

SOLID BIOMASS ENERGY IN TANZANIA

By

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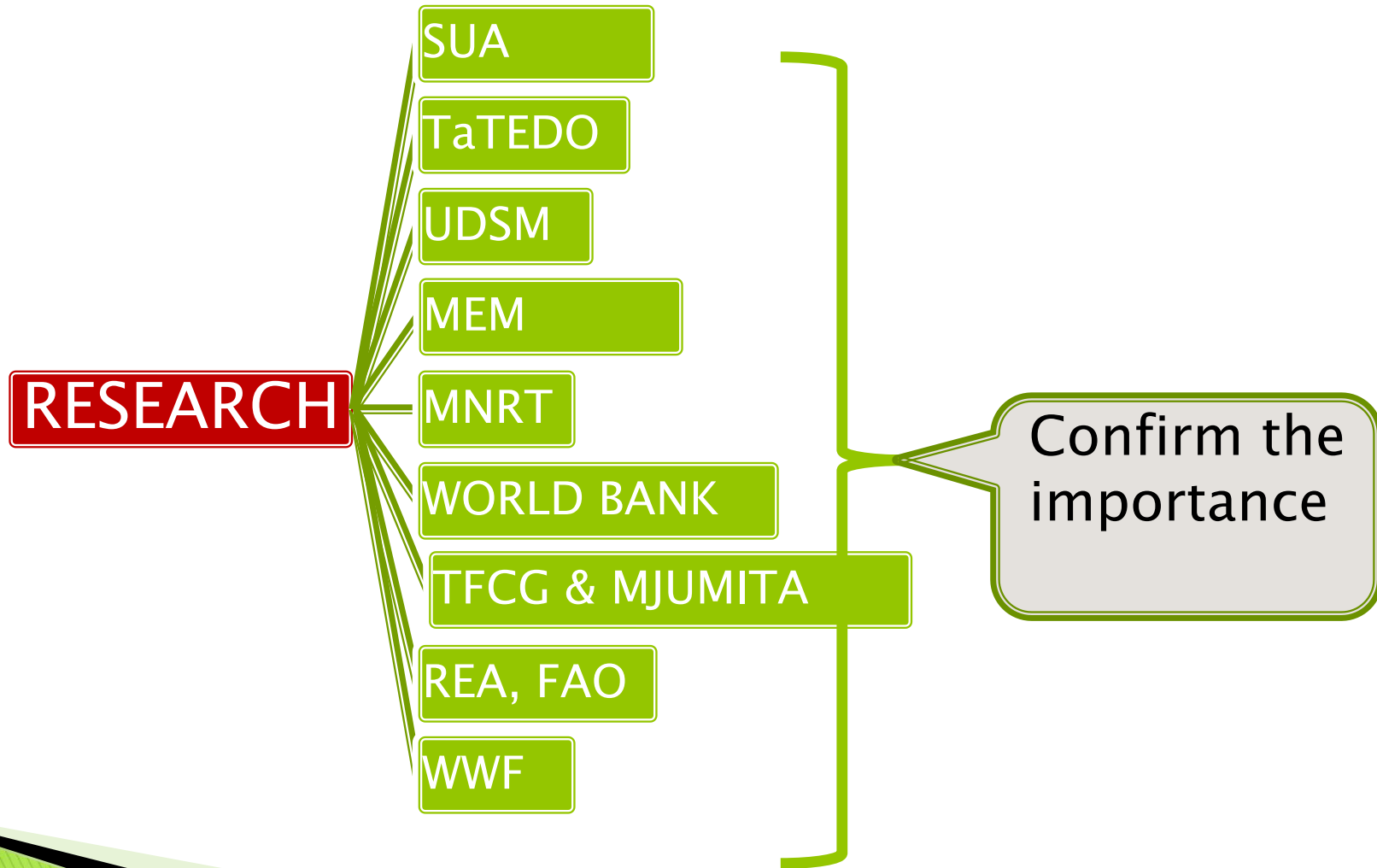
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INTRODUCTION

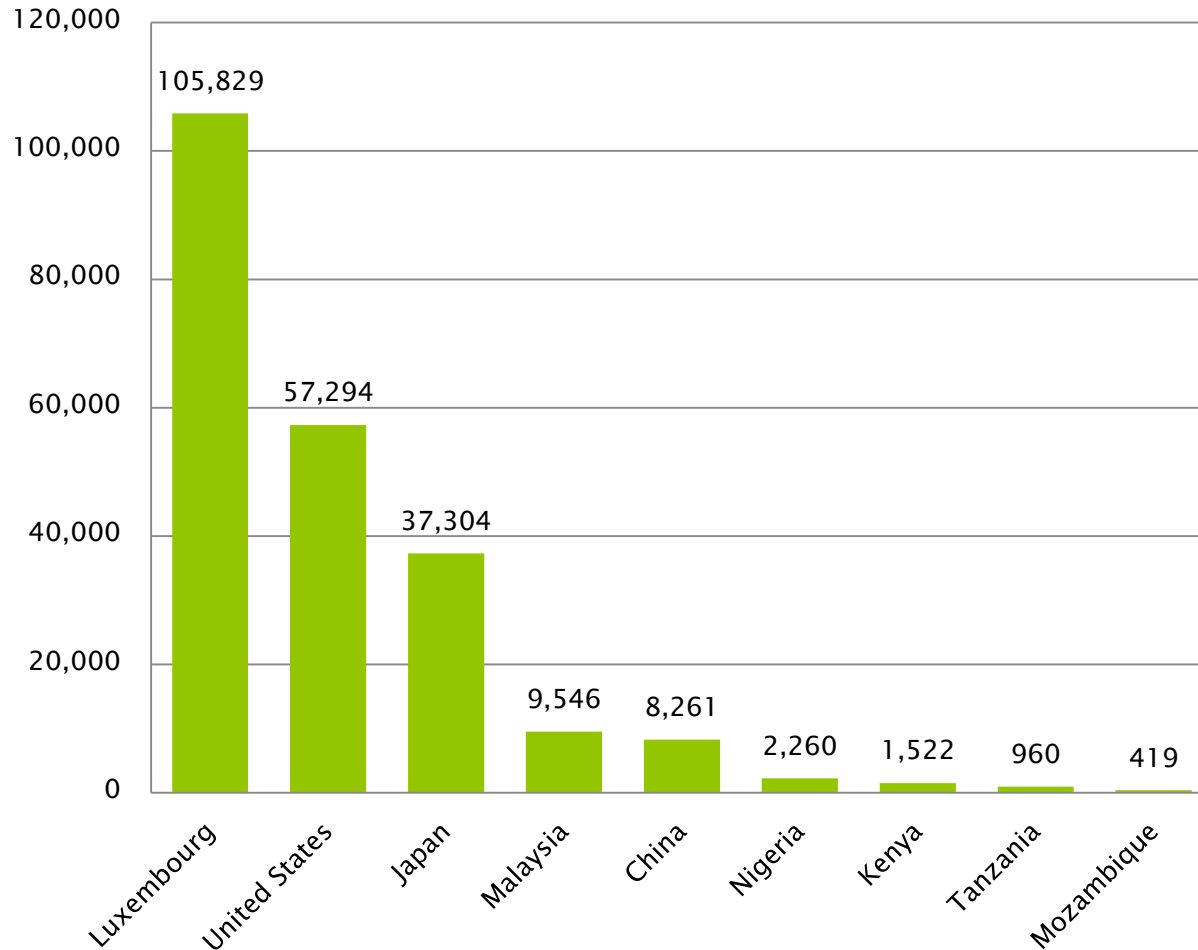
- Information is available from several sources



Energy and development

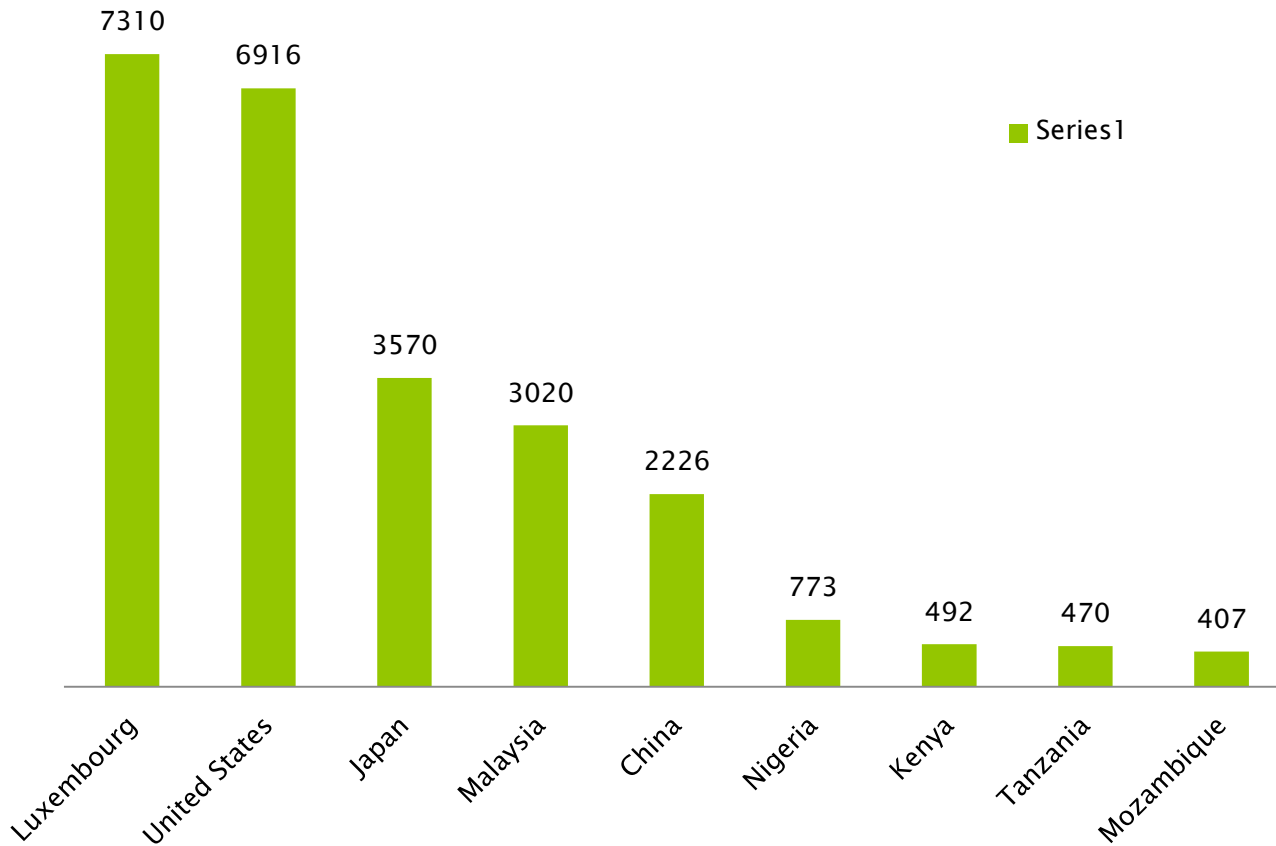
- Energy is needed to fuel economic growth and development.
 - Poverty has a bearing to the type(s) and quantities of energy consumed.
 - Developed economies consume more energy per capita and have capacity to develop new sources or secure imports.
 - Poor countries have limited capacity.
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GDP (per capita in US \$) 2016



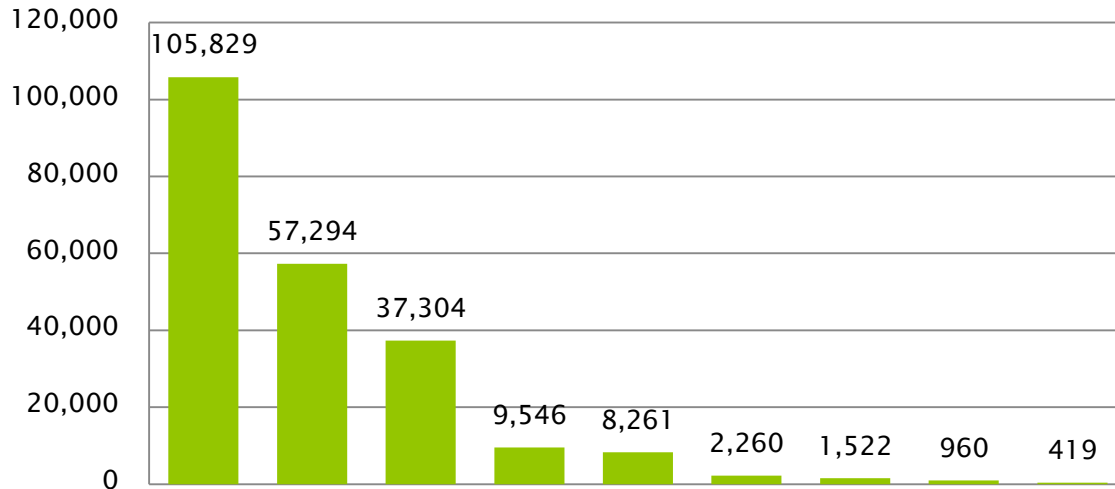
country	GDP (per capita in US \$)	Rank
Luxembourg	105,829	1
United States	57,294	8
Japan	37,304	25
Malaysia	9,546	66
China	8,261	75
Nigeria	2,260	133
Kenya	1,522	148
Tanzania	960	160
Mozambique	419	183

Energy used per capita 2014(kg of oil equivalent)

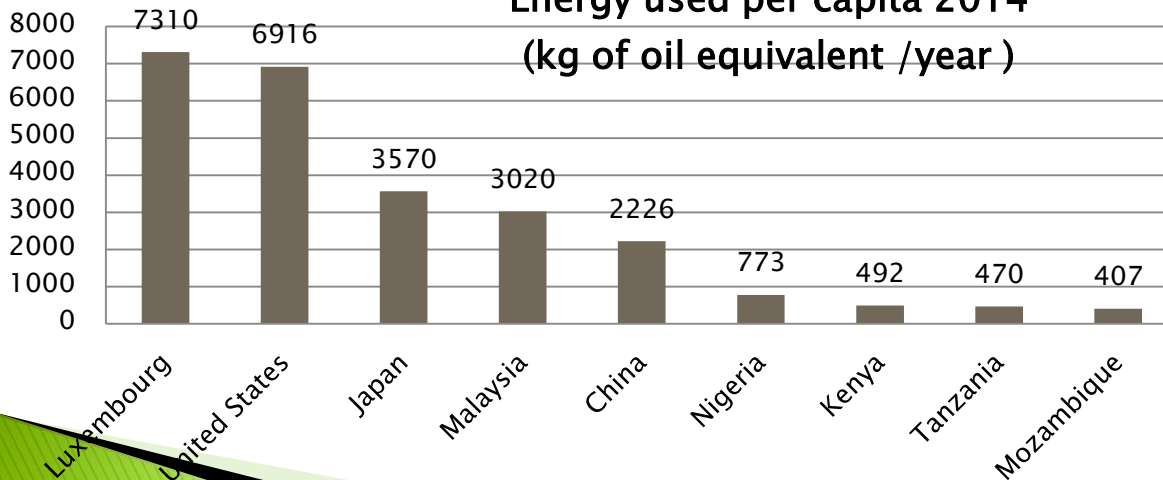


country	Energy used
Luxembourg	7310
United States	6916
Japan	3570
Malaysia	3020
China	2226
Nigeria	773
Kenya	492
Tanzania	470
Mozambique	407

GDP (per capita in US \$)2016

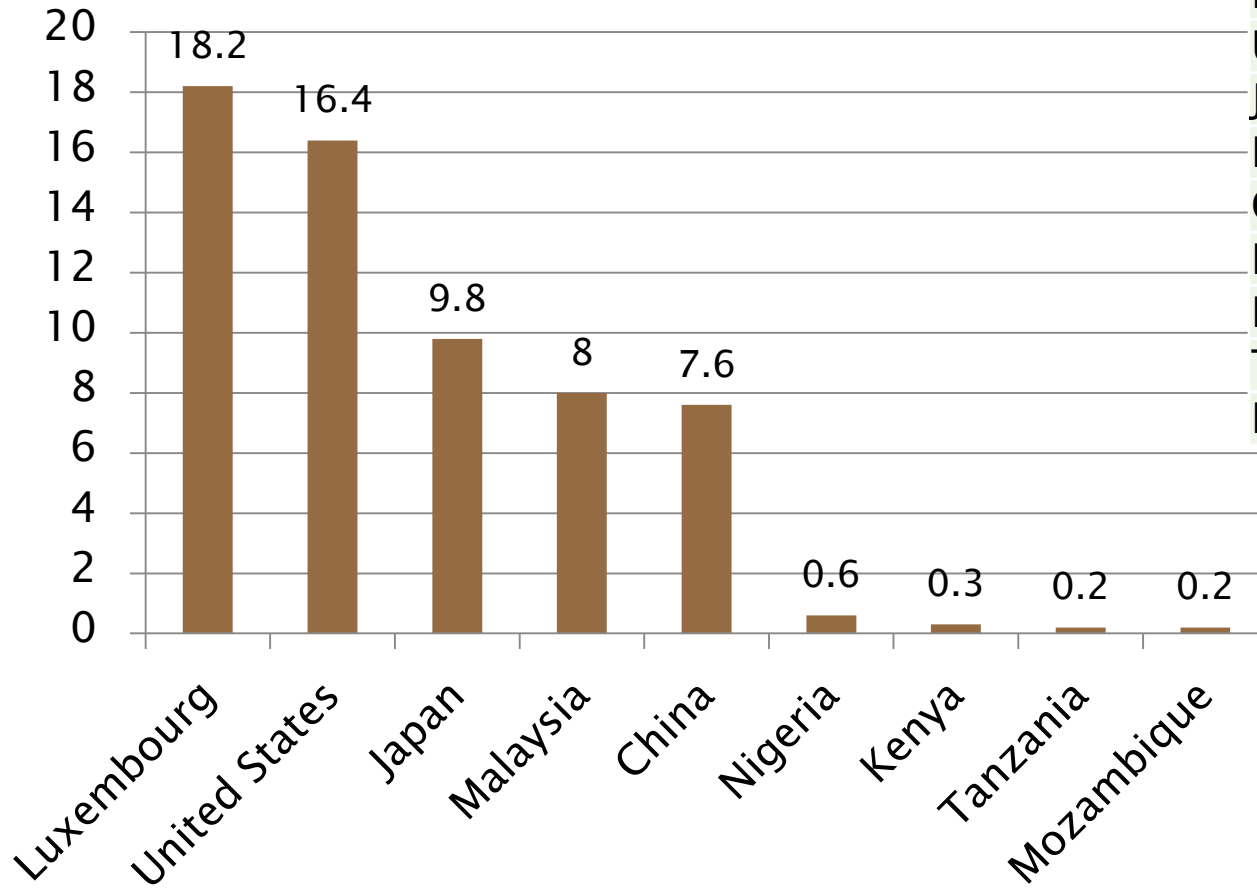


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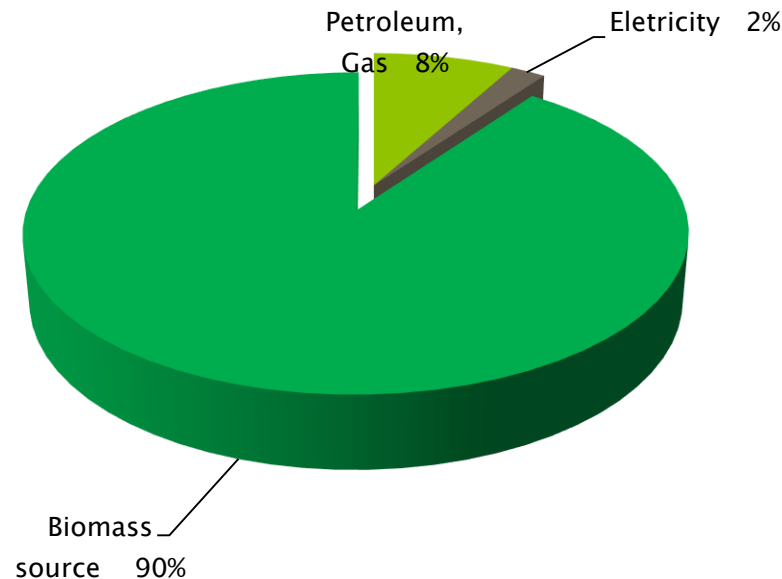
Carbon dioxide emission in metric tons/capita in 2013



country	CO2 emission
Luxembourg	18.2
United States	16.4
Japan	9.8
Malaysia	8
China	7.6
Nigeria	0.6
Kenya	0.3
Tanzania	0.2
Mozambique	0.2

ENERGY SITUATION IN TANZANIA

- In Tanzania like most developing countries, solid biomass energy in form of wood fuel (fuel wood & charcoal) dominates as a source of energy
- In 2013, wood fuel accounted for about 90% of the total national energy consumption with 2% from electricity and 8% from petroleum products.



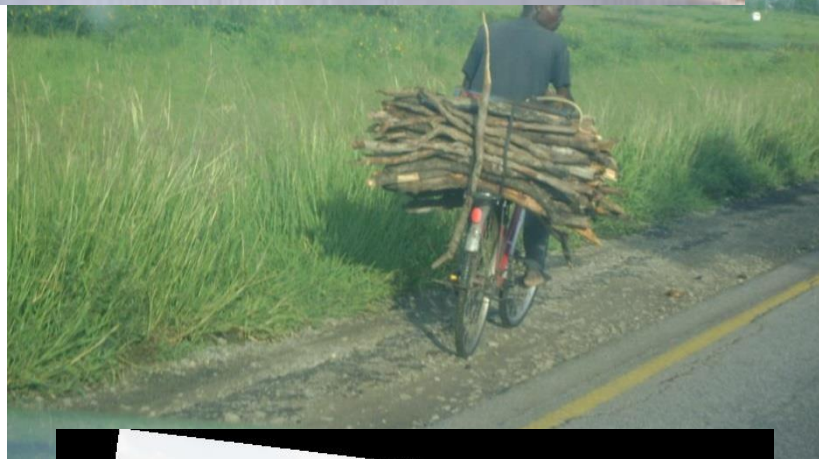
- In 2015 biomass energy was reported at 85% of the total energy consumption.



Fuelwood

- ▶ Major source of domestic energy in rural areas (more than 70% of the Tanzanians)
- ▶ Also used in peri-urban areas
- ▶ Respiratory diseases
- ▶ Low thermal efficiency of 10% (3 stones)
- ▶ Efficiency can be improved to 20% or more







- ▶ Fuel wood is important source of energy for fish drying, brick burning, tobacco curing, tea drying local brewing, schools, bakeries, hospitals, prisons, etc. This situation will not change abruptly

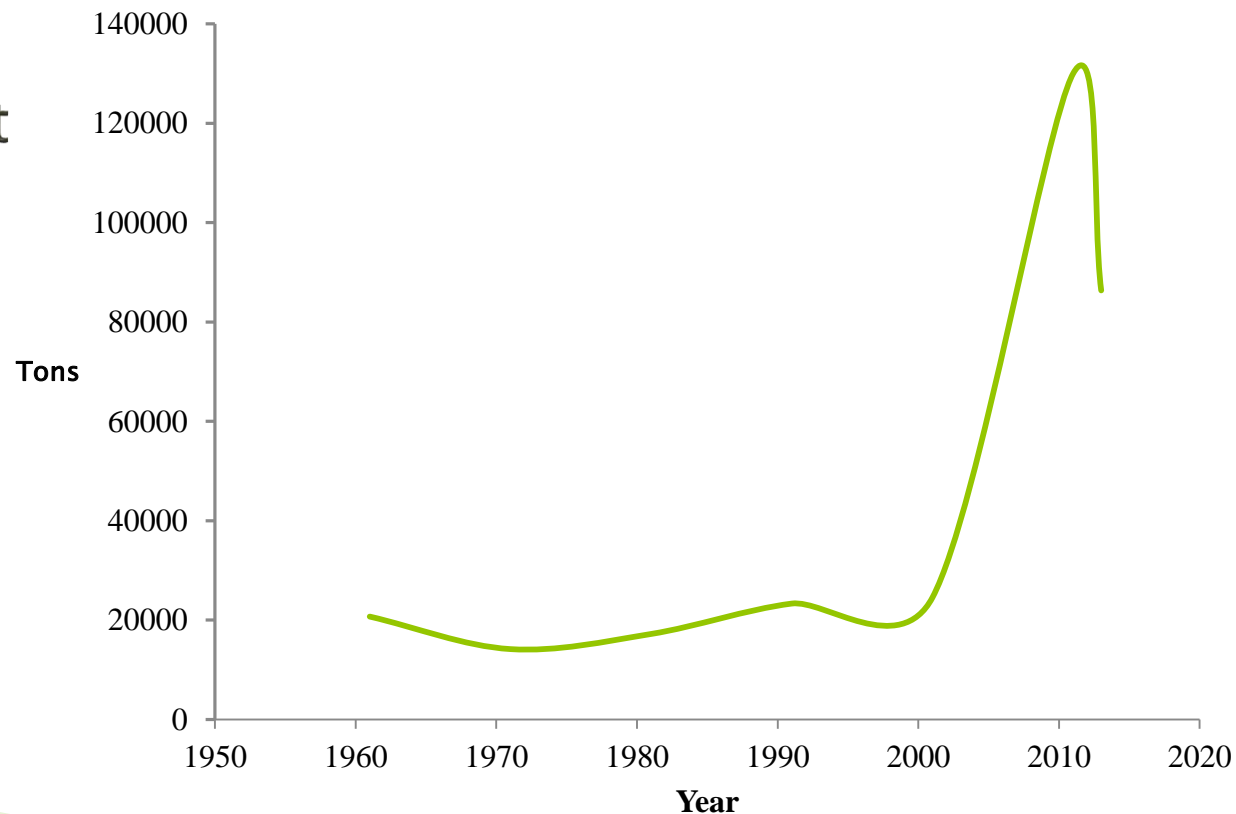


Tobacco production in Tanzania steadily expanded annually from 2,701 tons in 1961 to 130,000 tons of tobacco produced in 2012.

To cure one tonne of tobacco 42 m³ of solid fuel-wood is used(MEM, 2005).

For a production of 130,000 tons of flue-cured tobacco produced in 2012, it is estimated that 5,460,000 m³ of wood were used equivalent to wood in 109,200 ha of forest. However, wood consumption for tobacco curing can be reduced by 50%, if improved barns are used.

Tanzania Tobacco production, Tons



Charcoal

- ▶ Over 2.3 million tonnes of charcoal were consumed in 2012, predicted to double by 2030 (URT, 2015b).
- ▶ Charcoal is taken for granted because there are so many producers, can be purchased everywhere in urban areas, it is always there (unlike kerosene, LPG and electricity), because everyone has the appliances to use it
- ▶ Used by majority (households, policy makers, from local restaurants to expatriate development partners)
- ▶ Is a massive industry, providing livelihoods for thousands of people eg charcoal producers, transporters, traders along the supply chain (generates at least US\$ 1 billion per annum)
- ▶ Over 300,000 rural families (over 1 million rural people) depend on charcoal production.

Charcoal production

- ▶ Rural earnings from charcoal are greater than those from coffee, tea, cotton, sugar, cashews, etc
- ▶ To produce one ton of charcoal in the traditional kiln, 10 – 12 tons of wood are used
- ▶ Wood contained 583 ha of forest were required daily in 2012 and is in most cases harvested illegally
- ▶ Unfortunately charcoal producers are not organized
- ▶ Also, charcoal is inefficiently produced & used but also unsustainably managed





Charcoal transportation

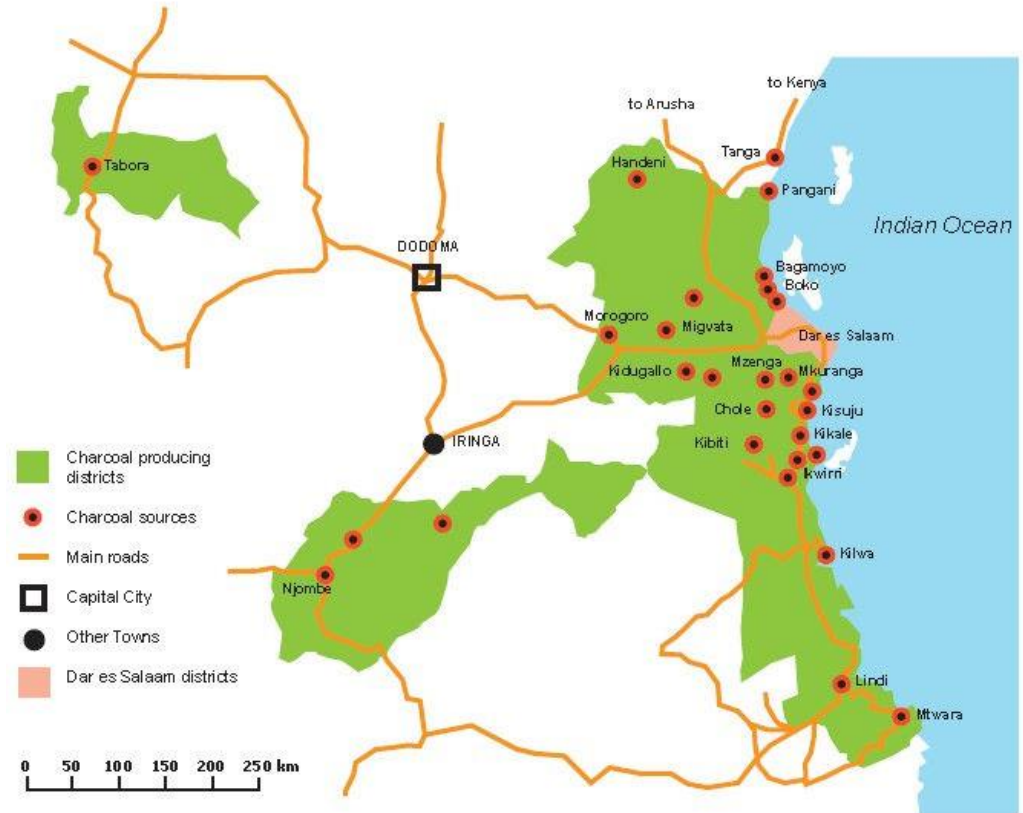
- Thousands of people engage in transporting charcoal from rural producers to urban users
- Bicycles, motorcycles, trucks, private , STK vehicles , tractors, etc are used





Charcoal transportation cont...

- Charcoal is produced and transported sometimes many kilometers from urban centres
- Production usually located close to access roads
- Transported on a return trip, after delivery upcountry



Sources of Charcoal for Dar es salaam (2008, Malimbwi and Zahabu,)

Wholesaling and retailing ...

- ▶ Produced in rural areas and consumed in cities & towns.
- ▶ There are many charcoal wholesalers and retailers in urban Tanzania (including home delivery)



Zanzibar relies on Tanzania mainland for charcoal and fuelwood



Charcoal is also imported into Tanzania priced at 5 times per kg when compared to locally produced charcoal

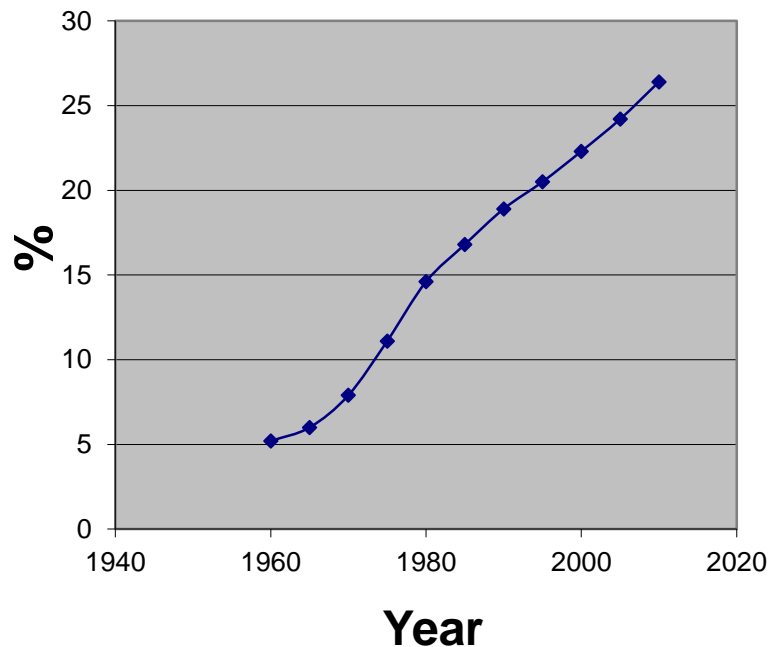


Many end users

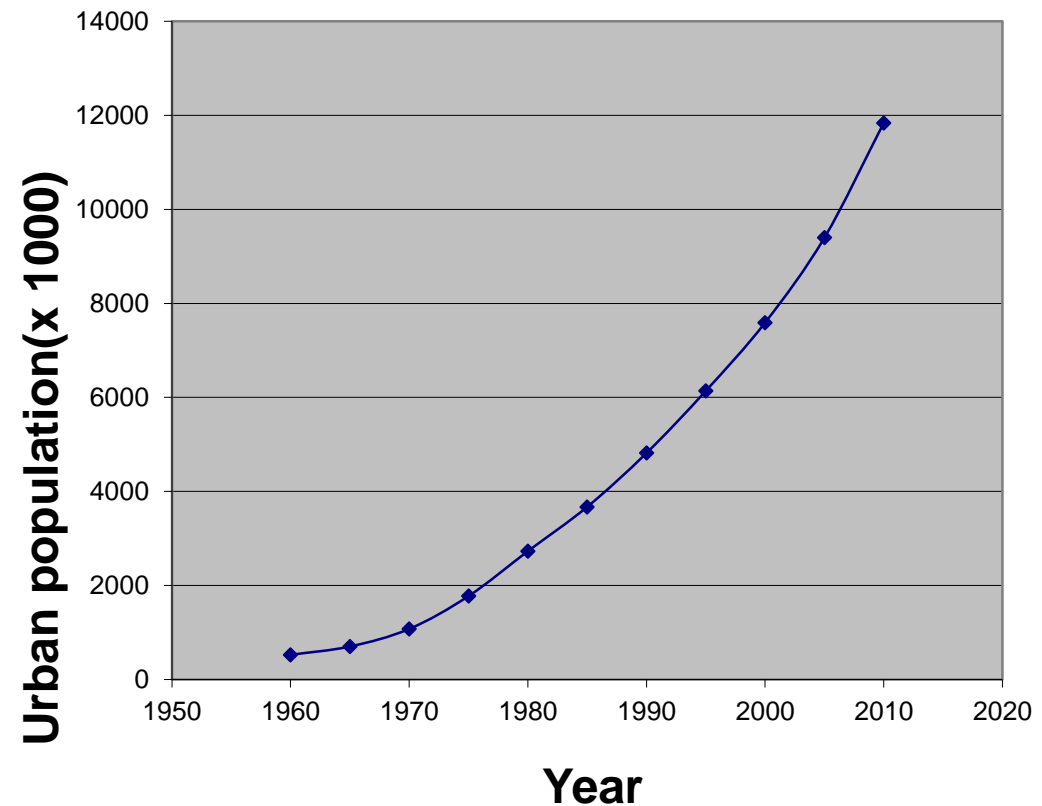


- ▶ Charcoal is mainly used in urban areas, primarily by urban households, restaurants, hotels.
- ▶ The urban population is increasing annually

% of Urban population in Tanzania




Urban population in Tanzania




Unsustainable supply

- ▶ Production forests where harvesting can be conducted legally cover an area of only 21 million hectares, of which 90% is covered by woodland (low productivity, having MAI of <1 to 2 m^3 per ha)
- ▶ In year 2012 there was a wood deficit of 19.5million m^3 from the production forests. The deficit increases annually & exponentially mainly due to increasing population.
- ▶ The wood demand is unsustainably met by overharvesting in accessible forests and encroachment in protected forests that are supposed to be legally in-accessible for wood harvesting.

CHALLENGES

- Characterized by very weak governance and weak law enforcement. It is almost a free access to wood resources.
 - Resulted to forest degradation and deforestation
 - Generally, illegally and unsustainably harvested mainly from miombo woodlands without payments being made for the raw material (wood), and licenses and levies largely evaded
 - Inefficient production & utilization technologies
 - A perception that it is a poor man's business, considered 'dirty' and economically unattractive
 - The sector is informal, almost totally unregulated, and open to any and all who wish to participate in it.
 - Significant changes need to be introduced to regularize and legalize this sector
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- The sector is characterized by;
 - a multitude of commercial players,
 - a large number of institutional and policy players
 - no comprehensive, unified national, regional or local vision, policy for the sector.
 - various laws, regulations and administrative policies touch on wood fuels.
 - hardly feature in national or local policy and planning
 - Wood fuel not considered a “commercial energy source” like petroleum, electricity, gas and coal.
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- It is wrongly viewed as a “traditional”, “inferior”, as retrogressive and environmentally destructive, tolerated rather than encouraged energy source that will grow less important, as economic development occurs and “modern” energy sources become more widely available
- Tanzania’s “National Strategy for Growth and Reduction of Poverty II (NSGRP II or MKUKUTA II)” of July 2010 (following MKUKUTA I in 2005) holds the same vision of Tanzania transitioning from woodfuels to “modern fuels”.
- There is nothing that will change that quickly.
- At current prices, most Tanzanians cannot afford fuel-switching since the so-called modern sources of energy are expensive and the prices are always increasing.
- On the other hand, Tanzania has a unique opportunity to convert its large biomass resource base potential into a sustainable and renewable energy asset

Current relative prices of energy for cooking

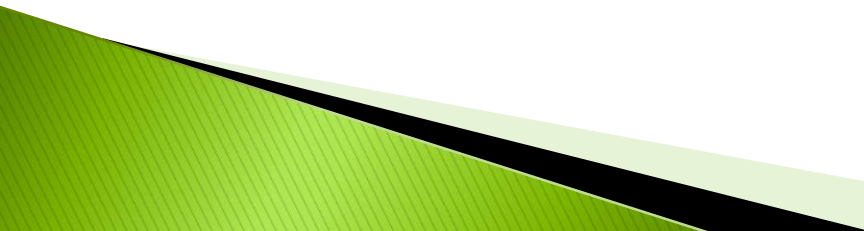
Energy source	Unit price (TZS) Nov 2013	KWH/KG	TZS/KWH equiv	End use cooking) efficiency	TZS/kWH equiv (effic factor
Kerosene (per litre)	2000	11.8	169.5	0.4	424
Tanesco electricity	273	1	297.0	0.7	424
LPG					
S					
3kg	16600	13.6	406.9	0.6	678
6kg	20000	13.6	245.1	0.6	408
15kg	50000	13.6	245.1	0.6	408
36kg	122909	13.6	237.8	0.6	396
Charcoal Briquettes(per kg)					
High	800	9.1	87.9	0.15	586
Low	400	9.1	44.0	0.15	293
Charcoal (per kg)					
Tradition cook stove	437.5	9.1	48.1	0.15	321
Improved Charcoal Stove	437.5	9.1	48.1	0.3	160
Fuel wood (per kg)					
Open fire	150	4.5	33.3	0.1	333
Improved Stove	150	4.5	33.3	0.2	167

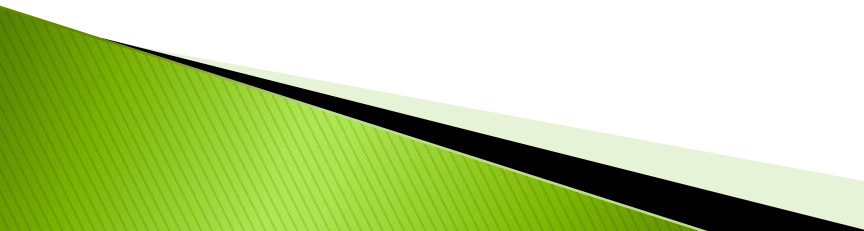
- ▶ If nothing is done to address the rampant deforestation and degradation and no additional plantations are established, the annual deficit will increase exponentially from 19.5 million m³ in 2012 to 47.2 million m³ in 2030.
- ▶ The environmental and social impacts of this deficit will be devastating.

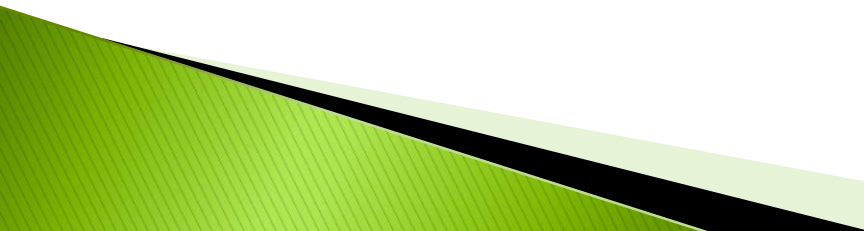


POLICY ISSUES

National Energy Policy 2015 as an example

- ▶ In the Foreword to the National Energy Policy the Minister states that the “role of the policy is to ‘enhance provision of adequate, reliable and affordable **modern energy** services to Tanzanians in a sustainable manner’ and that the role of MEM is to lead the implementation of the policy”.
 - ▶ If that is the case, which ministry is responsible for ‘traditional’ energy sources?.
 - ▶ As part of the transition process, MEM must ensure sustainable supply of ‘traditional energy’
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- ▶ Although woody biomass supplies 85 % of the energy consumed in Tanzania (URT, 2015), unfortunately not one of the 101 policy statements in the 2015 National Energy Policy addresses woodfuel consumption.
 - ▶ In general there is a significant disconnect between the way that charcoal is treated in national policies and its economic importance.
 - ▶ While the National Energy Policy 2015 recognizes that woodfuel is the most widely used form of energy in Tanzania; fails to provide any policy objectives or statements so as to offer national guidance on woodfuel.
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- ▶ The well intended policy aim to shift Tanzania towards electricity and fossil fuels.
 - ▶ However this will take at least the next 10 – 20 years. In that period, the majority of Tanzanians will continue to depend on woodfuel for cooking.
 - ▶ Thus the policy fails to provide much-needed policy guidance on sustainable energy supplies for the majority of rural and urban households (in the transition period which is also likely to be the life span of the policy). The policy should also provide clear guidance on how to manage the present situation.
 - ▶ Promotion of rural electrification by the policy, be looked primarily in the context of lighting and rural enterprise development rather than for domestic cooking.
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THE WAY FORWARD

- Wood fuel need explicit recognition and a key place in the policies and strategies of Tanzania.
- A policy and legal framework is required to guide the sustainable development and growth of this sector
- Significant changes (based on policy) need to be introduced to make wood based energy more modern, more efficient, sustainable, cleaner in both production and use. Need to be formalized into the economy so as to continue as an important source of economic livelihoods to thousands of Tanzanians.
- Since the National Energy Policy is now approved (and provide limited guidance to biomass energy i.e. 85%), a separate Biomass energy policy is required. In the absence of such a policy, the Biomass Energy Strategy is unlikely to secure required political support needed to address existing challenges.



This presentation is intended to provoke a discussion on solid biomass energy



Asante sana

