AGRO CHARCOAL BRIQUETTES

USING AGRICULTURAL WASTE TO PROVIDE ALTERNATIVES IN TANZANIA

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1- Executive Summary
Biomass, an energy producing source, is used principally in the form of firewood and charcoal. In Tanzania, people still rely on conventional charcoal to cook with; therefore, a viable and sustainable alternative to wood charcoal is needed to prevent further destruction of forest, pollution and economic hardship. This has driven us to target the 7th United Nations Sustainable Development Goal, affordable and clean energy through briquettes making, we’ve chosen the carbonized type because wood charcoal can easily adapt as opposed to non-carbonized briquettes. According to Tanzania Bureau of statistics of (2009 data) the average charcoal consumption in the city of Dar es salaam was 1,904 tons per day, equals to 694,960 tons per year. With respect to population growth it is expected the demand for charcoal will increase even more.

The company will be registered as Agro-Briquettes Charcoal (ABC) through the Tanzania Registrations and Licensing Agency (BRELA). We expect that 900 tons of briquettes will be produced during the first year of operation, which is an average of 3 tons of briquettes per day. One kilogram of briquettes will be sold at 2 cents, thus generating sales revenue of $18,000 at the end of the first year. An initial investment cost of $23,500 is needed. This will be used to purchase complete GCBC-II Biomass briquettes making machine, mixer and crushing machine, land, and annual operational costs. This capital will be financed through shareholders contributions and a bank loan. The project is easy to scale up and replicate wherever there is a feasible market demand. We have chosen to target UNSDG 7, which focuses around affordable and clean energy, in order to better the living and lifestyle conditions for those living in Dar es salaam city, Tanzania.

2 - Business Overview
2.1 - The Issue
In the least Developed Countries (LDCs) and sub-Saharan Africa, wood is a primary source of fuel. It is used for cooking relied upon by 85% of those who live in the rural area. On the other hand, wood provides energy for cooking for 38% and 30% of the urban population in LDCs and sub-Saharan Africa, respectively. Charcoal, firewood, dung, and other traditional fuels are the main energy sources in Tanzania, with their use growing in absolute terms due to the increase in population and urbanization. In Tanzania, more than 85% of the population depend on wood-based energy for cooking and generate at least one billion dollars in revenue to the rural sector, therefore providing income and livelihoods particularly for the rural people, transporters, and urban traders. Tanzania forests are excessively threatened by increased charcoal production fuelled by increased demand crucially in Dar es salaam city which consumes nearly 70% of all the charcoal produced in the country. The current natural firewood
and wood charcoal has contributed 24.6% land degradation, 19.58% deforestation of closed woodland and forests, and 50.8% deforestation of open woodland in the catchment area to the west and north of Dar es salaam that supplies charcoal to Dar es salaam city. (FAO, March 2020)

Current production patterns and consumption practice of wood-based biomass energy, particularly charcoal, are unsustainable, contributing to the degradation of natural resources, climate change, and impacting people’s health. There is an urgent need to identify alternative cooking fuels that are socially acceptable, ecologically, and economically viable with the potential to also mitigate indoor air pollution. Besides, more efficient wood-based energy value chains, alternative biomass energy options such as biogas, briquettes from farm residues, or jatropha oil, exist.

2.2 Objectives

Agro-Briquettes Charcoal will have its headquarters in Dar es salaam city, to serve its urban target customers of Dar es salaam. The company’s main objective is to replace natural firewood and wood charcoal with briquette charcoal, which is a low-cost fuel that emits less smoke and offers higher calorific (energy) value. This objective will combat the 7th United Nations Sustainable Development Goal, affordable and clean energy in Tanzania.

Our business model will convert agricultural waste into briquettes to be sold as fuel for cooking. ABC will buy crop residue from farmers and agro-industries like sugarcane trash and process them into briquettes. These will then be sold for profit to the households and businesses through direct sales and vendors. (W. Bogale 2009)

3- Product Overview

3.1 - Concept description

ABC understands that there have been projects like this in Tanzania but were done using handful procedures and the briquettes is nowhere near mainstream and are not meant for profit motives but charitable projects using one or two agricultural waste while leaving other agricultural waste piling up in waste pits. The company will install simple technology, the agricultural wastes will be burned in a carbonizing unit to form charcoal; the charcoal is then mixed, moulded and dried. Finally, the charcoal briquettes are packaged in various quantities suitable for sale to both direct buyers and vendors.

3.2 - The Production Process
Briquettes charcoal making process starts by crushing the agricultural wastes into required size and then carbonized in a local made kiln (drum kiln or brick kiln). It’s where waste will be burned into charcoal and the kiln will be closed to prevent the presence of oxygen from continuing burning into ashes. This method will be used because the set up costs are relatively lower. The charcoal will then be placed into a hemmer and crushed into powder and screen/filter them to ensure the charcoal is clean from any impurities before being taken to the mixture. The mixture will consist of 100kg fine charcoal, 4kg of cassava or maize starch(binder) and 30 litres of water mix them evenly before placing them slowly into the hot mix screw press where the heat will cause the starch to bind and become slimy while also blending the mixture some more. (Demirbas, A, 2010) Then the resultant hot mixed paste is fed to the shaping screw press for the desired shape (briquetting machine) and put into drying racks/pallets to be dried. The last process is quality check to ensure standards are maintained (hardness, smokeless, odourless, white ashes and sizing) before packaging.

3.3 - Benefits of Agro-briquettes Charcoal
Charcoal produced from agricultural waste has more benefits from a health, economic and environmental point of view. Unlike wood charcoal briquettes charcoal are smokeless and it reduces respiratory illness caused by solid wastes which are hazardous for health. Charcoal briquettes are environment friendly, instead of burning the wastes in the field we use them as a fuel source, slowing down the advance of deforestation by eliminating the need of cutting down trees for fuel wood. They are also smokeless, reducing the impact of smoke pollution on nearby communities. Good for the economy, charcoal briquettes are viewed as an advanced fuel because of its clean burning nature; it can be stored for a long period of time without degradation. Entrepreneurs can produce using agricultural wastes and sell them in the local market, in this way more money stays within the community rather than being exported for foreign fuels; By turning something that was previously unused into useful to produce income. Economically feasible, it does not require big investment to start a project and it is not difficult to start up within a short period of time; Also not difficult to scale up the project in such a manner to spread the technology to other society. (W. Bogale 2009).

4 - Market Analysis
4.1 - Target Market
ABC target customers are those who currently use charcoal as their cooking fuel in Dar es salaam. Therefore, we will target domestic households, chapati businesses, hotels, schools, hospitals and restaurants in the city, as they are the highest consumers of charcoal. Primarily, our target consumer will be household decision makers between the age of 18 - 65 who are interested in alternative or environmentally friendly fuels.

4.2 - Market Strategy
Dar es salaam city has six districts (Kinondoni, Ilala, Temeke, Ubungo, and Kigamboni) with a population of 6.7 million, where 88% of the population depends on charcoal as their cooking fuel (FAO, March 2020). ABC will target selected charcoal vendor markets in all Districts of Dar es salaam and the vendors will sell them to the end users. ABC will buy crop residue from farmers and from companies producing for example sugarcane trash. Besides that, ABC will designate a place for people to throw away trash that can be made into
briquettes ideally next to their usual trash pit. This will be beneficial for the people who are in
great need for fuel, but it is also beneficial for us as a company because more and more
people will join the movement getting us a lot of attention, which then can be leveraged when
we do other businesses or start another movement. The future plan is to sell to a large cross
section of the domestic markets. We also understand the changeover from wood charcoal to
briquettes will require little behavioural change, because there is direct substitution of wood
charcoal to briquettes and it does not need to change the current stoves. Therefore, the market
is already available for this product waiting to be utilized; the cost of cooking fuel is one of
the most important determining factors in determining which fuel to use. People are looking
for the cleanest, the most convenient and the most affordable cooking fuel. Briquettes have
a high bulk density compared to firewood or wood charcoal and they give a longer burning
time which will translate to cost saving. ABC marketing strategy is to use the current network
of charcoal vendors in Dar es salaam to enter the market. Today, 54.6 million people in
Tanzania use wood and wood charcoal for their cooking needs; making it a sizable market for
charcoal briquettes (FAO, March 2020)

4.3 - Advertising
Agro Briquettes ABC will be marketed through three main channels: Internet (PPC marketing),
Traditional media (Print) and Direct marketing (word of mouth). Marketing through a
collection of channels will ensure greater market coverage and the ability to reach the target
consumer in their preferred environment. Utilising the collection of channels will also increase
marketing frequency, keeping ABC top of mind and present in the consumer’s decision-making
process when they shop for cooking/heating fuels.

Internet access and usage in Tanzania has been spreading rapidly over the last few years due
to the adoption of smart-phones and growth in other technological areas. As of 2018, 82% of
the population now have access to the internet. Thanks to the recent penetration of the internet,
digital marketing has become much more viable in the region. ABC will leverage this internet
adoption as the main way to advertise their briquettes. Google search, display and shopping
ads will all be used in a PPC (pay-per-click) campaign that will target families and homeowners
within Tanzania. Google will be the medium for the PPC campaign as it’s the preferred search-
engine in the region (97% usage rate). Thanks to the recent adoption of the internet in Tanzania,
PPC will be the most cost-effective form of marketing. Due to low amounts of competition in
the online medium, cost-per-clicks (CPC’s) will be cheaper on average than developed
countries, allowing the marketing budget to go a long way. The use of digital marketing as the
primary form of marketing will also allow ABC to utilise a continuous marketing schedule.
Sales made via internet channels will also allow the briquettes to be sold directly, bypassing
handling and retail costs incurred when distributing the product through stores or markets.

Poster advertising will be utilised within market areas and distributed by vendors of the ABC
product. These posters will contain instructions, information about burning times and detail the
environmental benefits of the product. These posters will double as marketing material that
contains educational information and details product benefits. These posters will enhance the
users, advocates and market mavens ability to distribute information about the product.
Direct marketing will be leveraged during the adoption phase of ABC’s product into the
Tanzanian market. Product demonstrations will be used to showcase the briquettes, their
benefits and how the everyday consumer will be able to use the product. These
demonstrations will begin in marketplaces but will be used further in individual stores or by
vendors of the product themselves. A demonstration will also be captured and placed on the
web-store to be used as part of the internet marketing strategy.
ABC’s use of digital marketing and direct selling will allow the direct sale of the product from the production plant to the consumer's household. This will cut costs usually incurred by marketing through a third party or by distributing the product via other vendors. By cutting these costs, ABC will be able to position themselves as a cost-leader in the charcoal briquette market.

4.4 - Competition
Charcoal briquette technology is not new to Tanzania, with other companies like EF-CO and GAIA both producing briquettes meant for the community while also supplying jobs for locals. While ABC will follow these companies in the trend of producing employment for Tanzanian locals, ABC will use marketing, pricing, and distribution to create a competitive difference. ABC use of digital marketing and direct selling will allow the product from the production plant to the consumers household. This will cut costs usually incurred by marketing through a third party or by distributing the product via other vendors. By cutting these costs, ABC will be able to position themselves as a cost-leader in the charcoal briquette market.

By utilizing the three channels of marketing, ABC will aim to become the household name in Tanzania for briquettes as they will dominate both online and traditional media channels for this product category.

5- Financials

<table>
<thead>
<tr>
<th>S/N</th>
<th>Asset description</th>
<th>Cost (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GCBC-II Briquettes machine</td>
<td>5,000</td>
</tr>
<tr>
<td>2</td>
<td>Mixer</td>
<td>1,000</td>
</tr>
<tr>
<td>3</td>
<td>Kiln (locally made)</td>
<td>500</td>
</tr>
<tr>
<td>4</td>
<td>Land purchase</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>10,000</strong></td>
</tr>
</tbody>
</table>

5.1 - Initial Investment
An initial investment cost of US$ 23,500 is needed for startup capital, it will be used for plant construction, land and operations costs for the first year. The initial investment will be financed through shareholders contribution by 40% who will be paid dividend starting from the third year of operation. The other 60% will be financed through a bank loan as shown in table 1.
5.2 - Forecasted Sales and Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales</th>
<th>Cost</th>
<th>Gross Profit</th>
<th>Operating Income</th>
<th>Net Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>10000</td>
<td>9500</td>
<td>500</td>
<td>400</td>
<td>300</td>
</tr>
<tr>
<td>2022</td>
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<td>11000</td>
<td>4000</td>
<td>3000</td>
<td>2000</td>
</tr>
<tr>
<td>2023</td>
<td>20000</td>
<td>15000</td>
<td>5000</td>
<td>4000</td>
<td>3000</td>
</tr>
</tbody>
</table>

ABC expects to produce 900 tons of briquettes in the first year of operation, with an average of 3 tons of briquettes per day. 1 kg of briquettes will be sold at USD 2 cents thus generating sales of US$ 18,000 at the end of the first year (Stamico, 2018). We will have a negative cash flow in the first year of operation (US$ -500) due to the initial business setup cost. The higher growth for the first 3 years is based on our plans to expand by extending the operations to other parts of Tanzania, by opening a similar plant in Dodoma the capital city of Tanzania, as seen in the table below, and as follows in the appendices (1).

6 - Future Outlook

The innovativeness of this project lies primarily in recognizing the possibility of utilizing existing market and social structures in creating a new value chain that can be viable in and of itself. ABC plans to get ahead of the market; and to be the first Tanzania briquettes producing company to sell to a large cross section of the domestic markets. However, we will have to identify the opportunities to harness economies of scale as a potential for growth, and expand our sales to other regions in Tanzania. The creation of an attractive and sustainable brand is crucial for the ABC to succeed in charcoal briquettes manufacturing and sales. The focus is on building partnerships with solid, locally charcoal vendor networks across the country because it’s critical for our future success. Our focus also will be to equip the community with the required technology and skills to start these projects in their communities and they will pay training fees to ABC as other income. This will promote employment in the region especially to youth and women who are put in charge to find and collect charcoal for household cooking. We believe women are good teachers at home, if they are empowered with education on adapting to environmentally friendly briquettes which is less expensive compared to natural firewood it the ABC to achieve its long-term sustainable goals.
Appendices

1. https://docs.google.com/spreadsheets/d/10VICJUOpAOLFLiVQ8v2h88zY-jr89jgOVuuvfIFkX4/edit?usp=sharing

References


FAO 2020; Charcoal transition; http://www.fao.org/docrep/012/i1321e/i1321e10.pdf


