

Policy Brief

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Climate change mitigation and adaptation initiatives: Profile of biomass briquette producers in Tanzania

Executive Summary

The energy sector is a major emitter of greenhouse gases, primarily from the use of unclean cooking fuels like coal and wood, contributing to climate change. Unsustainable wood harvesting for fuel also leads to deforestation, reducing forest carbon uptake. Adopting alternative fuels such as biomass briquettes could mitigate these emissions, but their adoption in Tanzania, introduced four decades ago, remains low. A study mapped biomass briquette producers across twelve Tanzanian regions, finding a concentration in Dar es Salaam.

Ownership is predominantly male, with men also dominating managerial and briquette-making roles. Skills are acquired through various methods, with private producers managing most industries. Challenges like limited customers, raw material shortages, and drying space constraints hinder production capacity. Recommendations include promoting women's participation in the biomass briquette industry, integrating briquette skills into technical education, and enhancing community awareness and support from government and the private sector.

Key Messages

- The population of biomass briquette producers is growing because of the demand for environmentally friendly energy sources,
- The majority of producers are in the private sector and have formalised their businesses,
- Not only most producers are men, but they have also employed more men than women,
- Many of their members of staff have acquired biomass briquetting knowledge and skills through self-learning and apprenticeship.

Introduction

Since the 1800s, temperatures have increasingly risen, and the climate has been varying and changing across the globe because of natural and human activities. The effects of climate change are an existential threat to all known life on Earth. The debate on how to address the climate change problems calls for different levels to address the climate change issues. There are various mitigation and adaptation measures such as practices, technologies, and policies.

Use of biomass briquettes is part of the measures as

they are less carbon emitting sources and reduce the use of wood fuel and charcoal Tanzania has joined the international community to address the environmental challenges, including the climate change impacts. The Vice-President Office the Division of Environment, National Environment Management Council (NEMC) and other government institutions like the Tanzania Industrial Research and Development Organization (TIRDO) are committed to addressing such issues. There are also non-governmental organisations such as CARE, CANTZ, TCCI, SNV, IMED and AMRE whose missions are also related to mitigation and adaptation measures. In the 1980s, biomass briquettes were introduced in Tanzania, but over time despite their Environmental, and health benefits, the adoption rate is still low. The adoption of this energy source involves mainly producers and users though other stakeholders like the government also have a big role to play. The question is what makes the low adoption of such a beneficial innovation in the country?

Diffusion of Innovation theory guided the analysis to answer the question. This policy brief aims to prese-

nt the profiles of biomass briquette producers and give policy prescriptions. In this context, the term profile covers geographical locations, staffing, ownership and registration, and producer's population growth.

Methodology

Quantitative methodology was employed to collect and analyse data. The research methods were a survey and observation. The questionnaire survey was used to collect data from 58 selected biomass briquette producers. Also, observation was used to gather data from 44 chosen producers and 43 biomass briquette samples obtained from 43 producers. The observation techniques were overt non-participant structured observation for producers and laboratory tests for the biomass briquette samples. The data sources were selected through a non-probability strategy using a combination of purposive, convenience, and snowball techniques. The fieldwork was conducted in Tanzania mainland regions of Arusha, Coast (in Kiswahili, Pwani), Dar es Salaam, Iringa, Kilimanjaro, Lindi, Morogoro, Mtwara, Mwanza, Tabora, and Tanga as well as in Tanzania Zanzibar Mjini Magharibi (in English West Town). These regions were chosen because they were potential areas for biomass briquettes production and located in different geographical areas to cover a big proportion of the country. The fieldwork was conducted from June to August 2022

Results

The results comprise the magnitude and patterns of geographical distribution, staffing, ownership and registration, and established trend of briquetting industries.

Geographical location

Producers with different characteristics produce biomass briquettes. Of the 58 studied industries, one-third were located in Dar es Salaam, one in ten in Mwanza, and a handful of them in each of the other regions (see Table 1).

Table 1. The number of industries in the sampled regions

Region	Number of Industries	Percentage (%)
Dar es Salaam	17	29
Mwanza	7	12
Arusha	5	9
Kilimanjaro	5	9
Morogoro	5	9
Coast (Pwani)	5	9
Iringa	4	7
Tabora	4	7
Tanga	3	5
Lindi	1	2
Mtwara	1	2
West Town (Mjini Magharibi)	1	2

Staffing and staff qualities

Members of staff responded on behalf of producers who had different demographic features. The majority (71%) were men. Both men and women respondents aged between 22 and 74 years old. They had different levels of education, which were primary, secondary, college, and university. These education categories had almost equal shares; that is, a quarter for each category. In addition to respondents, producers had various categories of employees based on gender, skills, citizenship, and size (see Table 2). There were more men than women workers across managerial and briquettes making skills. The biomass briquetting skills were acquired through formal and informal learning approaches (see Figure 1). Two-thirds of respondents acquired them through self-learning, close to two-thirds via in-house training and one in ten through apprenticeship. It was also discovered that the briquetting does not require sophisticated technology and high skills. None of the foreign staff was a woman and all held managerial positions. The staff size ranged between one and 31 members, and the average was five operators in each industry.

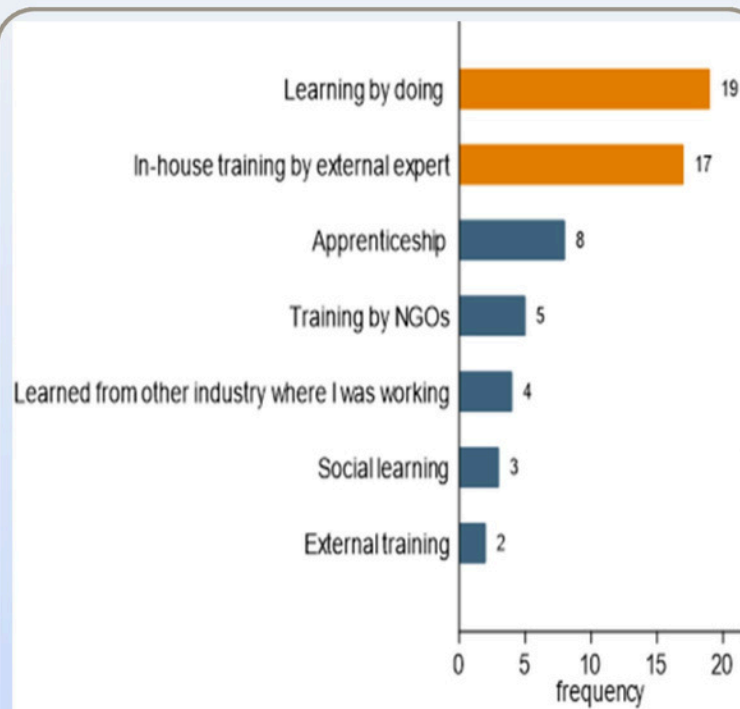


Figure 1. Briquetting skills learning approaches

Table 2. Gender, skills, and citizenship of employees in the biomass briquettes industries

Skills	Citizenship and Gender			
	Tanzanian males	Tanzanian females	Foreigner males	Foreigner females
Managerial, administrative, human resource and financial skills	74	53	9	-
Skilled personnel (briquette-making skills)	195	99	-	-
Unskilled personnel (briquette making skills)	171	87	-	-

Ownership and registration

The biomass briquette production business was owned by private establishments, groups, Non-governmental organisations (NGOs), Community-Based Organisations (CBOs), and the government (see Figure 2). The majority of

industries (74%) were run by private producers, while about one in ten by groups of producers. Most industries (90%) were owned by Tanzanians. Additionally, the majority of these establishments (78%) were registered. Of the 78% registered establishments, many (60%) were registered with the Business Registration and Licensing Authority (BRELA) and close to one-third with Local Government Authorities (LGAs). Others were registered with the NGO Registrar, Economic Processing Zone Authority (EPZA), and BPRA. Reasons for those who did not register were new business, high registration cost, lack of awareness, and non-commercial use.

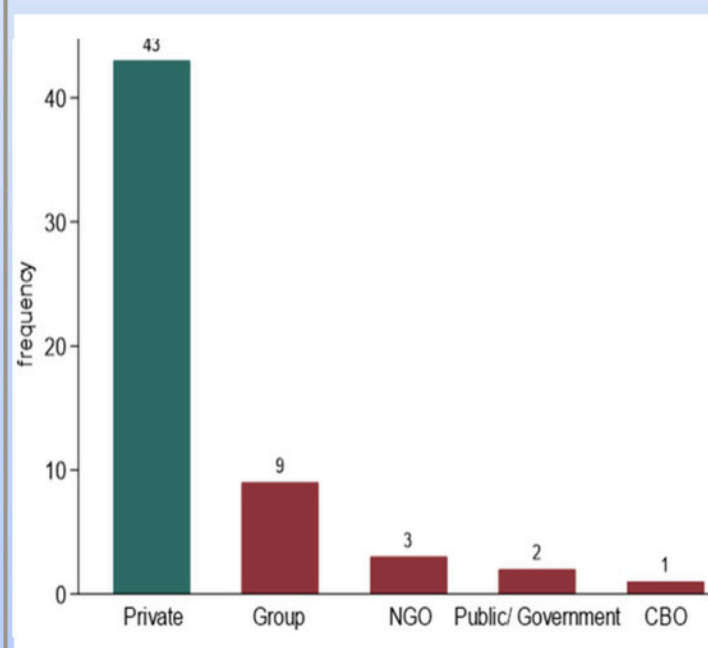


Figure 2. Biomass briquette ownership categories

Trend in producers population

Biomass briquettes industries were established since 1985 (see Figure 3). During the fieldwork it was observed that about two-thirds of the industries (69%) were operational. For those which were not reasons include lack of market (19%), financial constraints (31%) and technical challenges (50%). Additionally, those which were operating had different installed and actual production capacities. For example, the installed capacity ranged from 0.25 to 1,920 tonnes in a month, while the actual production capacity was between 0.03 and 1,200 tonnes in a month. Factors which contributed to a low actual capacity production were fewer customers, scarce raw materials, poor quality of raw materials, and limited space for drying and dryer challenges.

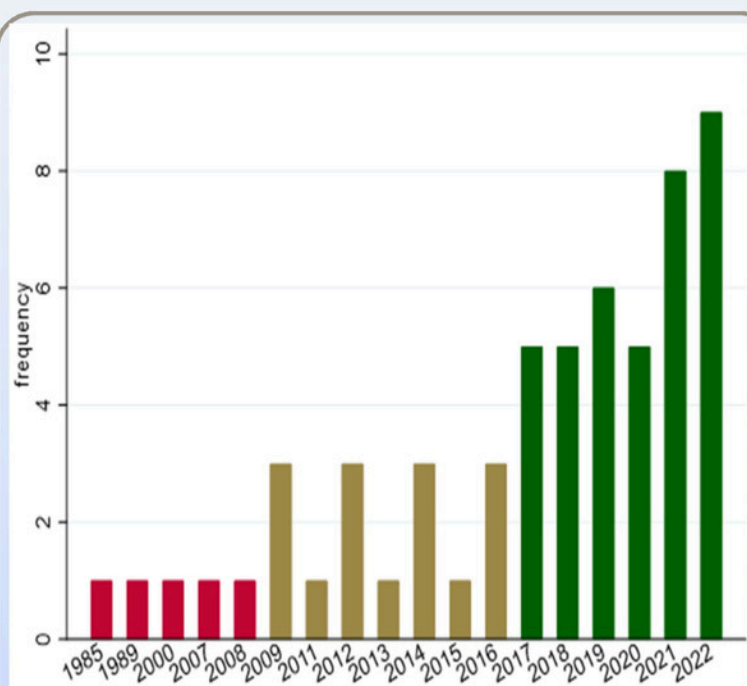


Figure 3. The trend in the increase of biomass briquetting industries between 1985 and 2022

Conclusions and recommendations

Many producers operate in the private formal sector. Despite being formalised, their staffing does not reflect the initiative to address gender inequality because the majority of staff are men. Majority of the staff members did not acquire biomass briquetting knowledge and skills through formal training; they did it through self-learning and apprenticeship.

Following these findings, there is a need to take policy action to improve the profiles of some producers.

- First, in collaboration with other key stakeholders, including the government, producers should balance the gender to empower more women.
- Second, the government should introduce biomass briquetting knowledge and skills to the Technical and Vocational Educational and Training/ Vocational Education and Training (TVET/ VET) curriculum and syllabuses.
- Finally, Climate Change funds should also be allocated for biomass briquetting students at different levels and TVET/ VET infrastructure such as energy laboratories and purchasing of machines

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