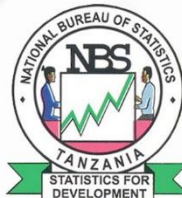


THE UNITED REPUBLIC OF TANZANIA

# IMPACT OF ACCESS TO SUSTAINABLE ENERGY SURVEY (IASSES 2021/22)



## ACCESS TO ELECTRICITY AND MODERN COOKING SOLUTIONS Key Findings



NOVEMBER 2023



# Impact of Access to Sustainable Energy Survey (IASSES 2021/22)

## Key Findings Report





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# 1 Introduction

In 2021/22 the National Bureau of Statistics (NBS) in collaboration with Statistics Norway, conducted a survey on the impact of access to sustainable energy for the first time in Mainland Tanzania. The Government of Tanzania and the Norwegian Agency for Development Cooperation (Norad) through Statistics Norway funded the survey. Ministry of Energy, Tanzania Electric Supply Company (TANESCO), Rural Energy Agency (REA) and Energy and Water Utilities Regulatory Authority (EWURA) as leading institutions for the energy sector in Mainland Tanzania participated in the survey.

The main objective of the Impact of Access to Sustainable Energy Survey (IASSES) 2021/22 was to measure and document status of access to and usage of sustainable energy sources and the impact of such access in Mainland Tanzania and its regions.

The survey captures multi-dimensional access details on modern sources of energy where access would be measured by quantity, stability and affordability. This is a more advanced technique than the traditional statistical approach which usually only provides the “yes-no” information on “the main source of energy” for lighting and cooking.

The IASSES 2021/22 results will be used in monitoring the SDG 7 (Ensure access to affordable, reliable, sustainable and modern energy for all) and Target 7.1 (By 2030, ensure universal access to affordable, reliable and sustainable energy services). The data from the survey would also be used in policy development and review, planning and applied in evidence-based decision making.

## 2 Survey Design

The sample for the IASES is a two-stage sample, comprising urban and rural areas in each region of Mainland Tanzania. At the first stage, the enumeration areas (EAs) were selected within each domain using the probability proportional to size (PPS) sampling based on the number of households in each EA as registered in the 2012 Population and Housing Census. At the second stage all households in a given EA were listed and a fixed number of households was selected using random systematic sampling. The final sample of 6,564 households (2,580 in urban and 3,984 in rural) was selected. The sample was designed to give accurate representation for Mainland Tanzania, Dar es Salaam, other urban areas, and rural areas.



### 3 Access and Connection to Electricity

Access to electricity may be determined in several ways. This report is using international and national tools/methods and indicators as far as household data may allow. The main international goals and indicators are broad enough for Sustainable Development Goal Number 7 (SDG7<sup>1</sup>) aiming at affordable, reliable, sustainable and modern energy for all by 2030. Furthermore, accessibility to energy is defined by the degree and quality of access to energy. This is also described by a multi-dimensional tier-classification.

A household benefits from electricity by being connected to the main grid, accessing solar based or other sources of electricity, or through neighbours and next to the community. The indicators presented below include households connected to electricity and communities accessing electricity.

#### 3.1 Households Connected to Electricity

The IASES results show that about 46 percent of households are connected to electricity in Mainland Tanzania. The percentage of households connected to electricity has increased from 32.8 percent in 2016/17 to 45.8 in 2021/22 (Table 1).

**Table 1: Percentage of Households Connected to Electricity, Mainland Tanzania**

	2016/17	2019/20	2021/22
	(EAUSS I)*	(EAUSS II)*	(IASES)**
Mainland Tanzania	32.8	39.9	45.8

Source: \*Ministry of Energy through Rural Energy Agency (REA): Energy Access and Use Situation Survey I and II

\*\*NBS & SSB: 2021/22 Impact of Access to Sustainable Energy Survey, Mainland Tanzania

The percentage of households connected to electricity is higher in urban areas than in rural areas. Almost nine out of ten households in Dar es Salaam (87 percent) and seven out of ten in other urban areas (70 percent) are connected to electricity. In contrast, about four in ten households (36 percent) are connected to electricity in rural areas (Figure 1).

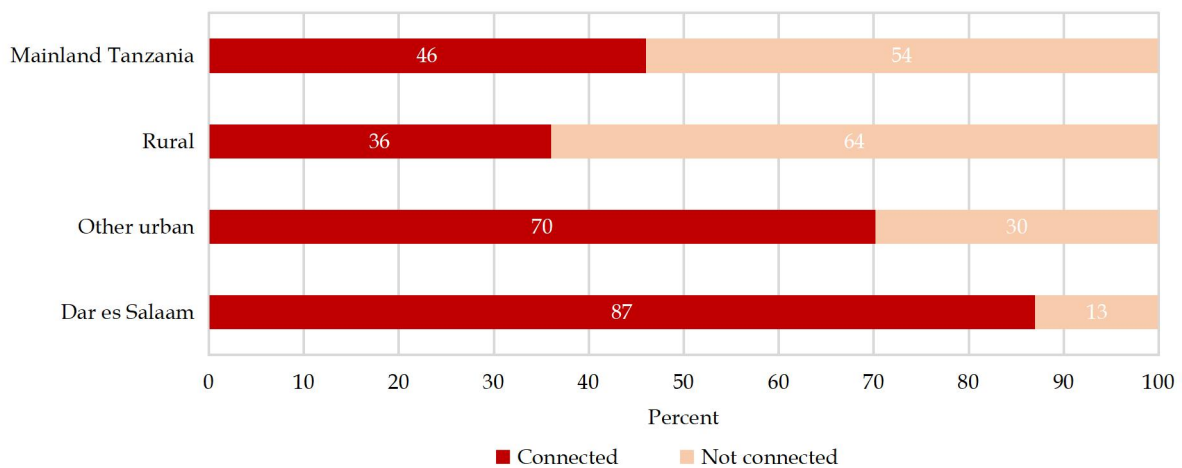
<sup>1</sup> SDG TARGET 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services

INDICATOR 7.1.1 Proportion of population with access to electricity. In meta-data: Access rates are only considered if the primary source of lighting is the local electricity provider, solar systems, mini-grids and stand-alone systems. Light on average for at least 4 hours per day and 1 hour at night.

INDICATOR 7.1.2 Proportion of population with primary reliance on clean fuels and technology

Clean is defined by the emission rate targets and specific fuel recommendations and in some circumstances by adopting advanced combustion cook stoves.

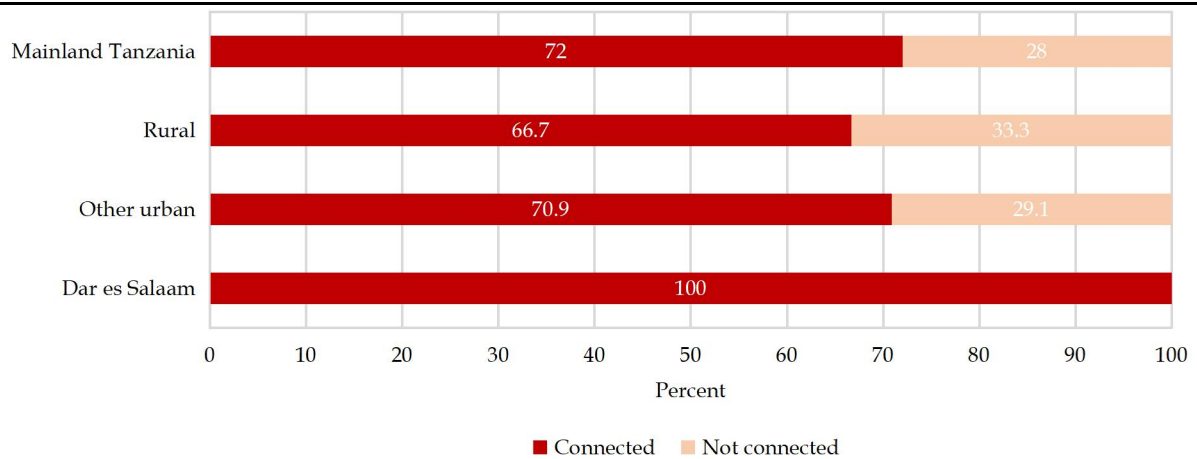
**Figure 1: Percentage of Households Connected to Electricity by Area, Mainland Tanzania (REA definition), IASES 2021/22**



### 3.2 Community Access to an Electrical Grid/ Electricity

The results show that 72 percent of households in Mainland Tanzania reside in communities with access to electricity. In Dar es Salaam, all households live in communities (mitaa) that have grid connection, followed by 70.9 percent of households in other urban areas. For those residing in rural areas, approximately two thirds of households (66.7 percent) live in communities with electricity.

**Figure 2: Percentage of Households Living in Communities with Access to Electricity by Area, Mainland Tanzania, IASES 2021/22**

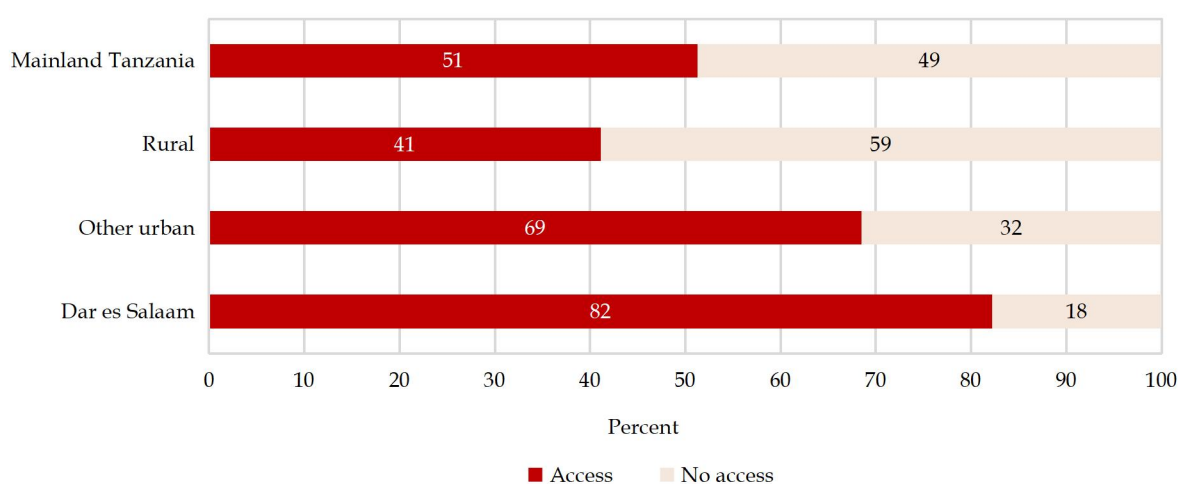


### 3.3 Access to Electricity as Defined by SDG7

Access to electricity as defined by SDG 7.1.1, requires access to a minimum supply of electricity sufficient to provide light for at least 4 hours during the day and 1 hour at night on average.

Figure 3 shows that, more than half of households in Mainland Tanzania (51 percent) access electricity in various forms. The share is relatively higher in Dar es Salaam (82 percent) and other urban areas (69 percent). In rural areas, however, only 41 percent of households have access to electricity.

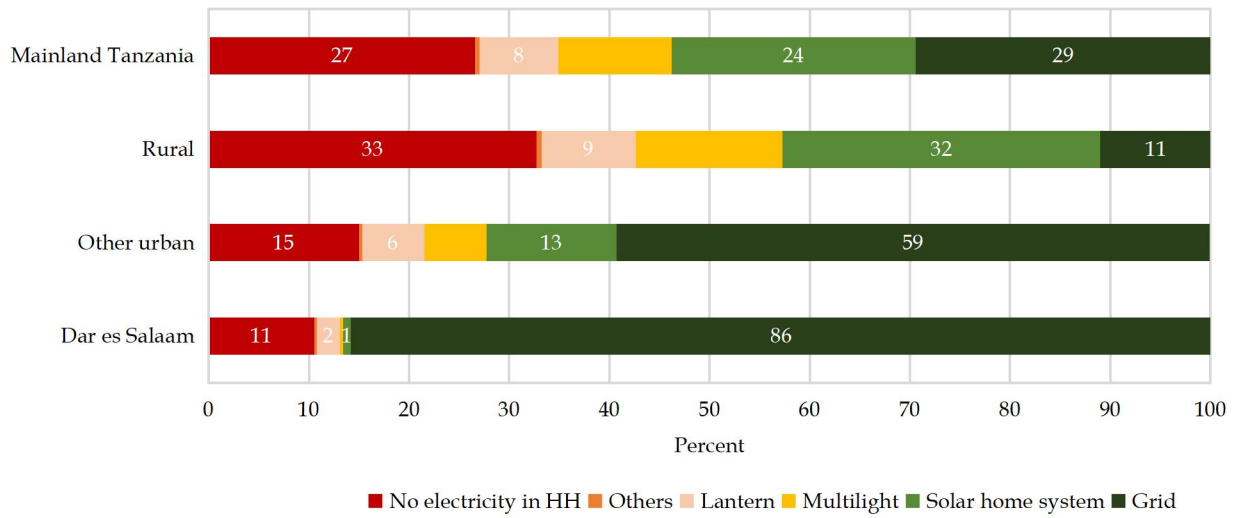
**Figure 3: Percentage of Households with Access to Electricity as Defined by SDG7 by Area, Mainland Tanzania, IASES 2021/22**



### 3.4 Main Source of Electricity

Figure 4 shows that about 30 percent of all households in Mainland Tanzania consider grid as their main source of electricity. In Dar es Salaam, it is the main source for 86 percent of the households. In rural areas, 11 percent of households reported grid as the main source while solar based sources (home systems, multi light and solar lantern) are the main sources for about 55 percent of the households. Around one third (33 percent) of rural households do not have electricity.

**Figure 4: Percentage of Households by Area and Main Source of Electricity, Mainland Tanzania, IASES 2021/22**



## 4 Tier Access to Electricity in Households

Access to electricity which is measured by the tier dimensions including: capacity, availability (duration), reliability, quality, affordability, legality, and health and safety. Households were classified into tiers for each dimension and overall tier is calculated based on the lowest of all the tiers.

### 4.1 Tiers Dimensions of Access to Electricity

The dimensions of access to electricity can be summarized based on definition and attributes of tiers (0 to 5).

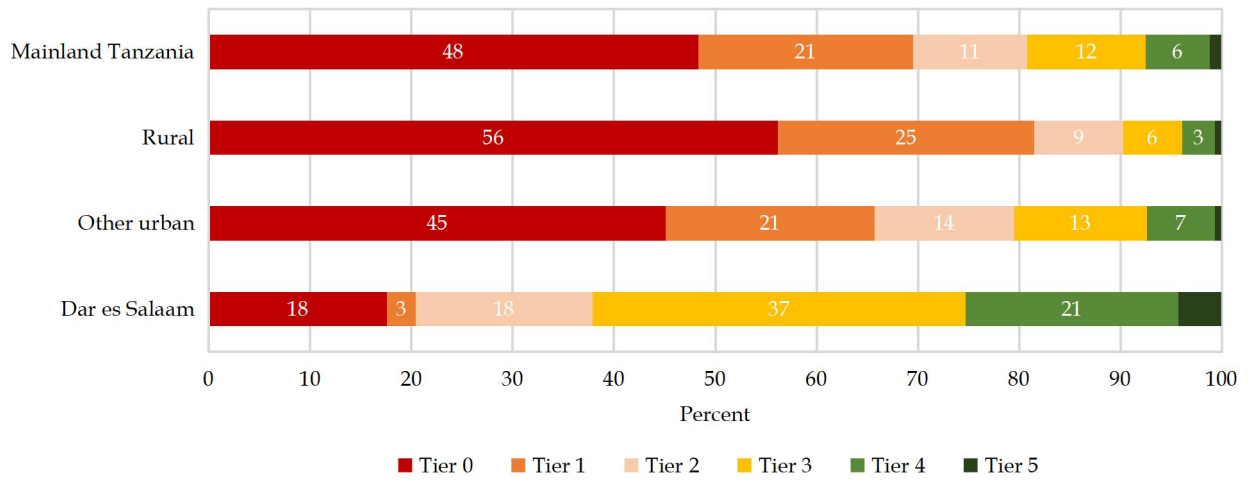
Table 2 shows the resulting distribution of households in the overall tiers. Overall, 69 percent of the households are in tier 1 or below and 31 percent are in tiers 2 to 5 while Seven (7) percent are in tiers 4 or 5.

**Table 2: Percentage of 12.796 million Households Overall Access to Electricity in Tiers Split in 7 Dimensions, Mainland Tanzania, IASES 2021/22**

DIMENSION		TIER 0	TIER 1	TIER 2	TIER 3	TIER 4	TIER 5	
Capacity	Power capacity ratings (W or daily Wh) including service used	42	26	3	0	0	30	100
Availability	Availability during day and night	35	2	10	39	11	3	100
Reliability	Disruptions	78				19	3	100
Quality	Voltage problems	75				25		100
Affordability	< or > 5 of income (total consumption as proxy)	42			58			100
Legality	Payment registered	73				27		100
Health & Safety	Accidents	70				30		100
Overall Access to electricity	N=12.796 mill.	48	21	12	12	6	1	100

Figure 5 shows the resulting distribution of households in the Areas. In Dar es salaam 21 percent of the households are in tier 1 or below and 55 percent are in tiers 2 to 3 while 26 percent are in tiers 4 to 5. In Rural areas 81 percent of the households are in tier 1 or below and 15 percent are in tiers 2 to 3 while 4 percent are in tiers 4 to 5.

**Figure 5: Percentage of Households by Area and Overall Access to Electricity in Tiers, Mainland Tanzania, IASES 2021/22**



## 5 Access to Modern Cooking Solutions

At the household level, the main non-electrical energy consumption is for cooking and in some countries also for heating. The energy carriers for cooking are usually solid fuel, gas (liquid gas and biogas), or liquid fuel but they may also be covered by solar energy or electricity. Traditional energy solutions based on solid fuel, either firewood or charcoal provides energy for both light and cooking. Access to electricity allows for a wider approach for cooking using closed and more efficient stove.



*Traditional three stone fireplace*

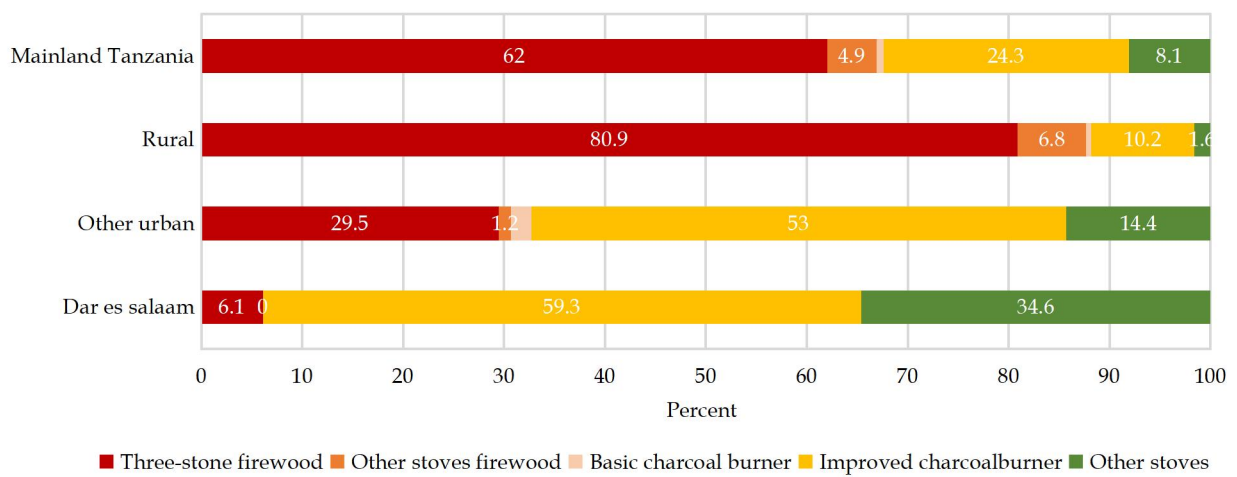


*LPG- stove*

### 5.1 Fuel and Stove Types

The results of the survey show that 67 percent of all households in Mainland Tanzania use firewood as their main source of energy for cooking while Charcoal is the second most common source of energy used for cooking (25 percent). In rural areas about 88 percent of households use firewood compared with 6 percent in Dar es Salaam (Figure 6). In Dar es Salaam like in other urban areas, charcoal is the most common fuel used for cooking. On the other hand, 34 percent of households in Dar es Salaam, use gas while electricity is used by less than one percent. In other urban areas, 14 percent of households use gas for cooking while only 2 percent use electricity. In rural areas, less than 2 percent of households use gas for cooking, and none use electricity.

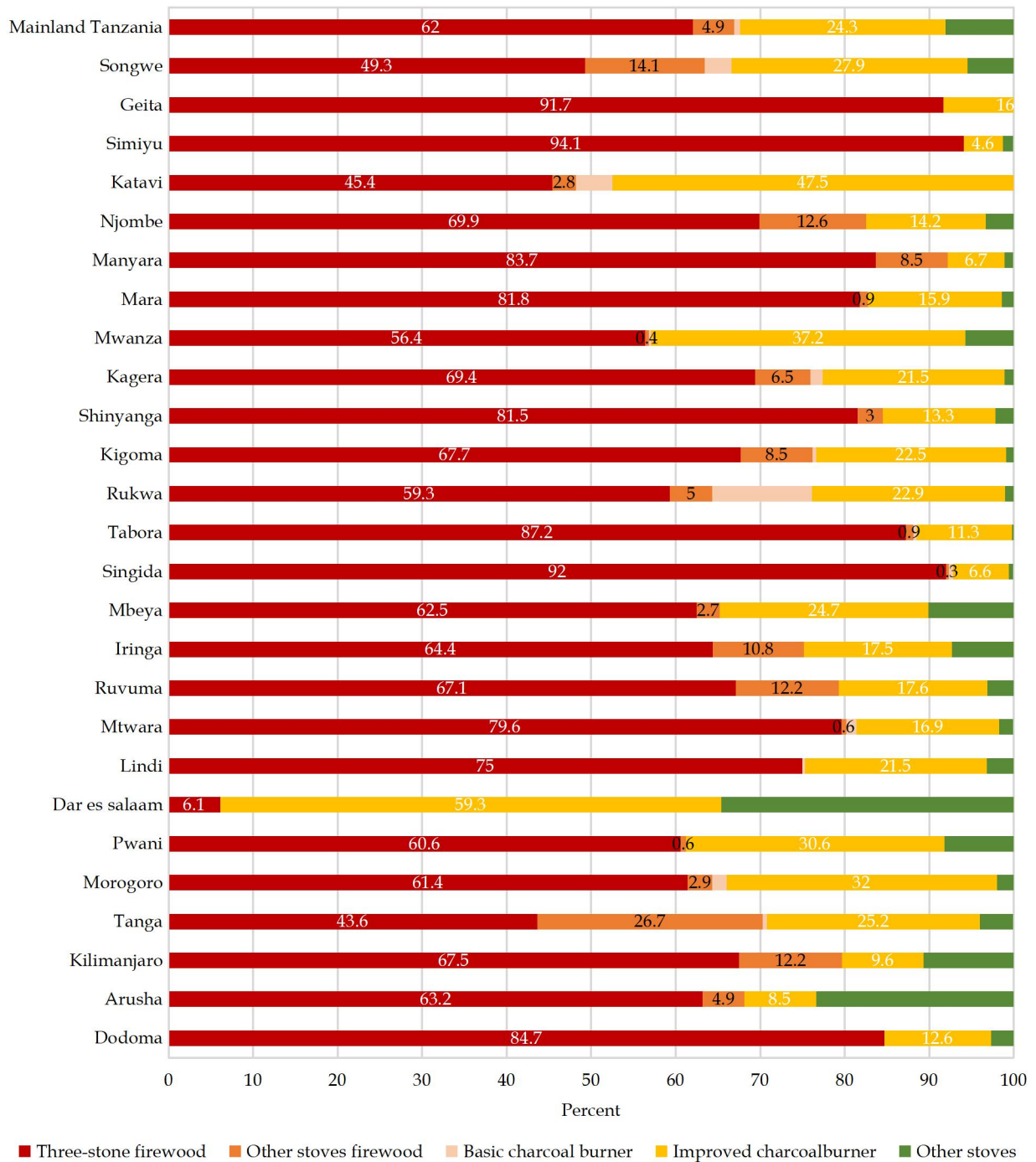
**Figure 6: Percentage of Households by Area and Main Cooking Stoves and Fuel, Mainland Tanzania, IASES 2021/22**



Variations are large across regions. Twenty-five (25) percent of households have improved firewood cooking stove in Tanga, while there is hardly any in Simiyu, Geita and Lindi.



**Figure 7: Percentage of Households by Region and Main Cooking Stove with Fuel and Improved Efficiency, Mainland Tanzania, IASES 2021/22**



## 6 Multi-Tier Cooking Solutions Framework

The "Beyond Connections: Energy Access Redefined" report [2] centers on achieving SDG Target 7.1, striving for universal access to affordable, reliable, and modern energy services by 2030. The report explores six dimensions pertaining to how cooking stoves contribute to sustainable and clean energy access, aligning with specific criteria such as the primary source of lighting and the duration of light provided. The assessment categorizes each dimension into tiers from 0 to 5, with 5 denoting the highest degree of access.

The IASES 2021/22 is based on these two sets of efficiency measurements implemented as a proxy fuel/stove type list presented below with the following colour codes for the different types of cooking stove and fuel. Red - tier 0 [Tier 0], Orange - tier 1 [Tier 1], Yellow- tier 2 [Tier 2], Blue- tier 3 [Tier 3], Light green - tier 4 [Tier 4], Green - tier 5 [Tier 5].

### 6.1 Main Statistical Facts on Cooking Stoves

The following are important findings from combining statistics of main cooking stove and the six dimensions of cooking solutions:

- i. In Mainland Tanzania 66 percent of all households are in tier 0 on access to modern cooking solutions as they use a traditional stove and have poor ventilation. One third (32 percent) of households are in tiers 1 to 3 as they use self-built or manufactured biomass stoves. Only 2 percent of households are in tier 4 and 5, because they use modern cooking solutions.
- ii. One of six households (18 percent) are unable to access modern cooking solutions as costs of cooking fuels are more than 5 percent of their total income per year. The remaining 82 percent can afford modern cooking solutions.
- iii. Traditional fuel and cooking stoves with high emissions and low efficiency still dominate. Half of the households use cooking stoves with high emissions of smoke and burning gases. More than half the households have cooking solutions with very low efficiency. Low efficiency contributes to deforestation as the need of firewood and charcoal is high.
- iv. The majority of the households using solid fuel take time to start a fire for each meal and spend more than 1.5 hours on food preparation. For most households, the remedy of high emissions during the considerable time spent at the cooking stove is neutralized by either a use of open cooking places or highly ventilated kitchens.

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<sup>2</sup> SDG TARGET 7.1

By 2030, ensure universal access to affordable, reliable and modern energy services INDICATOR 7.1.1

Proportion of population with access to electricity. In meta-data: Access rates are only considered if the primary source of lighting is the local electricity provider, solar systems, mini-grids and stand-alone systems. Light on average for at least 4 hours per day and 1 hour at night

- v. In rural areas, traditional open fireplaces dominate. These stoves are inefficient because they burn firewood without regulating airflow. They consequently demand a lot of money for buying firewood or a lot of time for collecting it.
- vi. The majority of households in urban areas use charcoal burners with regulated airflow which results in low emission and higher efficiency. These improved charcoal burners regulate the airflow either by closing the inflow of air to reduce capacity when food preparation only requires simmering, or by insulating burning chambers with increased efficiency.
- vii. LPG stoves are common in Dar es Salaam (almost 35 percent of households) but less common in other urban areas (14 percent). In rural areas use of gas is seldom. LPG is more efficient than charcoal, and much cleaner. Two problems with LPG are it is costly and unlike charcoal, it is not sold in small packages. You may buy a small cylinder of gas for TZS 24,000, while a small package of charcoal costs TZS 500. However, gas may be cheaper than charcoal over time, but requires more money at once. In addition, gas is not available in all areas, and therefore there are problems of buying and having the container refilled.
- viii. A range of LPG cooking stoves are used even though by a few households. Hence one expects that many households have knowledge of alternative more efficient solutions. The question is then what prevents the households from investing in more efficient solutions.
- ix. Serious accidents happen such that 1 out of 25 households report a serious accident in a year due to cooking-stove.
- x. Fuel is affordable for the majority of households. The estimated volume of charcoal according to Household Budget Survey 2011-12<sup>3</sup> and the mean costs in the current IAES survey, indicate that, about 5 out of 6 households may cover their fuel costs by 5 percent of the total income. Firewood is cheaper in rural than urban areas and this compensates for the lower income in rural areas. The costs for charcoal and LPG are at the same level, but somewhat more expensive than firewood.
- xi. Fuel is however not available throughout the year for the average household. More than half of the households (54 percent) experience fuel shortages for 2 months or more in a year.
- xii. In order to reduce the burden of household on provision of energy in rural areas, increase the use of improved cook stoves which will reduce the costs of fuel in a short time.

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<sup>3</sup> National Bureau of Statistics - Household Budget Survey main report, 2011/12 ([nbs.go.tz](http://nbs.go.tz))

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