (CARPA) and Rachar Agroforestry Initiative for Development (RAID). Generally, bagged charcoal is transported on ox-carts, bicycles, donkeys, wheelbarrows, pick ups and lorries. There are very few institutions willing to provide credit to the charcoal sub-sector, which limits the participation of the private sector interested in contracting charcoal producers.

- **Livelihood outcomes:** a) Human capital (knowledge and skills); b) Natural capital (240 ha of acacia trees added to the landscape over a period of seven years); c) Social capital (the CBOs

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2 Appendix 4 shows the presentation given by Dr Fridah Mugo on Charcoal Production and Marketing in Bondo
have grown vertically and horizontally); d) Financial capital – approximately Ksh. 240,000 per acre for a 6-year cycle (Ksh. 600,000 per ha.).

- **Lessons from Bondo case study:** (a) The commercial tree growing for charcoal production in Madiany Division has a lot of potential to improve the livelihoods of the rural poor because there is a large local, regional, national and even international market for charcoal. (b) A lot of awareness should be created for people to understand that charcoal can be produced as a cash crop (c) The enabling business environment has to be well developed to ensure high returns to the VC actors. (d) The low number of actors in the VC leads to an increase in producer income.

### 2.2 Charcoal Production, Transportation and Marketing in Kitui

Following is a summary of a presentation on Charcoal Production, Transportation and Marketing in Kitui.³

- **Current level of charcoal production in Kitui:** Up to August 2009 the rate of cutting naturally growing indigenous trees for charcoal production in Kitui was alarming and unsustainable. Charcoal production mainly targets acacia species. Areas with the highest level of charcoal production are Chuluni, Mutha, Ikutha, Mutomo, Yatta and Mwitika. There is minimal charcoal production in Kitui Central, Matinyani and Mutonguni.

- **Preferred species for charcoal production:** The most preferred species are: *Acacia tortilis* (Mwaa); *Acacia mellifera* (Muthiia); *Balanities aegyptica* (Kilului); *Kyala Ndathe*; *Brucea antidycentrica* (Mukame); *Acacia gerrandi* (Munina); *Acacia etbaica* (Musuisui); *Terminalia prunoides* (Kitoo); *Acacia Senegal* (Kisemei); *Dalbergia melanoxylon* (Mpingo); *Combretum aculeatum* (Kitithi); *Combretum apiculeatum* (Yaama) and *Commiphora baluensis* (Itula).

- **Prioritized reasons for charcoal production among communities:** The main reasons why communities are involved in charcoal production in order of priority are: a) Buy food; b) Pay school fees and hospital bills; c) Exchange for other commodities (barter trade), e.g. food, bicycles, clothes; d) Generate capital to invest in livestock and other businesses; e) Fight poverty.

- **Why current level of charcoal production in Kitui is unsustainable:** Charcoal production has become an alternative source of income due to prolonged drought and it is now highly commercialized. There is a lack of appropriate incentives to support commercial tree farming for charcoal production as an enterprise, a lack of marketing structures for producers, transporters and retailers as well as a lack of information on the current stocking levels of various charcoal producing species. The situation is exacerbated by poor local charcoal production methods (traditional charcoal kilns with an efficiency of only 10%) leading to wastage of the available tree resources, lack of tree valuation skills as well as lack of sustainable tree management skills for charcoal production.

- **Challenges and constraints encountered by transporters in the charcoal business:** Besides experiencing a lack of capital to conduct charcoal business, charcoal producers incur losses due to wastage during conversion of wood into charcoal. The transporters also pay Kitui County Council cess fees (Ksh. 20 per bag), Kitui Municipal cess fees (Ksh. 1,800 per lorry load) and Nairobi city council cess fees (Ksh.1,500 per lorry). In addition the charcoal transporters are forced to pay illegal taxes (bribes) to cartels in Nairobi and police units at barriers and along the highways. These vary from place to place and can be as high as Ksh. 10,000 per trip.

³ Appendix 5 shows the full presentation on Charcoal Production and Marketing in Kitui.
- **Suggested action**: Regulation of the market through formation of charcoal producers associations to address production, packaging and marketing challenges, as well as provision of credit facilities to the players in the charcoal industry. Enforcement of charcoal production and marketing regulations should go hand-in-hand with adoption of modern technologies for processing charcoal. Emphasis should be on the use of efficient methods including brick, metal and drum kilns etc. Other suggested actions are linking associations of producers and retailers to credit institutions; regulation of charcoal production, transportation and marketing by Kenya Forest Service (KFS) through the subsidiary regulations, and capacity building among tree resource owners on areas such as sustainable management of trees for charcoal production, marketing strategies, awareness creation and sensitization on tree planting for commercial production of charcoal, among others.

2.3 **Video on the Bondo Initiative**

Participants were shown a video on the Bondo initiative. Project beneficiaries, CARPA and KFS, jointly prepared the video, which highlights the collaboration between government and the private sector to promote sustainable charcoal production and marketing. It demonstrates that it is possible to grow charcoal sustainably. During the PMM workshop, participants from Kitui said they had learnt a lot from the video and would take some of the ideas to improve charcoal production and marketing in their own district.

2.4 **Case Study of Sustainable Charcoal Farming in Kitengela**

**Sustainable charcoal farming**

The Kitengela initiative is a private arboretum covering 2.5 acres of land with a total of 24 tree species adapted to dry land areas, some of which reach over 30 feet tall. It was started in 1996 with the aim of conducting research and developing a sustainable system for charcoal production in a semi-arid area. The arboretum focuses on detailed research on the production, management, and processing of wood fuels along with development and production of new and original designs of energy efficient charcoal and wood powered cook stoves and ovens – thus addressing the complete “seed to ash” cycle. Activities include tree planting and management, dissemination of forestry related information, training on tree seedling propagation, seed collection, efficient utilization of wood by-products and small-scale dry land wood production, among others. Besides providing an inspiration for tree planting and sustainable energy use, the arboretum has created a conducive microenvironment and is an island of biodiversity and tranquility that contrasts with the bustle of urban life in Kitengela Township.

The Kitengela initiative also demonstrates that pollarding – a silviculture practice where the tree stem is cut back at a certain height to allow dense new growth of many more shoots – of indigenous acacia trees can produce optimum biomass for charcoal production. In addition, removal of the tree canopy through pollarding allows for successful intercropping of short-term crops such as vegetables, sunflower and other species inside the forest. It demonstrates viable options for sustainable tree management and enhances the production cycle i.e. planting a seed or tree, harvesting the branches, while still keeping the tree.

Following a visit to the Kitengela Arboretum during the PMM workshop, participants felt the initiative demonstrates many lessons and re-affirms the fact that it is possible to make a sustainable forest in a desert, that one can plant and nurture their own forest and make money out of it through sustainable management. The Kitengela initiative also demonstrates that small trees can also produce charcoal while agroforestry can be successfully practiced on a small area of land. Participants felt the most important ingredients for promoting similar initiatives are political will and attitude changes that can potentially increase the current national forest cover from 1.7% to 10% or more. This can be achieved

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by making full use of the resources available and appreciating things that communities have traditionally ignored. The Kitui participants found the idea of deliberate planting of indigenous acacia species for charcoal production to be innovative, and felt that they should explore this possibility. Participants from Bondo realized that they could consider practicing pollarding in their tree management and also look at the tree spacing on their on-farm acacia wood lots, to see how this can lead to improved charcoal production. All the participants acknowledged the importance of efficient charcoal production technology such as improved kilns and appreciated that efficient small scale charcoal production is possible through the use of drum kilns. They recognised that there are resources in Bondo and Kitui that are similar to those available in Kitengela and that communities can learn a lot from this initiative on how to better utilize their local resources.

Lessons from the Kitengela Business Module

• **Species selection:** The initiative demonstrates that species such as *Acacia xanthophloea*, *Acacia kirki*, *Acacia polyacantha* and *Acacia nilotica* can be grown for sustainable production of charcoal and other products, e.g. carvings.

• **Use of improved kiln:** Improved kilns are impressive (especially the drum kiln) and can be constructed by anyone even at home. Charcoal production in this manner can be a good small scale income generating activity.

• **Holistic approach:** The combination of tree planting, charcoal production and manufacture of improved stoves is impressive. This initiative, which was started by an individual, demonstrates that communities should focus on making efficient use of existing resources and expand their charcoal production and marketing enterprises gradually as they access more resources. The holistic approach has turned the two and a half acre plot into an equatorial forest in a desert. A number of participants said they will replicate what they had observed.

• **Application of win-win concept:** The Kitengela initiative demonstrates a win-win situation in which the environment is protected while tree resources are simultaneously used to produce charcoal for sale. Dr. Maxwell Kinyanjui the proprietor of the Kitengela initiative was not present during the field visit – yet the workshop participants observed and deeply appreciated his achievements. They promised to put into practice the knowledge acquired from the visit for income generation and environmental conservation.

2.5 Emerging Issues from Case Studies

In order to support sustainable production of charcoal as a legal and acceptable business like any other, the following needs to be done:

a. Create awareness to promote a positive change in attitude towards charcoal production and marketing. Create awareness on the change in the mandate and focus of the KFS – for instance, during a recent collaborative field visit to Bondo by PISCES, some officials in Bondo were surprised to hear of a District Forest Officer (DFO) promoting charcoal production. This means there is need for information dissemination, which can help charcoal production to be regarded as a sustainable business.

b. Support tree planting for charcoal without fear so that stakeholders - especially farmers - can benefit from charcoal production.

c. Support and contribute to current government efforts to implement charcoal regulations. Ministries of Energy, Environment and Mineral Resources, Forests and Wildlife, and other actors and stakeholders need to take a common front to regulate the charcoal industry. This should include awareness creation on the now legal status of charcoal and the role of KFS in on-farm charcoal production. KFS is responsible for several plantations, but the area of gazetted forest in Kenya is minimal, with only 1.7% forest cover - out of which 1.5% is
indigenous and the rest is exotic. Since the gazetted forest cannot cover national needs, the new Forests Act has expanded the mandate of KFS to include on-farm production in addition to the large-scale plantations.

d. Select appropriate tree species for different areas based on: a) ecological conditions b) type of charcoal that can be produced from different species; c) growth cycle and d) socio-economic and cultural aspects.

e. Sensitize others using lessons from the Kitengela, Bondo and Kitui initiatives and facilitate the formation and strengthening of Charcoal Associations. These Associations will be answerable to the government on questions of sustainable production of charcoal.

f. Support the introduction of one “basket” for all permits and legal fees.

g. NEMA should closely monitor implementation through environmental impact assessment and environmental audits to find out whether the regulations are followed or not.

h. Promote the use of improved kilns for charcoal production. In most cases local methods of production are used in Kitui, which means large quantities of wood are used to produce relatively small quantities of charcoal.

i. Carry out research to establish a suitable growing cycle for acacia trees in Kitui. Given the poor rainfall pattern in Kitui, it is doubtful that the six-year cycle used in Bondo for acacia trees would work in Kitui. However, research results from Bondo would definitely be applicable in areas with similar rainfall, temperatures and soils.

j. Conduct research on the ecological effects of planting acacia species to avoid situations such as the one in Central Province where exotic eucalyptus species, once promoted, are now being removed due to negative effects on water catchments. Although acacia is indigenous to Kitui and Bondo, an Environmental Impact Assessment should be carried out to ensure there are no negative impacts.

k. Identify actions that will help address issues highlighted in the Bondo initiative video regarding:

- **Illegal importation:** Illegal importation of charcoal from other East African countries is common in Bondo. This is a difficult problem to address, and requires the involvement of all the countries in the region. It is important to encourage sustainable management of tree resources in other neighboring countries. Illegal importation of charcoal produced from unsustainable sources undercuts local charcoal sellers. Charcoal imported from Uganda, for instance, is much cheaper than charcoal produced in Bondo. The current subsidiary legislation provides for imports from sustainable sources and this should support the alleviation of the problem.

- **Tapping into the potential for acacia growing:** About 60% of land in Nyanza Province is underutilized and offers huge potential for acacia growing for charcoal and fuelwood.

- **Charcoal Certification:** KFS is pursuing the issue of certification. Charcoal Associations will be issued with licenses which is a form of certification. Community Forest Associations (CFAs) will be required to brand their charcoal and all members must have numbers to allow for tracing back the source of charcoal in case of any queries. Associations must be sure that a member has trees on the farm or ensure where the wood is obtained before accepting charcoal from any member.
3 Participatory Market Mapping

3.1 The Importance of Market Mapping

Market Mapping is a graphic representation of the market system VC. It can be carried out through participatory action where market actors come together to develop the map. The process of market mapping facilitates dialogue, trust and confidence building among market chain actors and leads to action for collective gain.

Market mapping is important for identification of key actors and how they are linked in the VC. The process also helps in identification of business services and provision of inputs as well as identification of key policies and regulations that can potentially constrain the growth of the VC. Market mapping also facilitates development and implementation of action plans to develop the VC.

Preliminary maps based on research in Bondo and Kitui have already been developed and the PMM workshop offered an opportunity to verify whether these maps represent reality with the aim of identifying what can be done to develop the VC. The idea is to involve actors in the market chain in identifying how the maps can be improved and taken forward.

During the PMM workshop, simulation of examples of market maps demonstrated the following:

• The market map helps actors make critical business decisions and to analyse the cost of doing business with different actors in the market map.

• For the market to be efficient, structures have to be in place, for example roads, market chain actors such as producers, retailers and wholesalers, etc.

• The market map does not show everything. So, there is a need to decide what to show based on the reality on the ground – you can show problems or constraints by, for example, putting exclamation marks. Dotted lines can help to show potential areas that need addressing.

3.2 Example of Market Mapping Exercise

The purpose of market mapping is to understand how the market works and the inter-linkages between the various actors in order to make informed decisions. The market map is a graphic representation of reality showing the three layers under which the market operates, as follows:

• **Enabling environment**: This includes existing policies, production facilities, licensing, by-laws, associations, quality control facilities etc (e.g. KEBS).

• **Market chain actors and linkages**: These include producers, retailers, institutional and individual consumers, etc.

• **Supporting Services**: These include Savings and Credit Societies (SACCOS), land, water, transport facilities, capital, technologies (such as kilns), security, seedlings, etc. Other supporting services are cooperative societies offering facilities such as credit, buying and storage and dissemination services, among others.
3.3 Charcoal market maps for Bondo and Kitui

Figure 1: Charcoal Market Map for Bondo

Enabling Environment

- Anti-charcoal attitude in NEMA
- Lack of awareness about policies, legislation
- Unofficial taxes by regulatory officers
- Lack of charcoal standards
- Corruption at transport, wholesale, retail points
- Inhibitive by-laws Bondo County Council
- Poor road infrastructure
- Weak VC actor organisations (Cooperatives)

Market Chain Actors and Linkages

- Schools in Nyanza province
- Hospitals and hotels in Nyanza
- Urban and Rural households
- Retailers
- CFA
- Distributors
- Charcoal producers
- Community (Labour)
- Lake Victoria (Water)
- Traders (Transport)
- CBOs (Acacia seedlings)
- CARPA, Community (Kiln)
- CARPA (Marketing)
- Farmers (Land)
- Community SACCO (Sacco)
- Security watchman (Tree Nursery) (Security)
- KEFRI, KFS, MoA, VI Agroforestry (Technical support)
- Donor, CARPA, Individuals (Finance)

Supporting services

Challenges affecting charcoal production and marketing in Bondo are:

- High cost of raising seedlings – inputs include polythene bags, seeds, labour, water, security, working tools.
- Wrong attitude towards charcoal farming, tree regeneration and use of trees with small diameter – farmers need to change their attitude to appreciate charcoal as a cash crop.
- Limited use of improved technologies particularly kilns
- Transportation of wood from farms to the kiln is expensive – the trees are produced far from the kilns. There is need for construction of additional improved kilns including small ones like the drum kiln nearer the woodlots.
- Dependency on donor funding – there is need to diversify funding sources especially to encourage farmers to purchase the seedlings.
Challenges affecting charcoal production and marketing in Kitui:

- Low prices and seasonal price fluctuation.
- Lack of knowledge on the negative environmental effects of unsustainable charcoal production.
- High expectations from producers.
- Inadequate information on taxation and erratic implementation of taxation policies.
- Depletion of sources of raw material, i.e. trees and shrubs for charcoal production.
- Limited knowledge on efficient charcoal production techniques.
- Lack of organized production and marketing groups – there is need for formation of Community Forest Associations and Charcoal Associations.
- High cost of transport.
### 3.4 Comparative Analysis of the Bondo and Kitui Charcoal Market Maps

#### Importance of the market map

The market map gives an idea of what to expect in the charcoal business, at a glance. It also helps in identification of any current and future opportunities and constraints. For instance the market map for Kitui indicates that traders are paying much more for trade licenses than they should be paying. This indicates a need to seek information from the Local Authorities (LAs) on what types of cess they should be paying and how much they should pay. Although LAs operate as autonomous units, if information is availed the traders can learn what they should be paying and make informed decisions.

Given the various constraints and hefty charges that retailers pay especially in Kitui, the question of whether the charcoal business is viable was raised during the market mapping exercise. Kitui and Bondo producers felt the business is profitable but is negatively affected because of exploitation by middlemen, especially in Kitui. Charcoal has a ready market and if it is better regulated profitability would increase since a large proportion of urban dwellers depend on charcoal for cooking energy. Formation of CFAs will help curb exploitation and improve profits. Ongoing cost benefit analysis in Bondo indicates that the producer can get a profit of Ksh. 350 (from one bag of charcoal), but most of this is used to hire transport. If kilns were near farms profitability could be increased.

#### Enabling environment

The role of NGOs is to support development of the market system since they mobilise and also participate in policy formulation. The government is a permanent enabling structure but NGOs depend upon donor funding which is available over limited time frames so it is therefore important to work with both institutions to ensure that the market system sustains itself.

The policy governing cess, which is money paid by transporters to government, requires harmonisation to create a more enabling environment for producers. In Kitui, for example, the county council licence fee is 20 shillings per bag of charcoal, which multiplied by the number of bags packed in lorry loads of between 50 and 200 bags, amounts to Ksh. 1,000 – 4,000 per lorry load. The cess is based on the Local Council Act cap 265. The municipal council of Kitui charges a fee of Ksh. 1,800 per lorry load but the key actors in the market chain do not agree whether this charge is legal. Charcoal producers, retailers and other market chain actors feel that once you pay to one council you are not supposed to pay any other fee to another council (paying twice is the current practice in Kitui, for example). This is one of the areas that require recommendations on how the cess policy and fees can be harmonised. In addition to payment of cess, unofficial taxes are paid to cartels and the police manning roadblocks and other exit and entry points.

If the volume of charcoal produced is large enough it would be ideal to have a CFA for each division. This would allow 1 person with 3 receipt books to collect the cess and issue separate receipts.

No standards have been set for the weight of a bag of charcoal - in Kitui a bag of charcoal weighs 42 kilogrammes, in Kakuzi (a large scale charcoal producer in Central Kenya) a bag weighs 35 kilogrammes, while in Bondo a bag weighs 45 kilogrammes. It is also to be noted that the weight of charcoal depends on the density of the wood used to produce charcoal.

#### Market chain actors

There are various charcoal market chain actors in both Bondo and Kitui. However, the charcoal market chain is most complex in Kitui. Participants at the PMM workshop actually referred to it as a cobweb! It involves individual brokers (in Kitui and Nairobi), supermarkets, wholesalers (Nairobi and Kitui), and retailers. Retailers sometimes buy directly from producers – e.g. when they find a charcoal producer waiting for customers by the roadside. The presence of so many actors in the market chain reduces the profit margin for charcoal producers and exposes them to exploitation by a complex range of market actors.
forces. In contrast, the market chain for Bondo is less complex with charcoal producers mainly dealing with charcoal associations, individual distributors and retailers.

The market maps for Kitui and Bondo indicate that producers incur the cost of doing business with all the retailers, who tend to exploit them by buying the charcoal at what producers perceive as very low prices, yet by the time it reaches the end consumer the prices are very high. It was however noted that most of the participants did not know for sure the cost of producing one sack of charcoal. In comparison, the producer at Kitengela sells charcoal directly through a retail outlet located within the production premises. In Bondo, producers incur the additional cost of taking wood to the kilns, which are located far away, while in Kitui such a cost is not incurred. The prices increase during the rainy season, but during the dry season producers are forced to sell charcoal at very low prices, yet this is the time they most need money due to shortage of food and other basic commodities. It was also noted that charcoal production in Kitui, which is a fragile environment and prone to drought, is not sustainable, yet illegal logging for charcoal production is rampant.

CFAs are a requirement under the new Forest Act, which is part of the current forest sector reforms. The CFAs are designed as community structures that will help improve the charcoal market by curbing exploitation of producers through regulation of the system (forest sector reform). In Bondo for example the CFA will be like a tea buying centre – a trader who can buy whatever quantity of charcoal they wish.

Summary of Emerging Issues

Participants at the PMM workshop identified the following as key emerging issues in charcoal production and marketing in Kitui and Bondo:

- Brokers are generally negatively viewed especially in Kitui where they grossly underpay producers. Both producers and retailers would like to exclude brokers from the market chain. In Bondo producers are anticipating that once the CFAs are fully active producers will sell directly to them and do away with brokers. However, it is important to critically analyse the role played by brokers to ensure that their exclusion does not lead to a dysfunctional market chain.

- Local Authorities are autonomous and there are no standardized fee structures, which means charcoal producers and retailers are vulnerable to exploitation. Therefore there is a need for harmonisation of cess policies and development of a single license fee that can be obtained from a single source.

4 Knowledge and Information Flow

The purpose of PISCES is to increase available knowledge and understanding of policy relevant trade-offs between energy, food and water security for livelihoods in relation to bioenergy. Knowledge is information, know-how, ability to do things. It helps but is only useful when it's put into practice. The field visit to Kitengela is a good example of how knowledge flows, and market mapping is a valuable tool for enhancing knowledge flow and understanding leading to:

- Improved relationships and collaboration between, and amongst, market chain actors.
- Transformations in the three segments of the market.
- Improved livelihoods for large numbers of small marginalized producers.
- Learning from those who have done it e.g. Musaki Enterprises, KEFRI, NGOs, government.
- Enhanced use of available resources e.g. seedlings, trees, kilns, associations, etc.
- Identification of new knowledge needs and acquisition of more knowledge to address the emerging challenges. For example, Bondo farmers can acquire new knowledge on improved charcoal production methods. They then use this knowledge on their farms to increase wood
production for charcoal making. Increased volumes produced may, however, present new challenges such as higher cost of transportation (for larger volumes of wood) to the nearest kiln. One way of addressing this new challenge could be for the farmer to learn how to build an improved on-farm earth kiln, thus reducing altogether the need for transportation. When farmers and other stakeholders are constantly able to acquire and share more knowledge to address new challenges as they arise, the knowledge loop completes a full circle.

To benefit from the new knowledge and skills learnt and shared during the workshop it was agreed that participants should implement the following immediately:

- **Kitui District**: KFS and MoE to establish 2 demonstration farms by planting trees to convert them from open ground to rain forests based on the Kitengela model. The 2 farms should become learning sites for communities in the area on sustainable tree management and use of more efficient kilns for charcoal production.

- **Bondo district**: RAID to do the same as Kitui and continue to pursue sustainable management and harvesting of existing trees based on new knowledge and skills learned from the workshop including the visit to Musaki Enterprises in Kitengela. In addition, Bondo charcoal producers were encouraged to adopt new improved kilns such as the small drum kiln or brick kiln to solve the current problem of transporting wood from farms to the central kilns. Farmers should also promote the harvesting of branches (pollarding) for production of charcoal rather than clear cutting of big trees.

### 5 Way Forward Strategy

Participants agreed on the following wider range of actions that they could implement in partnership with others to improve the charcoal VC, earn higher incomes and improve their livelihoods:

- **a.** Train communities on planting, management and sustainable harvesting of trees for charcoal production. This will entail the Bondo group scaling up their existing training activities, while in Kitui, participants, with support from KFS and other stakeholders will initiate their own training activities.

- **b.** Establish demonstration plots for appropriate tree species for charcoal production at the Ministry of Energy Regional Energy Centres. The Ministry of Energy’s Kitui Energy Centre will support raising of acacia seedlings since water is available at the centre.

- **c.** Increase the types of efficient charcoal kiln demonstrated at the energy centres, in collaboration with the Ministry of Energy and other stakeholders in order to provide stakeholders with information and train producers on available kiln options.

- **d.** Carry out campaigns on sustainable harvesting and conservation of indigenous tree species in Kitui and Rarieda by working with Chiefs, Assistant Chiefs, schools, youth group leaders and women groups in community mobilization for tree planting.

- **e.** Start with available resources - however small - to plant and manage trees for sustainable charcoal production and bring on board external support for expansion.

- **f.** The Rarieda umbrella farmers group to increase the number of tree nurseries in Bondo from 7 to at least 19 to expand tree planting activities.

- **g.** The Rarieda umbrella farmers group to recruit new groups in Madiany division i.e. four groups in five locations (target is 15 groups) in Bondo.

- **h.** Lobby for support to create awareness amongst stakeholders about charcoal legislation and policy to help eliminate illegal taxes.

- **i.** Lobby for support for a reduction in legal taxes. Transporters should lobby for taxes and fees on charcoal to be paid in one place.
j. Form strong Charcoal Associations in Kitui and Rarieda
k. Work with stakeholders to create standards for charcoal based on quality and weight
l. Improve marketing efficiency to ensure fair prices of charcoal in different regions. In Kitui this means producers, transporters and other actors organising themselves into groups and registering as associations in order to attain a legal status as well as benefiting from pooling their resources and activities. The Bondo farmers on the other hand, will try and address the problem of transporting wood from their farms over long distances to the improved charcoal kiln by introducing mobile charcoal kilns and improving on the traditional earth kilns on or nearer to their farms
m. Solicit support for producing a manual on sustainable management of trees for charcoal and dissemination to the relevant actors.

6 Conclusion and Recommendations

6.1 Conclusion
Considering the presentations made and the three charcoal models reviewed, the workshop participants concluded that, charcoal is very important as a source of energy in Kenya providing energy for 82% of the urban and 34% of the rural households. The government has formulated subsidiary legislation to facilitate implementation of the policies on charcoal. However, production and marketing of the product is affected by many challenges that include limited awareness of existing policies and legislation and the apparent perception of the product as illegal because of the presidential decrees of the 1990s that banned its production. In addition, there are still many actors in the regulatory system whose roles are not clear, and charcoal attracts many taxes that reduce its profitability. As a result of the apparent illegal tag that charcoal carries, little research has been undertaken to identify the appropriate tree species used for charcoal production in different parts of the country. The available information on how to determine the profitability of the industry is therefore very scanty. There are also very few credit providers to service the sub-sector making it grossly undercapitalized.

6.2 Recommendations
The following recommendations are made linking specific actions to the gaps in the market value chain:

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Market VC Gap being addressed</th>
<th>Level of Action</th>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Extract the key issues from the energy and forest policies and legislations and develop a set of appropriate and simplified sensitization materials (e.g. a small booklet that could be used as reference materials by the charcoal value chain actors).</td>
<td>Enabling Environment (policies and legislation)</td>
<td>Local: Kitui-Bondo (with potential for national scale up)</td>
<td>PISCES (lead); KFS; MoE</td>
</tr>
<tr>
<td>b. Initiate a dissemination process to create awareness among value chain actors on the improved policy and legislative environment. It will involve sensitizing the provincial administration - DOs, Chiefs, Assistant Chiefs; Police, and further information exchanges between the charcoal value chain actors in Kitui and Bondo on the current policy and practices and legislative position on charcoal.</td>
<td>Enabling Environment (policies and legislation)</td>
<td>Local: Kitui-Bondo (with potential for national scale up)</td>
<td>CODCA (lead); PISCES; other partners</td>
</tr>
<tr>
<td>c. Pilot the implementation of the charcoal subsidiary legislation in Bondo and Kitui in order to identify the weaknesses and recommend appropriate policy and legislative amendments.</td>
<td>Enabling Environment (Policies and legislation)</td>
<td>Local: Kitui-Bondo National: (Feedback to policy makers)</td>
<td>CODCA (lead); PISCES; KFS; MoE; other partners</td>
</tr>
</tbody>
</table>
### d. Facilitate the formation and/or strengthening of the Community Charcoal Associations to coordinate sustainable production and marketing of charcoal.

**Enabling Environment; Market chain actors & Linkages (strengthening market actors)**

**Local:** Kitui-Bondo  
**CODCA (lead); other partners**

### e. Initiate the process of developing standards for charcoal. This will involve stakeholders agreeing on measurement units, such as what a bag of charcoal would weigh and how charcoal should be graded.

**Enabling Environment (Standards development)**

**National**  
**CODCA/PISCES (lead); KEBS; KFS; MoE; KIRDI; other partners**

### f. Facilitate development of a prototype brick version of the drum kiln and evaluate its performance. This will encourage small scale production of charcoal, allowing individuals to produce it in their homes even when they have very little wood. An analysis on the most efficient scale of production will also be undertaken.

**Supporting Services (Technology transfer, development)**

**National**  
**KEFRI (lead); KIRDI**

### g. In Kitui, facilitate the establishment of 4 demonstration farms, 2 for demonstrating the management of natural woodlands for charcoal production, and 2 for actual planting of acacia trees for charcoal production as witnessed in Kitengela.

**Support Services (Generating local knowledge of practices)**

**Local**  
**KFS Kitui (lead)**

### h. In Bondo, identify and establish 2 demonstration farms for management of naturally occurring on-farm indigenous tree species, including acacia, for charcoal production.

**Supporting Services (Generating local knowledge of practices)**

**Local**  
**KFS Bondo (lead)**

### i. In Kitui, facilitate charcoal producers to establish a charcoal collection centre where members can sell their charcoal.

**Market chain Actors & linkages (Strengthening market actors)**

**Local**  
**KFS Kitui (lead)**

### j. Conduct research on appropriate charcoal tree species for different ecological zones to generate information for guiding the management of the same for sustainable growing of wood for charcoal production.

**Supporting Services (Generating new knowledge through research)**

**National**  
**KEFRI (lead)**

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PISCES will take lead in developing a project proposal, in collaboration with key stakeholders, to address key gaps identified by the charcoal market mapping exercise. Activities carried out immediately as outlined in Section 4 will provide good evidence and make the proposal more attractive. PISCES will also identify potential funding to support project implementation and lesson learning. The proposal will address both the local and national level issues. Local level actions will be geared to improving energy access and delivery in Bondo and Kitui. This will be done by expanding charcoal production and marketing in Bondo, and developing sustainable production and marketing in Kitui. Lessons learnt from the local level actions will be used to inform policy. National level actions will be aimed at generating new knowledge to support decision making by policy makers to contribute to an improved charcoal sector in Kenya.
7 Closing Remarks:

7.1 Closing Remarks

Jan Coffey, the Regional Director for Practical Action Eastern Africa, said in her closing remarks, that the workshop was very interactive and productive. She thanked and congratulated the participants, organisers and facilitators for making the workshop such a resounding success. She said that judging from the workshop summary the workshop process was highly participatory and had come up with concrete actions to be taken forward by participants to promote sustainable charcoal production and marketing for their benefit. The workshop results resonated with Practical Action and the vision of Fritz Schumacher, the founder of the organization. He developed a model challenging large infrastructure projects and published a book called *Small is Beautiful*; thus the spirit of Schumacher echoed through the workshop, emphasising the implementation of practical useful activities at grassroots level with appropriate technologies. She emphasised that participants should put this into practice by starting right away, using the resources they have. With this remarks, she declared the workshop closed.

7.2 Vote of Thanks:

On behalf of the workshop participants, David Tegutwa, the District Officer (DO) for Bondo, expressed deep appreciation to the workshop organisers. He said the facilitators and other organisers did a commendable job to make the workshop possible while all the participants were attentive and interactive, which contributed immensely to the success of the workshop.
8 Appendices

8.1 Appendix 1: Workshop Programme

“Promoting Sustainable Charcoal Production and Marketing in Kenya: A Comparative Analysis through Participatory Market Mapping”

<table>
<thead>
<tr>
<th>DATE/TIME</th>
<th>SESSION/ACTIVITY</th>
<th>RESOURCE PERSON</th>
<th>FACILITATOR</th>
</tr>
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<tbody>
<tr>
<td>23rd Nov 2009 Evening</td>
<td>Arrival &amp; Registration</td>
<td></td>
<td>William Gichohi</td>
</tr>
<tr>
<td><strong>Tuesday 24th November 2009: Day I</strong></td>
<td><strong>SESSION I: INTRODUCTIONS, OVERVIEW &amp; CASE STUDIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.00-8.20 a.m</td>
<td>Introductions and Programme Overview</td>
<td>Fridah Mugo PAC, EA</td>
<td>Alex Mugova, PAC, EA</td>
</tr>
<tr>
<td>8.20- 8.45 a.m</td>
<td>Opening address</td>
<td>Eric Akotsi, Acting Director, Dept of Renewable Energy, Ministry of Energy</td>
<td>Alex Mugova</td>
</tr>
<tr>
<td>8.45-9.00 a.m</td>
<td>Overview of PISCES</td>
<td>Tameezan wa Gathui</td>
<td>Alex Mugova</td>
</tr>
<tr>
<td>9.00- 9.30 a.m</td>
<td>Community Driven Commercial Afforestation, Bondo</td>
<td>Fridah Mugo</td>
<td>Alex Mugova</td>
</tr>
<tr>
<td>9. 30- 10.00 a.m</td>
<td>Charcoal production and marketing in Kitui</td>
<td>Joseph Njigoya, Zonal Forest Officer, Kitui</td>
<td>Alex Mugova</td>
</tr>
<tr>
<td>10.00-10.30 a.m</td>
<td>Comparison, Questions and Discussion</td>
<td></td>
<td>Alex Mugova</td>
</tr>
<tr>
<td>10.30-11.00 a.m.</td>
<td>TEA BREAK</td>
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<tr>
<td><strong>SESSION II: PARTICIPATORY MARKET SYSTEMS DEVELOPMENT</strong></td>
<td></td>
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<tr>
<td>11.00-11.30 a.m</td>
<td>The Participatory Market Development Approach</td>
<td>Alex Mugova</td>
<td>Fridah Mugo</td>
</tr>
<tr>
<td>11.30-12.00 noon</td>
<td>Example Market Mapping Exercise</td>
<td>Jane Mung’oma</td>
<td>Fridah Mugo</td>
</tr>
<tr>
<td>12.00-12.30 p.m</td>
<td>Group Work: Briefing on group tasks</td>
<td>Jane Mung’oma</td>
<td>Fridah Mugo</td>
</tr>
<tr>
<td>12.30 -1.00 p.m.</td>
<td>LUNCH (PACKED LUNCH)</td>
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<tr>
<td><strong>SESSION III: FIELD VISIT TO KITENGELA</strong></td>
<td></td>
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<tr>
<td>1.00- 2.30 p.m</td>
<td>Travel to Kitengela</td>
<td>Tameezan wa Gathui</td>
<td>William Gichohi</td>
</tr>
<tr>
<td>2.30- 4.30 p.m</td>
<td>Musaki Enterprises Ltd. Kitengela</td>
<td>Philip Ndichu Extension Officer</td>
<td>Tameezan wa Gathui</td>
</tr>
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5 24-25th November 2009, Gracia Guest House, Nairobi
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<th>RESOURCE PERSON</th>
<th>FACILITATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.30-5.00 p.m</td>
<td>Discussion of observations in the field.</td>
<td>Fridah Mugo</td>
<td>Tameezan wa Gathui</td>
</tr>
<tr>
<td>5.00-6.30 p.m</td>
<td>Travel back to Gracia Guest House</td>
<td>William Gichohi</td>
<td>William Gichohi</td>
</tr>
<tr>
<td>7.00 pm</td>
<td>Logistics session</td>
<td>William Gichohi</td>
<td>William Gichohi</td>
</tr>
</tbody>
</table>

**Wednesday 25th Nov 2009: Day 2**

**SESSION I: FIELD OBSERVATIONS; PARTICIPATORY MARKET MAPPING**

| 8.00-8.20a.m | Programme Overview | Tameezan wa Gathui | Alex Mugova |
| 8.20 – 9.00 a.m | Observations from the Field Trip | Fridah Mugo | Alex Mugova |
| 9.00-10.30 a.m | Group work: Building Market Maps | Jane Mung’oma | Alex Mugova |
| 10.30-11.00a.m | TEA BREAK | William Gichohi |

**SESSION II: PARTICIPATORY MARKET MAPPING**

| 11.00-11.45 a.m | Group 1 Presentation | Fridah Mugo |
| 11.45-12.00 a.m | Discussion and feedback | Jane Mung’oma | Fridah Mugo |
| 12.00- 12.45 a.m | Group 2 Presentation | Fridah Mugo |
| 12.45-1.00 p.m. | Discussion and feedback | Alex Mugova | Fridah Mugo |
| 1.00- 2.00 p.m. | LUNCH BREAK | William Gichohi |

**SESSION II: PARTICIPATORY MARKET MAPPING(Contd.)**

| 2.00-2.45p.m | Group 3 Presentation | Jane Mung’oma |
| 2.45-3.00 p.m | Discussion and feedback | Alex Mugova | Jane Mung’oma |
| 3.00- 3.45 p.m | Overview & summary of PMM exercise | Alex Mugova | Jane Mung’oma |
| 3.45-4.00p.m | TEA BREAK |

**SESSION III: PARTICIPATORY MARKET MAPPING; WORKSHOP HIGHLIGHTS & SUMMARY**

| 4.00-5.00 p.m | Highlights and key findings | Tameezan wa Gathui | Alex Mugova |
| 5.00-5.20 p.m | Closing Remarks & Vote of Thanks | Jan Coffey, RD, Practical Action | Alex Mugova |

**Thursday 26th Nov 2009: Day 3**

| 8.00 a.m | Departure for Bondo and Kitui | William Gichohi |
## Appendix 2: List of Workshop Participants

<table>
<thead>
<tr>
<th>NAME</th>
<th>DESIGNATION/ ORGANISATION</th>
<th>CONTACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile No.</td>
<td>E-mail</td>
<td></td>
</tr>
<tr>
<td>1 John Ouma</td>
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<td>8 Lubanga Osango</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>17 Boniface Mutie Kivindu</td>
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<td>0711470293 <a href="mailto:njigoya2006@yahoo.com">njigoya2006@yahoo.com</a></td>
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</table>
8.3 Appendix 3: Opening Speech and Workshop Presentations

Opening Speech – presented by Mr. Eric Akotsi, Acting Director, Renewable Energy Department, MoE

On behalf of the Ministry of Energy, Mr. Eric Akotsi, Acting Director, Renewable Energy Department, thanked Practical Action for organizing the workshop that had brought together various stakeholders in the charcoal industry to share experiences and set benchmarks. He also thanked workshop participants from Bondo, Kitui and Nairobi for having spared time from their busy schedules to attend this workshop.

Following are issues highlighted in the opening speech:

There is a strong collaboration between the MoE and PISCES project, and the project is represented on the National Biofuels Committee, which gives direction for project initiation in the biofuel industry. Currently the MoE is collaborating with PISCES among other stakeholders in developing a policy on biofuels. Stakeholders in the charcoal industry are all aware of the importance of charcoal in the national economy as a form of energy particularly at the household level. The national energy consumption statistics still show biomass to be the most widely used energy source at about 68 percent, followed by petroleum products at 22 percent, electricity at 9 percent and other forms of energy at one percent. Charcoal is used by 82 percent of urban and 34 percent of rural households in Kenya. The charcoal industry employs over 700,000 people who support over two million dependants.

In spite of charcoal being an important energy source, as a product it still faces numerous challenges along the VC in Kenya. The production and transportation of charcoal remains clandestine and the value of charcoal is not captured in the national economic statistics. The charcoal industry has therefore remained a low profile industry, a status that makes it difficult to access funds for upgrading the VC.

Kenya faces the challenge to fully commercialise the production and marketing of charcoal. Charcoal regulations have been formulated and this demonstrates the governments’ commitment to regulate the industry. The MoE supports initiatives to develop charcoal as an important source of domestic energy. The Ministry through its centres promotes efficient methods of charcoal production by demonstrating and training charcoal producers on construction and operation of improved kilns. The centres also promote use of more efficient cook stoves and fast growing trees species such as eucalyptus clones for production of charcoal and other forms of biomass energy.

Commercialisation of the charcoal industry requires that the gaps along the charcoal VC be identified and interventions taken to address them. It is therefore important to closely look at the charcoal VC and generate reliable information that would feed into policy formulation and decision making towards improvement of the industry.

Mr Akotsi said the MoE appreciated the workshop as a very important forum for identifying areas that need attention along the charcoal VC and also developing best practices to enhance the charcoal trade. He said the forum would complement the efforts to improve livelihoods by improving vital sub-sectors of energy and the national economy. Calling on participants to be attentive and focused, Mr. Akotsi cited the need for continued dialogue through such forums, which can generate information for decision making on the best way forward for charcoal production and marketing. He said that Kenya looks forward to developing all forms of energy needed to drive Vision 2030 and charcoal is a key energy resource. He said it was a pleasure to be associated with such an important forum and on behalf of the MoE declared the workshop open.
8.4 Appendix 4: Charcoal Production and Marketing in Bondo

Community Driven Commercial Afforestation – presented by Dr. Fridah Mugo, University of Nairobi/PISCES Partner

Project summary

Community Driven Commercial Afforestation (CODCA) is implemented in Central Uyoma Location, Madiany Division, Rarieda District, of Nyanza Province. The project, which focuses on growing acacia trees for charcoal, was initiated by Youth to Youth Action Group (YYAG) and Thuiya Enterprises Ltd. in September 2002. Current estimated area of land under acacia is 240 hectares. Estimated yield is 100 tons of round wood or 30 tons of charcoal per hectare under six years rotation. Project beneficiaries include farmers, households, charcoal producers, transporters, wholesalers, retailers, community based organizations and KEFRI. The project was motivated by high poverty levels estimated at 56 percent in 2002 and high un-employment rate of 45 percent in Rarieda District. Other factors leading to project initiation included food insecurity in the district, high demand for charcoal in urban areas of Kisumu and high yield potential of intercropping of acacia with groundnuts/beans. The search for an afforestation model that could motivate farmers to plant numerous trees for income generation was driven by the above factors.

Project Implementation

YYAG sensitized and mobilized farmers interested in planting trees for charcoal on a commercial basis while Thuiya Enterprises Ltd. provided funding for the Charcoal Contract Farming Project. YYAG was contracted and paid by Thuiya Enterprises Ltd. to raise *Acacia xanthophloea* and *polyacantha* tree seedlings. The number of seedlings to be raised depended on farmer’s total demand and financial ability of Thuiya Enterprises. Forest Department Officers trained YYAG members on tree nursery establishment and management.

Farmers were given between 500-2000 seedlings on loan (equivalent of Ksh. 2,500 –10,000) at no interest - to plant as woodlots for charcoal. The agreement with the farmers was that the money for seedlings would be recovered from the tree/charcoal revenue at the end of four years when Thuiya purchases wood/charcoal from them. Farmers were also given 40 kilogrammes of groundnuts/beans per hectare for intercropping. After three years of project implementation, the quality of the wood for charcoal was assessed by Moi University Forest Department and it emerged that although the trees were large in size (7.5 - 12 cm Diameter at Breast Height), the wood was immature hence the trees required more time to mature. A six-year cycle was recommended to ensure maturity. Harvesting started in 2008 and it emerged that 6-year old acacia trees produce heavier charcoal than 4-year old acacia trees. Under ideal conditions and efficient conversion, it has been estimated that an acre of land should produce about 300 bags (40 kg) of charcoal.

After seeing the final product and believing that acacia trees can be planted for charcoal, more farmers are now interested in planting and also managing acacia trees for charcoal. The promoted *Acacia polyacantha* species are indigenous to the area so other farmers have started managing their naturally growing trees for charcoal production. Other acacias growing naturally in Madiany Division include *Acacia seyal* and *Acacia mellifera*.

Sustainability of the project

The market focus and integrated design of the project is evolving into a self-sustaining project. Farmers get food and income from the short season crop (beans and ground nuts) for the first and second year. When the tree canopy closes, in the third year, farmers are issued with one beehive (equivalent to Kenya shillings 5,000) on loan for every 500 acacia trees they have planted. The number of beehives will be increased to at least one for every 100 acacia trees to ensure sufficient income for the farmers.
The Market
The main market chain actors in this initiative are: farmers, charcoal processing CBOs, transporters, urban depot wholesalers, urban retailers and urban households, hotels, colleges and schools as consumers.

Enabling environment
Even though the external market is lucrative, the producers cannot export freely and benefit from charcoal production. There are no developed standards for charcoal. A charcoal bag weighing 35 kilograms sells for the same price as a 42 kilogrammes bag of charcoal, giving some consumers a raw deal. Charcoal from very light tree/shrub species like cypress is sold at the same price as the charcoal from very dense wood like the acacias. There are very few institutions willing to provide financial credits for the charcoal sub-sector. This limits participation of actors in the private sector interested in contracting charcoal producers. It is mainly individuals and communities with secure land tenure that can engage in production of charcoal.

Support services
KEFRI and Moi University are undertaking the necessary research to advice on optimal spacing, wood yields and efficient production of charcoal. The main source of market information is CARPA and RAID. The market for charcoal is large. Generally, bagged charcoal is transported on ox-carts, bicycles, donkeys, wheelbarrows, pick ups and lorries.

Livelihood outcomes
The livelihood outcomes of this project are:

- Human Capital: Knowledge and Skills
- Natural Capital: 240 hectares of acacia trees added to the landscape
- Physical Capital - bought land for an office site, have six kilns and three tree nursery sites.
- Social capital: the CBO has grown vertically and horizontally
- Financial capital – it is anticipated that this will increase significantly

Lessons from the Bondo Case Study
The commercial tree growing for charcoal project in Madiany Division has a lot of potential to improve the livelihoods of the rural poor because there is a big local, regional, national and even international market for charcoal. The initiative does not require high capital investments and can easily be integrated with other enterprises to ensure sustainable access to food and income and other multiple benefits. The current initiative has not maximized its potential because it is still in its pilot phase and the enabling business environment is not well developed.

If contractual business arrangements can be adopted, this will assure producers of regular and predictable income and also assure contractors of a steady supply of the product. Despite the presence of the large market, if the farmers produce charcoal and the enabling business environment is not conducive enough for them to sell profitably, and also given the current corruption and harassment from the regulators, it would be very easy for the initiative to collapse. However, if the enabling environment improves, and sufficient investment is provided to reach the threshold level where the initiative expands naturally, then the project can be very successful. Since it is a business enterprise, whose every activity is valued, sustainability can be assured as long as there is market.
8.5 Appendix 5: Charcoal Production, Transportation and Marketing in Kitui

Presented by Mr. Joseph M. Njigoya, Zonal Forest Officer, Kitui

Current level of charcoal production in Kitui

Up to August 2009 the rate of cutting trees for charcoal production in Kitui was increasingly at an alarming and unsustainable rate. The rate of removal by end of August 2009 was 100,000 bags of charcoal per month that translates into 25,000 trees. Thus about 300,000 trees were cut each year for charcoal production. Charcoal production mainly targets acacia spp. Areas with the highest level of charcoal production are Chuluni, Mutha, Ikutha, Mutomo, Yatta and Mwitika. There is minimal charcoal production in Kitui Central, Matinyani and Mutonguni. The rate of reforestation in charcoal producing areas with mainly exotic species that cannot produce charcoal is less than 100,000 trees per year with a survival rate of 30 percent. Hence the rate of depletion of vital charcoal trees is irreversibly high.

Preferred species for charcoal production The most preferred species are: Acacia tortilis (Mwaa); Acacia mellifera (Muthiia); Balanities aegyptica (Kilului); Brucea antidyscentrica (Mukame); Acacia gerrandi (Munina); Acacia etbaica (Musuisui); Terminalia prunoides (Kitoo); Acacia Senegol (Kisemei); Derbergia melanoxylon (Muvingo); Combretum aculeatum (Kitithi); Combretum apiculeatum (Yaama) and Commiphora baluensis (Itula).

The main reasons why communities are involved in charcoal production, in order of priority, are:

- Buy food
- Pay school fees and hospital bills.
- Exchange for other commodities (batter trade), e.g. food, bicycles, clothes.
- Generate capital to invest in livestock and other businesses and
- Poverty.

Previously, charcoal production in Kitui was not continuous and when there was sufficient food in Kitui, little or no charcoal burning took place. This was evident during the rainy season and especially when there was a good harvest. However, this trend changed over time and the trade is now commercial and continuous.

Why current level of charcoal production in Kitui is unsustainable

- Prolonged drought leading to charcoal production as the alternative source of income.
- Commercialization of charcoal production as any other business
- The current stocking levels of various charcoal producing species is unknown
- Lack of marketing structures for producers, transporters and retailers.
- Lack of appropriate incentives to support commercial tree farming mainly for charcoal production as an enterprise.
- Poor local charcoal production methods with a recovery rate of only 10 percent and hence wastage of the available tree resources.
- Lack of sustainable tree management skills for charcoal production.
- Lack of tree valuation skills that have resulted in very low prices of trees in some areas.
- Free range system of livestock keeping which hinders regeneration of young seedlings and coppicing of the cut trees.
Challenges and constraints encountered by transporters in the charcoal business

- Charcoal business is very risky; one has to bribe their way up to Nairobi since it is like an illegal business.
- Fire accidents are very common; lorries have burned down while on transit as a result of carelessness during charcoal packaging.
- Lack of capital to do charcoal business.
- The tree resource is diminishing very fast as a result of cutting without replacement.
- Wastage during conversion of wood into charcoal.
- Lack of credit facilities for all the value chain actors.

Types of fees paid by transporters

- Kitui County Council cess fee (Kenya shillings 20 per bag)
- Kitui Municipal cess fee (Kenya shillings 1800 per lorry load)
- KFS forest produce movement permits fee (between 1000 – 1500 Kenya shillings per lorry load depending on tonnage)
- Nairobi city council fee (Kenya shillings 1500 per lorry)
- Police barrier – illegal charges (bribe) but varies
- Police high way units – illegal charges but varies
- Cartels in Nairobi – illegal charges but varies

On average the cost of transportation of a lorry load of charcoal to Nairobi without official documents is 10,000 Kenya shillings, excluding the cost of hiring the vehicle.

Suggested action

a. Formation of charcoal producers associations to address production, packaging and marketing strategies.

b. Provision of credit facilities to the players in the charcoal industry.

c. Enforcement of the charcoal regulations.

d. Adoption of modern technologies in charcoal production and hence emphasize on use of efficient methods in charcoal production; improved brick kilns, metal kilns, drum kilns etc.

e. Link associations, producers, retailers to credit institutions

f. Regulation of charcoal production, transportation and marketing by KFS through the subsidiary regulations being developed by the service

g. Capacity building among tree resource owners on:
   - Sustainable management of trees for charcoal production
   - Agro-silvi-pastoral farming
   - Forest/tree valuation
   - Marketing strategies
   - Introduction and sensitization of communities to embrace tree planting for commercial charcoal production and as a viable enterprise.
Example of commercial charcoal production enterprise in Kitui Area - one acre

**Species:** Acacia gerrandii, A.xathopholea, A. nilotica and A.polycantha.

**Spacing** – 3 x 3 meters (440 trees/acre).

**Rotation age** -15 yrs.

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<th>Unit prize</th>
<th>Inputs/output</th>
<th>Cost (Ksh)</th>
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<td>440</td>
<td>6,600</td>
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<td>2,000/acre</td>
<td>1</td>
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<td>Weeding (2/yr)</td>
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<td>4 times</td>
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<td>Harvesting and making kilns</td>
<td>3,000/acre</td>
<td>1 time</td>
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<td>Firing the wood to produce charcoal</td>
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<td>1 time</td>
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<td>Ksh. 30/bag</td>
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<td>137,500 (2)</td>
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One tree= 2 bags of charcoal

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<th>Inputs/output</th>
<th>Cost (Ksh)</th>
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<td>Bags of Charcoal @ 30% recovery (2)</td>
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<td>Less costs (1)</td>
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<td>Less cost (2)</td>
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(Exchange rate: 1 £ = Ksh 119)
8.6 Appendix 6: Workshop Evaluation

Workshop evaluation was conducted through a participatory process. Participants were requested to rate workshop sessions based on relevance, clarity of presentation, time management and style of presentation. Participants were also requested to indicate which workshop sessions they liked best and any lessons they would like to take forward in future. They were also requested to give their views on the workshop venue and logistics and to indicate areas that require improvement in future.

Participants rated majority of workshop sessions as either very good or excellent. The most highly rated sessions were participatory market systems development and mapping, field visit and field observations. Participants also cited these, as the best liked sessions. Under general remarks, participants rated the workshop as very resourceful, educative, informative and timely, among other favourable comments. All the participants liked the workshop venue and rated food, rooms and conference hall as good, very good or excellent.

Participants indicated that they had learned a lot through the workshop and would like to take forward some of the lessons. Examples of lessons that participants would like to replicate in future include starting tree nurseries, sensitisation and awareness creation on tree planting for energy production and conservation among community groups, schools and other institutions and being more pro-active in promoting sustainable charcoal production, among others.

Areas cited by a number of participants as requiring improvement included time management of some of the sessions, need to improve logistics, welfare and per diem. Some participants suggested that in future a wider cross-section of representatives from the grassroots should be invited to similar workshops, including chiefs and assistant chiefs.

8.7 Appendix 7: PISCES

Policy Innovation Systems for Clean Energy Security (PISCES) is a five-year research project funded by the Department for International Development of the United Kingdom (UK).

PISCES is implemented by a Research Project Consortium (RPC) whose members include:

- Africa Center for Technology Studies (ACTS): Lead, Kenya
- Practical Action Consulting (PAC): UK; East Africa and Sri Lanka
- University of Dar es Salaam (UDSM): Tanzania
- M.S. Swami Nathan Research Foundation (MSSRF): India
- University of Edinburgh (UoE): UK

PISCES research themes include:

- RT1: Technology (led by UDSM)
- RT2: Access & Delivery (led by PAC)
- RT3: Climate & Environment (led by MSSRF)
- Research into Use RIU (led by ACTS)
- South-South-North SSN (led by ACTS)
- Capacity Strengthening (led by UoE)
- Equity (led by UoE)
Appendix 8: Group Photograph

L-R (back row): Alex Mugova (PAC, Eastern Africa); Jacob Kimanzi (Kitui County Council); Natalie Akumu (Masanga CBO Group, Bondo); Eric Akotsi (Department of Renewable Energy, MoE); David Muthengi (District Education Officer, Kitui); Samuel Anyienda (RAID, Bondo); David Tegutwa (District Officer, Rarieda); John Ouma (CBO Group Coordinator, Bondo); Lubanga Osango (Forest Officer, Rarieda); Tameezan wa Gathui (PAC, Eastern Africa); Shadrack Kirui (ACTS); Geoffrey Mutuku (Charcoal Transporter, Kitui); Edwina Atieno (Cobra CBO Group Bondo); Dominic Kinoti (NEMA, Bondo); Boniface Mutie Kivindu (Charcoal Producer, Kitui); Gisinalis Barasa (OCS Mutomo, Kitui); Jane Mung’oma (Practical Action, Eastern Africa).

L-R (front row): Cecillia Ocholla (Chamluchi CBO Group, Bondo); Joseph Njigoya (Zonal Forest Officer Kitui); Wairimu Ngugi (Rapporteur); Halima Abdi (Chief Central, Kitui); Josephine Gacheri (Charcoal Retailer, Kitui); Jackson Bambo (Kenya Forest Working Group); Josephine K. Mwangi (Charcoal Broker, Kitui); Cosmas Okwama (Chief, Central Uyoma, Bondo).