



# ***SUSTAINABLE CHARCOAL PRODUCTION FOR POVERTY REDUCTION IN TANZANIA ( SOME ISSUES AND OPTIONS ).***

***Some Selected Experience from TaTEDO's work on improved charcoal production practices.***



***Bioenergy for Sustainable Development in Africa.  
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# **Presentation Outline.**

- **Country context:**
  - **Tanzania – Location & Features.**
  - **Tanzania Development Vision and Strategy.**
  - **Energy Situation in Tanzania.**
  - **Tanzania Policies relevant to Biomass Energy.**
- **Tanzania Energy strategy and direction outline.**
- **Charcoal Sector**
  - **Economic and Environment issues.**
  - **Why charcoal use is preferred.**
  - **Sustainable charcoal production.**
  - **Barriers to sustainable charcoal production.**
  - **TaTEDO initiatives on improved charcoal production.**
  - **Achievements from TaTEDO initiatives.**
  - **TaTEDO participation in energy policy and strategy development.**
- **Conclusions and Recommendations.**
- **About TaTEDO.**

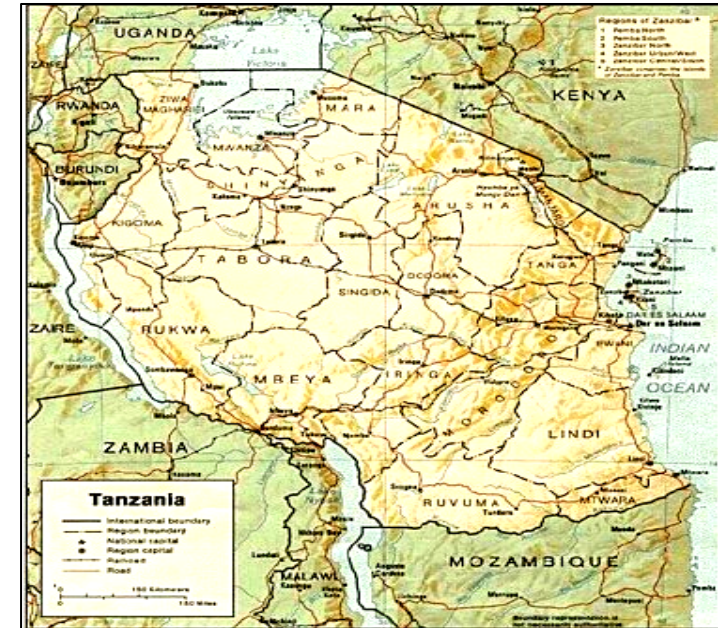
# COUNTRY CONTEXT



## Tanzania- Location and Features.

**Location:** Tanzania lies between  $1^{\circ}$  and  $12^{\circ}\text{S}$  and  $30^{\circ}$  and  $41^{\circ}\text{E}$  between three great lakes - Victoria (north), Tanganyika (west) and Nyasa (south) in the Western Rift Valley and the Indian Ocean (east) in East Africa.

**Altitude:** The altitude varies between the summit of Mount Kilimanjaro 5,950 m. above sea level and the floor of Lake Tanganyika 358 m. below sea level.



Lake Tanganyika-Gombe  
Shore (358 m below sea  
level)

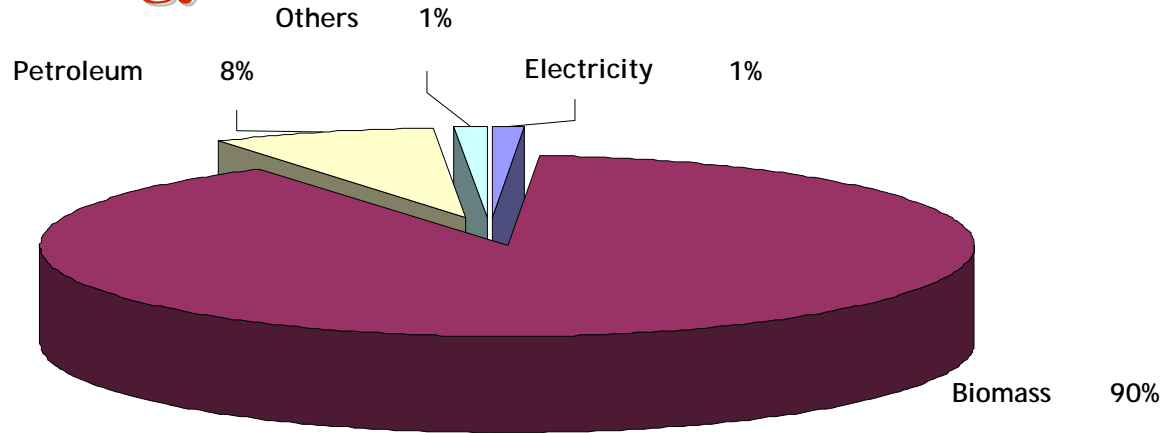


# **Tanzania Development vision and strategy.**

- **Despite recent improvement in economic performance, poverty remains the principal challenge in Tanzania, and any efforts to improve the bioenergy production and use must operate against this background.**
- **Key initiatives include the Development Vision 2025 document, which sets the broad development agenda for Tanzania; the National Poverty Eradication Strategy, focusing on poverty targets; the Tanzania Assistance Strategy, for directing external support to priority areas.**
- **The National Strategy for Growth and Reduction of Poverty (or MKUKUTA in Kiswahili) is a national organizing framework focusing on poverty reduction. MKUKUTA specifically sets a goal for reducing the “proportion of population depending on biomass energy for cooking from 90 percent in 2003 to 80 percent in 2010.**



# Energy Situation in Tanzania.



- **Wood fuels (charcoal and firewood) meet 90% of the total energy consumption**
  - Accounts for more than 80% of cooking needs in urban and more than 90% in rural areas.
  - Yet is left with the informal sector.
  - Implications on deforestation and forest degradation is high.
- **Gender dimensions – women spend up to 6 hrs per day collecting fire wood.**
- **Only 2% of rural homes have access to electricity (& only 39% in urban areas)**
- **In urban areas the poor spend up to 35% of their income on energy**

# Tanzania Policies Related to Biomass Energy



- Relevant biomass energy related policies in Tanzania support efficient technologies and sustainable biomass management.
- Energy Policy of 2003, *no bioenergy policy in place yet, liquid biofuels guidelines in the process.*
  - *“efficient biomass conversion and end-use technologies”,*
  - Forest Policy of 1998
  - *“Establishment of private woodlots and plantations for wood fuel production”.*
  - *“Village forest reserves will be managed by the village government”.*
- Land Policy of 1997
  - Recognize the importance of land tenure and management of resources over most land in Tanzania. The President owns the land in trust for present and future generations. Commissioner of land acts and administer land, granting right of occupancy and general underlying right to land, but clearly recognize customary and other use rights to land including biomass conservation.
- Environmental Policy of 1997
  - *“Investment in development is vital for environmental conservation including biomass conservation,”.*

## **Tanzania energy strategy and direction outline.**



- **Promoting affordable and reliable energy technologies and services to contribute to the achievement of MDGs.**
- **Reforming the market for energy services & establish adequate institutional framework – to facilitate investment, services expansion, efficient pricing mechanisms & other financial incentives.**
- **Enhancing development & utilization of indigenous & RE sources & technologies.**
- **Taking account of environmental concerns in all energy production and use.**
- **Promoting energy efficiency & conservation including biomass energy production and use.**



## **The Charcoal Sector facts**

- **More than 80 percent of the urban population (8mill.) in Tanzania depend on charcoal for their daily cooking.**
- **Unsustainable production of charcoal in Tanzania is a major cause of deforestation.**
- **Charcoal production alone, cause loss of forest cover at a rate of more than 100,000 hectares a year, this is on the increase.**
- **Charcoal production, high manual labor and minimal income are a cause of poverty for rural population**
- **Cost of purchasing charcoal and firewood collection and use are major causes of poverty in Tanzania.**



## Economic Issues

- Several recent studies have shown that over a million urban Tanzanian households use approximately one million tons of charcoal annually as their primary source of energy for cooking;
- Logical alternatives are either unavailable (briquettes) or seen to be dangerous and too expensive (LPG);
- Tens of thousands of rural Tanzanian micro-entrepreneurs depend on the revenue resulting from charcoal production and trade for their subsistence;
- Some District Councils near main urban areas reports that, greater than 70% of their revenue is a result of licenses and duties imposed upon charcoal producers and traders;
- Annual charcoal consumption is valued at approximately Tsh 310,845,934,157 per year (roughly US\$250 million<sup>way</sup>).
- As such is a key sector employing more than 150,000 people-using local energy resource and technology.



Load of charcoal bags on the way

## Environmental issues.



- To produce one million tons of charcoal using traditional methods, the producers have to clear-cut the equivalent of 331.7 hectares of forest every day. A full year of this consumption equates to more than 121,061 hectares of forest destroyed.
- Within the charcoal catchments areas of Dar es Salaam city it has been observed that the forest mean annual increment is  $2.35\text{m}^3/\text{ha}/\text{year}$  while annual cut for charcoal is  $6.4\text{m}^3/\text{ha}/\text{year}$ ;
- Ministry of Natural Resources and Tourism believes that current annual forest reduction is between 120,000 and 500,000 hectares, against only 25,000 hectares planted;
- The accelerated harvesting of trees impacts negatively upon soil, watersheds, biodiversity and climate change.
- According to various studies and calculations, each ton of charcoal produced and consumed in Tanzania generates nine tons of  $\text{CO}_2$  emissions, one million tons of charcoal thus translating into nine million tons of  $\text{CO}_2$ ;

# Why use of Charcoal is preferred instead of Firewood ?



- Its higher calorific value per unit weight than fire wood.**
- It is more economical to transport charcoal over longer distances as compared to firewood.**
- Storage of charcoal takes less room as compared to firewood.**
- Charcoal is not liable to deterioration by insects and fungi which attack firewood.**
- Charcoal is almost smokeless and sulphur free as such it is ideal fuel for towns and cities.**
- Availability, price and convenience in small quantities**



# **Sustainable charcoal production could occur in several ways.**



- Ensuring financial profitability of charcoal making operation.
- Promoting community and private sustainable managed woodlots for charcoal.
- Sustainable forest management- through selective harvesting within the forest MAI.
- Demarcation of the forest into annual blocks indicating clearly the allowable sequence of harvesting cycles.
- Involve local communities in forest management.
- Protect clear felled forest areas for regeneration.
- Use by-products of sustainable timber and agricultural production.
- Improve charcoal production, transportation and marketing.



Women cooking with improved charcoal stove.



# Sustainable charcoal production ctnd...



- Support farmers within peri-urban and nearby rural areas to establish woodlots for charcoal production.
- Ensure sustainable management of Charcoal production from public general village forests.
- Promote large scale use of more efficient kilns combined with more efficient stoves.
- Organize and empower small scale charcoal producers to use efficient kilns and form marketing associations.
- Set up certification system designed to differentiate sustainable charcoal from traditional.



Half orange charcoal kiln.





## **Barriers to sustainable charcoal production.**

- **Government is yet to recognize charcoal as the main source of fuel for cooking in urban areas, as such is left to the informal sector.**
- **Lack of clear bioenergy policy, strategies and effectively enforced regulations.**
- **Lack of basic data and baseline information for policy formulation.**
- **Limited capacity and will to organize the charcoal production sector.**
- **Charcoal is under priced energy resource. Trees are obtained free of charge from the forest,**



- **The current traditional charcoal production practices and technologies in Tanzania are inefficient and unsustainable.**
- **Most charcoal is produced through traditional earth mound kilns from wood cleared mostly from natural forests.**
  - **7kg of wood are required to produce 1kg of low quality charcoal with 26kJ/kg.**
  - **However 4.5kg of wood is required to yield 1kg of charcoal with a calorific value of more than 31kJ/kg.**



Over the years, TaTEDO in collaboration with different partners has provided support to charcoal producers to adopt sustainable charcoal production practices which include, tree planting, better wood harvesting practices and use of improved charcoal kilns to replace inefficient traditional earth mound kilns.

**Main objective:** To improve quantity and quality of charcoal produced from a given volume of wood while conserving the environment and improving livelihoods of producers and users of charcoal in Tanzania.



Support tree nurseries and tree planting- capacity building

# **TaTEDO initiatives on improved charcoal production.**



**Promote use of efficient Charcoal Production Kilns  
-TOT and charcoal producers training.**



**Half Orange Kiln (HOK)**

**Applicable where there is large  
amount of biomass as raw  
materials  
(25-30%).**



**Improved Basic Earth mound Kiln (IBEK)**

**Efficiency of about 20-25 per cent  
Carbonization cycle time 4 days**

## CHARCOAL FROM FARM RESIDUES AND SAWDUST



**Promote simple retorts for carbonizing sawdust and agricultural residues. The carbonized residues are then made into briquettes using appropriate briquette machines.**



Externally heated simple retort.

**Annually Millions of tons of sawmill and agricultural residues are produced, this could be turned into quality charcoal**



# Achievements from TaTEDO initiatives.



- More than 650 charcoal producers and 100 TOTs at the district have been trained over a period of three years.
- More than 700,000 tree seedlings have been raised and planted by peri-urban smallholder farmers, schools and women groups.
- Training manual, trainer's guide and hands on manual on improved charcoal production.
- Manuals on methods of tree planting have been prepared and published.
- Several private farmers, farmer groups and schools have been trained and assisted to establish commercial nurseries, tree growing and environment conservation.
- More than 10 groups of charcoal producers have been formulated and are being assisted to establish associations for marketing charcoal collectively.



Charcoal training at Kisangara.

# **TaTEDO participation in energy Policy and Strategies Development in Tanzania.**



- **Participate as member of the national Energy and Industry advisory group.**
- **Member of the Bioenergy Policy development working group.**
- **Member of the National institutions collaborating in research and development hosted by the commission of science and technology.**
- **Member of the Technology Development and Transfer Centre hosted at the University of Dar es Salaam.**
- **Member of National biogas steering committee chaired by the Ministry of Energy and Minerals.**
- **Hosts the national sustainable energy advisory group.**

# Conclusions and Recommendations.



- Charcoal will remain a growing dominant source of energy for cooking for the urban households sector for the foreseeable future in Tanzania.
- Currently the charcoal industry, despite its many shortcomings, delivers charcoal to urban users through an informal system based on unfair market forces.
- To facilitate large scale uptake and use of efficient kilns, a combination of economic and legal instruments should be introduced.
- The formulation of bioenergy policy including that of charcoal production and utilization could create new possibilities for the modernization of charcoal industry in Tanzania.
- Forest Division should work closely with the Energy Department and other stakeholders to enhance sustainable management of natural resources for charcoal production.
- Appropriate legal mechanism should be put in place to enhance the role of key actors in this very important and vital energy source
- The Government should devise an effective method of charcoal revenues collection and plough back some of this revenue for its development.

## Conclusions and Recommendations.

- Participatory forest management should include charcoal producers who should be trained on sustainable forest harvesting and improved charcoal production practices and technologies.
- Production of green charcoal from forests and farm residues through simple locally produced retorts and briquette machines should be promoted.
- Charcoal Producer associations should be empowered for improved charcoal production and marketing.
- The rate of adoption of Improved kilns and stoves is still relatively low. There is urgent need to extend support for scaling up greater uptake and adoption of more efficient and modern charcoal production practices, kilns and stoves.



Sazawa charcoal stove.



## *About TaTEDO:*

- A Centre for sustainable modern Energy Initiatives and non-profit sharing organization established in 1990.
- **Vision:** Poverty free and self-reliant communities in Tanzania accessing sustainable modern energy services.
- **Mission:** To advance popular access to sustainable modern energy technologies in marginalized communities in Tanzania through technological adaptations, capacity building. Community mobilization and advocacy for increased access to sustainable energy.
- Some key activities: Capacity building, community mobilization, advocacy, energy technologies development and transfer, networking, energy related enterprise development services, etc.
- Has diverse partnership base, locally and internationally with GOs, LGs, NGOs, Private Sector, Donors, and communities.
- Has field experience of more than 17 years in sustainable energy activities - studies, planning, implementation, enterprises support, monitoring and evaluation. Has multi-disciplinary team of 55 staff.



# THANK YOU FOR YOUR ATTENTION



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