Country Action Plan for Clean Cookstoves and Fuels

ICS Taskforce in collaboration with Clean Cookstoves and Fuels Alliance of Tanzania (CCFAT)

July 2014

About ICS Taskforce

Facilitated by SNV, the ICS Taskforce of Tanzania was created in 2011, with the Ministry of Energy and Minerals (MEM) as the Chair and the Tanzania Renewable Energy Association (TAREA) elected as the secretariat. The ICS Taskforce was initiated with the aim to increase coordination in the Improved Cook Stove (ICS) sector, for stakeholders to better understand and develop the sector through multi-stakeholder processes, while doing the necessary studies to come to a joint way forward for further ICS market development in the country. This document is one of the resulting documents of the ICS Taskforce. Other documents include: a technical assessment report of ICS in Tanzania, market intelligence studies for ICS in different regions of the country, and an ICS policy analysis.

About CCFAT

The Clean Cookstoves and Fuels Alliance of Tanzania (CCFAT) was formed in 2012 by clean cookstoves and fuels stakeholders, several of them also being a member of the ICS Taskforce. CCFAT goal was to strengthen local actors and stakeholders working in the cookstove and fuels sector and influence the government to facilitate the increased innovation in designing, producing, marketing and use of clean cookstoves and fuel through better government policies, increased public awareness, micro-finance opportunities and capacity building through information sharing, training and campaigning.

Credits and acknowledgements

This document was developed by the ICS Taskforce in collaboration with CCFAT. We would like to thank all the organizations and people that attended the workshops that stood at the basis of this publication, enthusiastically sharing their expertise and experiences on ICS in Tanzania.

Authors:

- Dr. Hassan Rajabu — University of Dar es salaam
- Dr. Leonard Rweyemamu — University of Dar es salaam
- Shima Sago — TaTEDO
- Estomih Sawe — TaTEDO
- Emma Laswai — TAREA
- Eng. Matthew Matimbwi — TAREA
- Manon Lelievre — ARTI
- Finias Magessa — SNV

Compilation, supervision and editing: Finias Magessa & Martijn Veen, SNV Tanzania

Photos cover page: Josh Sebastian, SNV Tanzania

ISBN: 978-9987-9895-0-8

Disclaimer

Table of Contents

Abbreviations

BCE	Biogas Construction Enterprise
BEK	Basic Earth-Mound Kiln
BEST	Biomass Energy Strategy Tanzania
BTK	Box Type Kiln
CAP	Country Action Plan
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CBO	Community Based Organizations
CCFAT	Clean Cookstoves and Fuel Alliance of Tanzania
COPD	Chronic Obstructive Pulmonary disease
COSTECH	Commission for Science and Technology
DP	Development Partners
EDG	Energy Development Group
EWURA	Energy and Water Regulatory Authority
FCC	Fair Competition Commission
FI	Financial Institutions
GACC	Global Alliance for Clean Cookstoves
HOCK	Half Orange Charcoal Kiln
IAP	Indoor Air Pollution
IBEK	Improved Basic Earth-mound Kiln
ICS	Improved Cookstoves
ISO	International Standard Organization
LGA	Local Government Authority
LPG	Liquified Petroleum Gas
M&E	Monitoring and Evaluation
MEM	Ministry of Energy and Minerals
MFI	Micro Finance Institutions
MNRT	Ministry of Natural Resources and Tourism
MoF	Ministry of Finance
MoHSW	Ministry of Health and Social WelFare
NG	Natural gas
NGO	Non- Government Organization
ProBEC	Programme for Biomass Energy Conservation
R&D	Research and Developent
REA	Rural Energy Agency
SEECO	Sustainable Energy and Environmental Company
SME	Small and Medium Enterprises
SNV	Netherlands Development Organisation
TaTEDO	Tanzania Traditional Energy Development and Environment Organization
TBS	Tanzania Bureau of Standards
TEMDO	Tanzania Energy and Mechanical Development Organization
TFA	Tanzania Forest Agency
TIRDO	Tanzania Industry Research and Development Organization
TLUD	Top-Lit Updraft
TPDC	Tanzania Petroleum Development Corporation
TRA	Tanzania Revenue Authority
UNIDO	United Nations industries Development Organization
USD	United States of America Dollar
VETA	Vocational Education and Training Authority
VPO	Vice President's Office
WHO	World Health Organization
WWF	World Wildlife Foundation

Executive Summary

Tanzania is a nation of approximately 48 million people with the majority of households using biomass as the primary source of cooking energy. Firewood is the most common fuel in rural households and charcoal is the most common fuel in urban and peri-urban households. This high dependency on biomass energy is a fact of life in Tanzania and it will continue to be so for the foreseeable future.

Most rural households use the three stone fire place to cook their meals, whereas low quality charcoal cookstoves are used in urban and peri-urban households. Institutions, such as secondary schools, canteens and restaurants fair no better, often using cooking devices that are substandard. Needless to say the uptake of improved cookstoves and fuels is limited to a small percentage.

The low use of clean cookstoves and fuels has numerous consequences, including deaths due to indoor air pollution, untold numbers of burns and other injuries, deforestation and environmental degradation, an economic burden caused by the need to purchase more biomass fuel to feed inefficient cooking methods, and a reduced quality of life due to the burden of having to cook in a dirty and smoke-filled kitchen, and long fetching time and distances for those who cannot afford to purchase fuelwood.

While it is easy to resign ourselves to the perceived insurmountable challenges, the truth is that the challenges in the current state of the biomass and cookstove sector are juxtaposed to the equally great number of opportunities. The charcoal sector alone employs hundreds of thousands of Tanzanians in rural areas, generates revenues of approximately 650 million USD per year and could potentially generate 100 million USD in revenues for the Government through taxation, hence investing in the clean cookstoves and fuels sector will be of great socio-economic and environmental benefit to Tanzania. The sector will create thousands of "green jobs", especially in rural areas, improve the health of its citizens, create a source of income for the government and make households cleaner and safer for families.

The Tanzanian government has recognized the challenges in the sector and has been developing a Biomass Energy Strategy for Tanzania (BEST) through the Ministry of Energy and Minerals. The Ministry of Natural Resources and Tourism (MNRT) has been working closely with stakeholders on forestry management as well as supporting efforts to promote charcoal briquetting. Additionally, several cookstove programs have taken place in the country and efforts have been made by local stakeholders to promote clean cookstoves. That said, to date the sector remains uncoordinated with little cohesion amongst stakeholders.

In 2012 stakeholders initiated the formation of organizations and task groups related to improved and clean cookstoves and fuels including the Clean Cookstoves and Fuels Alliance of Tanzania (CCFAT) and the ICS Taskforce with the goals of mobilizing stakeholders, securing resources and championing the sector. Membership to these platforms is attached as Appendix 5 and 6. Members to the two platforms are from public and private companies, NGOs, Government Institutions and individuals with interest to clean cookstoves and fuels. The ICS Taskforce will finalize accomplishment of its set tasks by development of this Country Action Plan (CAP) and the Programme Implementation Document (PID). In achieving this ICS CAP output it has collaborated with CCFAT. CCFAT was successfully registered with the government in 2013. Many of the stakeholders who participated in the formation of ICS Taskforce and CCFAT contributed to the creation of this country action plan and therefore are a reflection of their commitments to the sector.

While there are numerous interventions required before the clean cookstoves and fuels sector can be considered to have reached a stage of maturity, stakeholders have identified key interventions that need to be addressed immediately. These interventions serve as the corner stone, or foundation, of all future interventions, and include:

- Supporting and lobbying government through the Ministry of Energy and Minerals (MEM) for the development and implementation of the biomass energy policy & strategy through stakeholder involvement.

- Strengthening an agreed coordinating entity/ platform (chapter or working group) to enhance collaborative efforts among stakeholders thereby creating an enabling environment for market growth, and securing funding for its operations.
- Establish Standards working group with the Tanzania Bureau of Standards (TBS) through the abovementioned acceptable platform/ chapter or working group and, supporting TBS to develop clean cook stoves and fuels standards based on ISO standard.
- Advocating for policy frameworks that support tax relief and incentives for clean cookstoves and fuels producers in Tanzania.
- Conduct a baseline survey to support the call for intervention with facts.
- Carry out action research (value chain analysis) to identify existing stove producers, their products and their clientele with a focus to identify enterprises and gaps in the market and building linkages for the expansion of the clean cookstove market.
- Commission a study into the challenges and opportunities for women in the sector.
- Undertake a baseline market demand assessment study at district and regional levels. Special focus on usage and preference of women.
- Develop appropriate strategies, mediums, tools and messages for awareness rising.
- Establish M&E data collection systems.
- Support the expansion of the charcoal briquette and biomass briquettes and pellet industries.
- Support training for entrepreneurs on how to access funding programs.
- Support the development of clean cookstoves and fuels market networks.

This country action plan will require funds to truly put it to action. While the Government of Tanzania has shown a willingness to support the effort, its financial resources are limited. Hence other development partners including the Global Alliance for Clean Cookstoves (GACC), donors and funding organizations are needed to help raise these resources.

1. Introduction

1.1 Background

It is estimated that about 9.3 million[1] households in Tanzania and most public institutions cook with firewood and/or charcoal on traditional cookstoves. This means that nearly 95% of the population uses biomass energy as their primary fuel for cooking. The inefficient use of charcoal or firewood has many environmental, health and socio-economic negative impacts that need to be addressed. It is estimated that only 1.2 million households are using improved cookstoves, although many are of untested quality and performance. It is stated that most households are not aware of the energy and money savings that can be obtained by using[2] ICS. While 75% of this untapped market is in rural areas, where promoting improved wood stoves is difficult, over half of Tanzania's urban market (nearly 1.5 million households) are said to be unaware of the benefits of improved cook stoves.

Many programmes have been undertaken in Tanzania to improve cooking technologies and services, specifically biomass stoves to potential users. Several organizations have played a role in this sector. However, the vast majority of these initiatives have been small-scale with short-lived funding and few have been successfully commercialized at large-scale. While the Jiko Bora has been widely disseminated, it has been heavily subsidised through donor and NGO programmes, and the quality of most stoves that are commercially sold are virtually untested. Of the current stove producers, mostly the informal artisanal sector is commercially successful and supplies variety of locally made stoves, but, stove quality is questionable. Apart from locally made stoves, a new trend of imported stoves from a number of players are emerging and expanding the distribution of higher performing ICS.

Improved Cook Stoves (ICS) have been developed, studied, promoted and commercialized in Tanzania since the 1980s to address concerns that increasing wood energy use is causing major environmental problems, specifically forest degradation and deforestation. Many programmes have been undertaken to improve cooking technologies and services, specifically biomass stoves to potential users.

For many years TaTEDO has remained the key player in the subsector under consideration. However, the number of new entrants in the sector has been on the increase ranging from small local actors to big international actors including those from the NGOs wing to private sector wing. Among others, such new players include individual enterprises to private companies[3] and NGOs[4]. A number of programmes and projects have also featured in the sector including The Program for Biomass Energy Conservation program (ProBEC), which was one of the largest sustained initiatives, although it came to an end in 2011.

It is worth noting that all those new activities and initiatives basically lack coordination and certification of quality. Most are still donor- or NGO-funded and subsidised. There is still a strong lack of focus on commercialisation, on building capacity in the local private sector, on raising the skill level, the level of efficiency and the level of production of the few existing stove producers.

As a result the country is yet to sustain a commercial market outside of the main urban centres and those markets are producing stoves that, in many cases, are not really improved because the quality of production has deteriorated under competition, and consumers are not aware or educated on how to differentiate a true ICS from one that just looks like an ICS.

Noticeable changes in the ICS sector are beginning to take shape. Key players in the ICS sector are working to transform the ICS sector. In 2011, ICS stakeholders formed the ICS Taskforce, coordinated by the Tanzania Renewable Energy Association, and supported by SNV, COSTECH, TaTEDO and others

[1] National Bureau of Statistics, 2014
[2] Riedijk. 2011
[3] Private companies include Kiwia & Laustern, SEECO, Envotec, MR technologies, ARTI, and LS solutions.
[4] NGOs include TaTEDO, WWF and SNV.

with the goal to promote ICS, enhance coordination of the sector, raise public awareness and improve quality of ICS in the market place. Concurrently, the Clean Cookstoves and Fuels Alliance of Tanzania (CCFAT) were also formed to further advocate development of the same. This alliance emerged after several stakeholders in Tanzania got inspired by the worldwide efforts of the Global Alliance for Clean Cookstoves (GACC). Both ICS taskforce and CCFAT decided to join forces and work together in the preparation of this joint sector action plan. Stakeholders have developed this document and have agreed to move forward with the view of improving performance of the sector and players under one platform, chapter or working group. The next step is to jointly revise and further develop and market the improved cookstove and fuels Country Action Plan for Tanzania.

This ICS CAP document is well aligned with the recently MEM developed national Biomass Energy Strategy for Tanzania and its action plan (BEST). The proposed CAP activities contribute to the implementation of BEST to see to it that there is a sustained, long-term commercial clean cookstoves and fuels market and actors developed in Tanzania. CAP also contributes to MNRT supported efforts to promote charcoal briquettes and other ministries' efforts demonstrating greater willingness to support the sector under consideration. The ICS CAP aims to support and accelerate that change to achieve sustainable (non-donor-subsidized) commercial ICS production, distribution that reduces charcoal consumption by 50% in half of the fuelwood consuming households and all the institutions by 2020.

Because most rural wood energy is not commercial (i.e., not bought or sold), rural wood energy demand management requires a longer-term approach than ICS in urban areas. As with urban areas, a coordinated public awareness campaign, coupled with targeting those in rural areas who buy fuel, or who have the means to buy stoves, will be necessary at the beginning. Focusing on rural consumers who buy their fuel is critical because the key consumer incentive for buying an ICS is to reduce expenditures. 8.5% of rural households who utilise charcoal (which they purchase), represents over 1 million households who will be a prime targets for the rural ICS action plan.
This document aims to highlight the marked potential and current prospects of improved cook stoves in Tanzania.

1.2 Why We Need Action Now

By promoting the development of the clean cookstoves and fuels sector in Tanzania, the ICS CAP aims at addressing the following key needs.

1.2.1 Contribute to Environmental conservation

Charcoal production and firewood collection coupled with poor forest management accounts for a major part of environmental degradation through its impact on deforestation and watershed destruction in certain cases (Msuya, 2011). Strengthening the clean cookstove and fuel sector will have direct impact in GHG emissions reduction as the appliances and fuels promoted reduce the use of wood based fuels. In the search for climate change mitigation measures, households and institutions use of improved and efficient cooking stoves and fuels would contribute to improved environment conservation and reduced deforestation.

1.2.2 Reduce health hazards related to cooking devices and cooking fuels

Cooking with charcoal or firewood presents many health risks to users, mainly women and children, especially when used with poor quality stoves. Traditional methods of cooking tend to produce a lot of smoke and soot especially if cooking is done in an enclosed area. This indoor air pollution (IAP) is responsible for chronic health diseases such as pneumonia, stroke, ischemic heart diseases, chronic obstructive pulmonary disease (COPD) and lung cancer (WHO, 2014). The World Health Organization (WHO) estimates that about 18,900 deaths are attributable to IAP annually in Tanzania (WHO, 2007). However, the health impacts of IAP are certainly greater than this statistic particularly due to lack of awareness about IAP's impacts within the general population.

1.2.3 Play a crucial role in improving Tanzanians socio-economic status

In addition to the health problems associated with current cooking practices in Tanzania, increased demand for wood fuels has led to the increase of their prices. The current situation has led to decrease the access and affordability for suitable wood charcoal and firewood[5] for most of the Tanzanian population especially for low-income households. Therefore, the market for more efficient stoves, which use less fuel, is becoming increasingly appealing to consumers facing higher prices. Alternative fuels to charcoal that are cheaper and easily accessible prove to be of high interest amongst consumers. Hence, the clean cookstove and fuels products will play an active role in reducing poverty by reducing monthly energy budget spent and/or reducing the time spent on collecting fuelwood by most Tanzanian households.

On the other hand, the sector will create jobs and income opportunities for stove and fuels manufacturers and distributors which will improve the livelihoods of many Tanzanian families and benefit the overall nation. Women will be crucial player in this sector as well.

1.2.4 Support the development of a conducive policy framework

There is a lack of dedicated policy in the sector to address and regulate the production, commercialization and use of the biomass energy. Coordinated stakeholders will actively lobby relevant governmental bodies to actively undertake measures that promote the importance of the clean cookstove and fuel sector for Tanzania. One key step has been made with the elaboration of BEST and the ICS CAP will, under its scope, allow implementation of many of the actions proposed in the BEST action plan. Planned ICS CAP activities will play a key role in supporting the government to develop policy and regulations for clean cookstoves and fuels by creating an effective bridge and interlink between the government and the ICS and clean fuels stakeholders.

1.2.5 Improve the coordination of the clean cookstove and fuels sector

Currently, limited clean cookstoves and fuels promoters, manufacturers and distributors exist throughout the country but their actions are scattered and uncoordinated. Initiatives have been carried out to promote clean cookstove since the 1980's but they are yet to reach large-scale commercial success.

The manufacturing of clean cookstoves in Tanzania takes place primarily in the informal sector with localized sales, substandard quality, and little consistency in stove quality. At this time new companies are entering the market and they could benefit from additional support and expertise to help develop market linkages and access financing. The sector is currently characterized by variety stakeholders from NGOs and parastatal organizations, private sector and local informal sector.
The need for a more coordinated sector is urgent to effect the links between producers, suppliers and customers to strengthen supply and enhance demand for the products. The coordination of the sector will actively involve the private sector as key actor to develop a sustainable and durable sector. An active agreed platform will be a key in increasing awareness within the key stakeholders general population to increase the demand for clean cookstoves and fuels.

A major outcome of an organized sector will also be the setup of quality standards and testing facilities, which will be crucial to develop the market. So far, the increased government and NGO awareness, the creation of ICS Taskforce and CCFAT, increase in fuel costs, and resource depletion have contributed to gaining momentum to improve the sector. The government of Tanzania and a number of NGOs are increasingly becoming more cognizant of the deficiencies with traditional cookstoves and fuels and the need to act. With these many factors coming together at this time now is the moment to act on improving the cookstoves and fuels sector in Tanzania. Taking all these aspects into consideration will

[5] Suitable wood charcoal or firewood comes from hard wood whose property is to burn for long period. Currently most charcoal or firewood use is from fast-growing trees that burn very fast.

allow the agreed platform to help build realistic programs based on previous experiences and lessons learnt.

1.3 An Overview of Common Stoves and Fuels Terminologies

1.3.1 Introduction to stoves

Also referred as a *cookstove,* a stove is a device that generates heat from an energy carrier and directs that heat to the intended use in a specific application[6]. An energy carrier can be fuelwood, kerosene, electricity, etc. Stoves are made to transfer and direct the heat generated to the pot containing food with a purpose of getting it cooked or warmed. Thus a stove features the combination of heat generation and heat transfer to the food in the pot as illustrated in Figure 1 below. If the food contains fluids a pot is used to contain the food, and if the food is solid and cannot spill a griddle or grill can be used to position the food to be cooked or roasted.

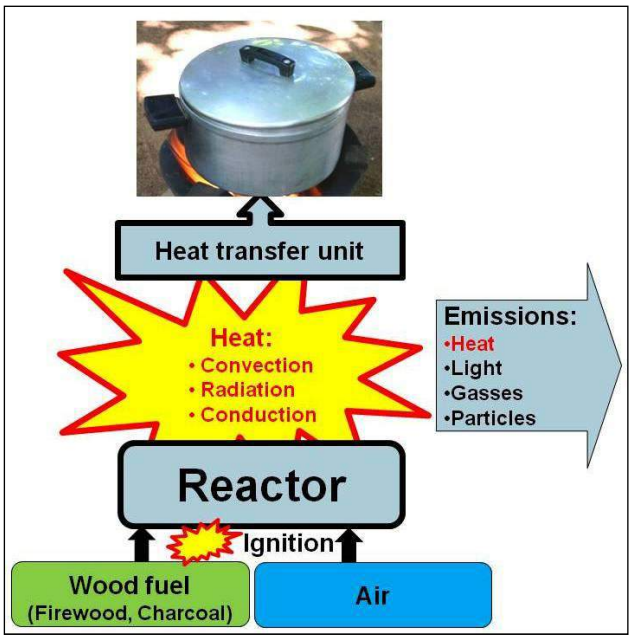


Figure1: Schematic illustration of stove cooking system (Source: https://energypedia.info/)

Traditional Stoves

Depending on the location, traditional stoves can range from three-stone open fires to substantial brick and mortar models, and stoves with chimneys. In Tanzanian context, traditional cookstoves are referred to as three-stone fire and single-walled metal charcoal stove models.

Improved Cooking Stove

Improved Cooking Stove (ICS) is a relative concept which depends on the desired improvement from the traditional stoves. The improvement is mainly associated to fuel saving, because when biomass cookstove programs started in 1980s the drive was on forests conservation and energy saving in general. But improvement can also be on indoor emissions reduction, usability, durability, fast cooking, etc. A study by the World Bank[7] reports that many early ICS models were designed so that even the poorest customers could afford them. Valued at about US$5 or less, the best of these improved cookstoves represented an improvement over a three-stone open fire; still they were rudimentary devices.

[6] https://energypedia.info

[7] Household Cookstoves, Environment, Health, and Climate Change: A New Look at an Old Problem. 2011. The Environment Department, World Bank.

Clean Cookstoves

According to the Global Alliance for Clean Cookstoves (GACC)[8], these are cooking technologies, fuels, equipment, and practices that address the health and environmental impacts associated with cooking. A clean cookstove should not only alleviate health and environment impacts, but it must meet the needs of the users and be culturally appropriate to be utilized over the long term. This includes making sure that the technology is affordable, socially acceptable, easy to use, widely available, durable, and most of all, that the technology is desired.

1.3.2 Fuelwood (or Firewood) stoves

These are stoves designed to use heat from flaming combustion of biomass fuel and transfer majority of the heat by convection. A fuelwood stove can be traditional, ICS, or a clean cookstove. A sample of locally made fuelwood stoves are shown in appendix 1.

Charcoal stoves

Charcoal stoves are designed to burn carbonized biomass and radiate the heat of glowing charcoal to the food. The advantages of using charcoal over fuelwood are reduction of smoke; high energy density (unit mass energy) of the charcoal, and storability. However, when using charcoal a smaller fraction of the energy contained in the original wood reaches the pot compared to when using fuelwood. This is because of energy wasted during carbonization of fuelwood to charcoal. A sample of locally made traditional and improved charcoal stoves is shown in appendix 1.

Three-stone fire place

From the definition of stove, three-stone fire place is not a stove, but it is an open fire surrounded by three stones (or bricks, mud) to support the pot, griddle or grill above the fire. Three-stone fires are characterized by high inefficiency and indoor air pollution and can be a fire risk. Three-stone fire is a traditional cooking system in Tanzania and is the basis for improvement to improved cookstoves.

Gas stoves

A gas stove or *gas* cooker is a clean fuel stove that uses fuel in the form of storable and piped gas such as biogas, natural gas, propane, butane, liquefied petroleum gas (LPG) or other storable flammable gas. The source of the gas can be from biomass or from fossil fuels. Samples of gas stoves are shown in appendix 1.

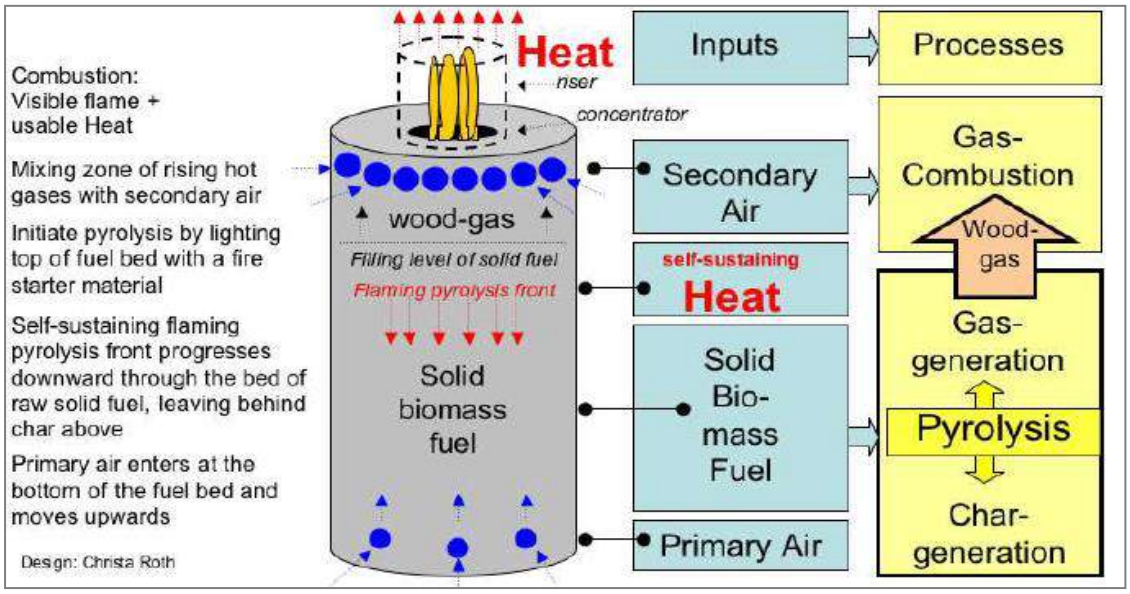


Figure 2: Principle of Top-Lit Updraft (TLUD) Gasifier Stove[9]

[8] http://www.cleancookstoves.org

[9] Crista Roth. Micro-gasification – Cooking with gas from biomass

Biomass gasifier stoves

Is a stove which *pyrolyzes* biomass to produce flammable pyrolysis gas (synthesis gas or wood gas) which is burn separately from the pyrolyzing biomass to create heat for cooking. By separating the flamable synthesis gases from the pyrolyzing biomass, the gases can be mixed thoroughly with air and burned to create a clean combustion like a gas cooker. Figure 2 illustrates the principle of a gasifier stove. Advantages of gasifier stoves over fuelwood and charcoal stoves include: very clean burning hence can be used indoors; use a wider variety of biomass fuels (husks, shells, grass,); higher efficiency; makes charcoal (or biochar) during the process; and the synthesis gas can be transported by piping to locate the burner away from the biomass pyrolyzer unit. A sample of gasifier stoves are shown in appendix 1.

Rocket Stove

A rocket stove is a cooking stove designed to use small diameter firewood which are burned in a high-temperature combustion chamber containing a vertical chimney which ensures almost complete combustion of the flames before reaching the cooking pot. Figure 3 illustrates the principle of the rocket stove.

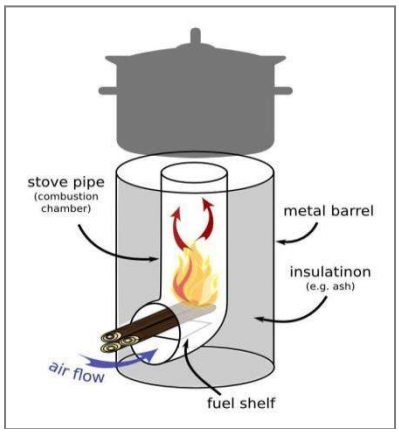


Figure 3: Schematic illustration of the rocket stove cooking system (Source: http://en.wikipedia.org)

Electric stove (or cooker)

Electrical cookers are electrical devices converting electrical energy to heat energy used for cooking purposes.

Solar stove (or cooker)

A solar cooker is a device which uses heat in the sun radiation to cook or heat the food. To achieve higher temperatures required for cooking the radiation has to be concentrated. The three most common types of solar cookers are heat-trap boxes, curved concentrators (parabolics) and panel cookers[10].

Multi-pot Stove

A multi-pot stove is a cookstove which has two or more pot supports and one source of heat (combustion chamber). Most multi-pot stoves are fuelwood stoves because the hot flaming gases can be directed to reach all pots unlike charcoal stoves where radiation from glowing charcoal travels in a straight line to the pot or food. A sample of locally made multi-pot stoves is shown in appendix 1.

Multi-fuel Stove

A multi-fuel stove is a stove capable of using two different types of fuels. A good example is a fuelwood stove which has a provision to put a grate to use charcoal.

Fixed Stove

A fixed stove is a built-in stove which cannot be moved without dismantling. Fixed stoves can be multi-fuel and multi-pot and are normally preferred when a chimney is desired to remove smoke from the kitchen, and when stove stability is an important criterion during cooking.

[10] http://www.solarcookers.org

Portable Stove
Portable stoves are lightweight and can be moved quickly without substantial dismantling. They are normally preferred when the cook likes to shift cooking location (e.g., indoor and outdoor)

Mud Stoves
A mud stove is an improvement from the three-stone fire by filling the two sides with mud or clay to make a U-shape open fire leaving one side for feeding the fuel. This modification improves the efficiency of the mud stove over the three-stone fire because it stabilizes the flame under the pot by preventing air through-draughts and also increase combustion chamber insulation which leads to hotter flames. Made of clay and sand, mud stoves are the cheapest of improved stoves and can be made to be multi-fuel, multi-pot, and can be made with rocket stove principle. Nearly all mud stoves are fixed (built-in) as a portable version will be very heavy and fragile. A sample of locally made mud stoves are shown in appendix 1.

Ceramic Stove
Ceramic stoves or fired-clay stoves are similar to mud stoves, but the main difference is that ceramic stoves are fired at high temperatures in a kiln for added strength and durability. Making fired clay stoves requires higher quality clay and expertise in fabrication compared to mud stoves. Ceramic stoves can be portable, fixed, multi-pot, multi-fuel, and can be made with rocket stove principle. A sample of locally made ceramic stoves is shown in appendix 1.

Metal-ceramic stove
Metal-clad stoves have ceramic or clay liners enclosed with a metal body. These types of stoves have added advantage of being lightweight compared to mud or ceramic stoves and most are portable and more durable compared to ceramic and mud counterparts. A metal-clad which forms the external body of the stove give all the strength to the stove, hence the ceramic or mud inserts are made thinner with the sole task of insulating the stove to increase efficiency. Other components of the stoves such as pot rests, air control, and legs can also be of metal which can easily be attached to the metal body surrounding the stove. A sample of locally made metal-clad stoves is shown in appendix 1.

All-metal stoves
These are stoves fabricated entirely from metal such as the traditional charcoal stove fabricated by small-scale artisans using scrap metal and some new improved charcoal stoves. Nearly all gasifier stoves which have been developed in Tanzania and other countries in the World have been all-metal because of the complexity, accuracy and tight dimensional tolerances required for gasifier stoves to work properly.

1.3.3 Cooking fuels

Biomass Fuel
Is any fuel that is derived from living material such as plants, animals, fungi, and bacteria, and can be in solid, liquid, or gaseous form. Sources of biomass fuel include trees, crops, crop residues, municipal waste, manure, wood waste, sawdust, etc

Fuelwood
Sometimes referred as *firewood*, is a woody biomass material used for cooking extracted from tree logs (branches and stems). It is mostly used by majority of Tanzania communities in cooking.

Biomass Charcoal
This is a dark or black porous carbon material obtained by heating wood or other organic substances in the absence of air (as from wood by charring in a kiln from which air is excluded). It is widely used by periurban and urban Tanzanian populations in cooking.

Biomass Charcoal briquettes
Briquettes are *reconstituted fuels* made by *densifying* or *agglomerating* carbonized or non-carbonized small-particle biomass materials. Carbonized and non-carbonized briquettes are made to compliment or substitute fuelwood and charcoals sizes (6 -10 cm diameter) and are used as fuel in charcoal and fuelwood stoves, respectively.

Biomass pellets
Pellets are *reconstituted fuels* made by *densifying* or *agglomerating* small-particle biomass materials similar to briquettes. However, pellets diameters ranges from 4-8 mm and are preferred fuels for gasifier stoves.

Biogas fuel
Biogas is a mixture of gases which is produced after the biological breakdown of organic matter in the absence of oxygen. Being a gas, it is used for cooking by using gas stoves.

Ethanol Fuel
Ethanol is an alcohol that is produced by fermentation of sugars from various crops, such as maize, sorghum, wheat, cassava and sugarcane. There are several ethanol stoves and among their differences is the form of the fuel used. This can either be a liquid or a gel. Liquid ethanol is used in stoves similar to kerosene stoves. Gel ethanol is a mixture of ethyl alcohol (ethanol) and organic pulp (cellulose). The two are gelatinised with addition of water to form a clear and transparent compound with a gel like consistency which can be coloured to give it a distinguished appearance. Ethanol gel fuel is used in special stoves purposely designed for gel fuels as shown in Appendix 1.

Liquefied Petroleum Gas (LPG)
Liquefied petroleum gas or liquid petroleum gas (LPG or LP gas), also referred to as simply propane or butane, is a flammable mixture of hydrocarbon gases used as a fuel in heating appliances, cooking equipment, and vehicles. It is increasingly used as an aerosol propellant and a refrigerant, replacing chlorofluorocarbons in an effort to reduce damage to the ozone layer. When specifically used as a vehicle fuel it is often referred to as autogas.

Natural Gas
Natural gas is a fossil fuel formed when layers of buried plants, gases, and animals are exposed to intense heat and pressure over thousands of years. The energy that the plants originally obtained from the sun is stored in the form of chemical bonds in natural gas. Natural gas is a nonrenewable resource because it cannot be replenished on a human time frame. Natural gas is a hydrocarbon gas mixture consisting primarily of methane, but commonly includes varying amounts of other higher alkanes and even a lesser percentage of carbon dioxide, nitrogen, and hydrogen sulfide. Natural gas is an energy source often used for heating, cooking, and electricity generation. It is also used as fuel for vehicles and as a chemical feedstock in the manufacture of plastics and other commercially important organic chemicals.

Natural gas development in Tanzania is gaining speed. A number of commercial industries are deploying natural gas for heating processes. However, less has been done on the domestic level. Natural gas could as well be developed and used as an alternative cooking fuel option and source for cooking purposes. The attempt would reduce pressure on forest resource for the market segment with the abilities to afford Natural Gas.

1.3.4 Charcoal production methods

Traditional Charcoal production methods
There are different types of traditional charcoal kilns. These include Basic Earth-Mound Kiln (BEK), Box Type Kiln (BTK), Mdomo wa Chupa (Bottle Shape) Kiln, Msonge (Conical Shape) Kiln, Pit Kiln Etc.

Improved charcoal production methods
There are three types of improved kilns promoted by biomass energy stakeholders, in particular TaTEDO. These are Improved Basic Earthmound Kiln (IBEK), Half Orange Charcoal Kiln (HOCK), Pit Kiln, Metal Kiln and Retort Kiln. The IBEK knowledge is mostly disseminated to normal charcoal producers and forest officers while HOCKs are built in wood mills, large forest clearing areas for carbonising wood leftovers and cleared trees into charcoal. The retort kiln is used for carbonization of bio-residues from agro processing or saw milling sites. The carbonized bio-residues could be used for producing charcoal

briquettes or used for fertilizing the soil sine it has characteristics of retaining nutrients in the soil for a long time.

1.4 Major Areas of Intervention

In the following chapters, three major areas of intervention are described that need to be addressed in order to facilitate the growth of the cook stoves and fuel sector in Tanzania. They include: Enabling Environment, Enhancing Demand, and Strengthening Supply. Each of the three major intervention areas includes corresponding list of primary activities and specific actions that are designed to tackle the issue under consideration.

The body of this country action plan is divided into two parts. The description of each of the major intervention areas is followed by a detailed log frame that shows the logical flow of interventions including focus area, primary activities, specific actions, indicators and potential implementers required on the ground.

2. Foster an Enabling Environment for Clean Cook Stoves and Fuels

A sound enabling environment is crucial to achieving the goal of providing clean cooking technologies and fuels to more than half of the households and all institutions in Tanzania by 2020. This achievement cannot be achieved through a one man show; it requires a regiment of interventions, leadership and commitment of the government, policy makers, regulatory institutions, research and academic expertise, private sector, as well as the involvement of committed sector stakeholders who can champion the cause and take the lead in ensuring interventions are carried through.

2.1 Policies, Strategies and Regulatory Framework

Despite the many benefits of clean cookstoves and fuels, the market to supply and demand them is underdeveloped. This stems from both policy and market failures; a lack of awareness and knowledge about the benefits of clean cookstoves, weak government policies, poor stoves quality and insufficient access to finance. It is important to remove these barriers through the creation of an enabling environment supported by policies and strengthened government institutions, improved testing and standards, access to finance and sensitization of all stakeholders.

Government players and stakeholders with important role to play but remains uncoordinated or loosely coordinated for scale and impacts include the Ministry of Energy & Minerals, Ministry of Natural Resources and Tourisms, Rural Energy Agency, Tanzania Bureau of standards, Ministry of Industry, Research and Development institutions, Tanzania Commission for Science and Technology, and Tanzania Investment Commission. The agreed platform// working group or chapter will advocate and lobby for strengthened coordination of the above mentioned government entities and others.

At the district and local levels, LGAs, numerous NGO, private sector, parastatal organizations, micro financing institutions and development organizations have played significant role in the sector. The list of initiatives is long but there hasn't appeared to be a great deal of coordination in these activities. Unfortunately District level Institutional framework for energy is not yet in places as there is no specific department or unit that deals with energy issues at this level. Sometimes improved cookstoves is placed in the department of Community Development Gender and Children because cooking is regarded as women role without specific budget to champion this sector. Relevant policies creating energy frameworks and energy development clusters at the District levels that brings together representation from health, community & women's issues, forestry, natural resources, agriculture and building capacity of these clusters will provide appropriate framework to coordinate the clean cookstoves and fuels sector at the district level.

There is certainly more need for government leadership and commitment in supporting the clean cookstoves and fuels sector and this is reflected in the main priorities for intervention, which includes supporting and lobby MEM for the development of the Biomass Energy Policy through stakeholder involvement, lobby REA and local government authorities (LGA) to fund improved cookstoves and fuels more substantially. Others include development of strong linkages with the health sector (Ministry of Health and social welfare, health NGOs, and medical practitioners) on issues related to infections from IAP. The agreed platform/ chapter/ working group will also coordinate budget inputs from its members and other stakeholders for budget process and developments plans and submits them to MEM energy dept., which includes cookstoves and clean fuels significantly. Furthermore, the agreed platform will advocate for policy frameworks that support tax relief and incentives for clean cookstoves and fuels producers in Tanzania. Last but not least it will support inclusion of clean cooking stoves and fuels in Energy NAMA.

2.2 National Awareness Campaigns

For several years, awareness campaigns related to clean cooking stoves have emphasized environment and poverty benefits. As a sound awareness campaign targeting to make sense to several stakeholders, clean cookstoves market segmentation, needs and preferences will be carried out and documented. It will be followed by development and implementation of appropriate strategies, mediums, approaches, tools and messages for awareness rising. The content of such awareness raising will include among others financial savings, environment hazards, health issues, poverty, and employment opportunities. The following will include ways for awareness raising use of mass media, demonstrations, road shows, drama, leaflets through (CCFAT and individual members. Other awareness raising means are establishment of Clean Cookstoves day/ week (including presentation, competition, exhibitions and demonstrations).

In developing awareness strategy it is essential to consider gender sensitive messages and mechanisms for dissemination as the majority of the audience will be women consumers. In developing materials and mediums for sensitization it is very important to ensure campaigns include exposure of most Tanzanians to direct information and use of clean cookstoves and fuels.

2.3 Standards and Certification

Numerous cookstove designs and models are available in the market and several prominent players involved mostly operating in the informal sector. Local players are active and supply a broad choice of stove designs, with few models being imported. The quality features of local cookstove producers vary in terms of materials of construction, fuel saving and emissions. The government is aware of the major issues around dependence on biomass for fuel and the state of the sector in general and has started to work on the current unsustainable demand for forest products for domestic and commercial uses to alleviate the negative environment impacts.

Tanzania Bureau of Standards (TBS) has developed a standard for only charcoal stove (TZS 473:2010) but due to the informality of the sector there is no enforcement mechanism on the products and in the interim, there is no mechanism or framework in place to protect customers from sub-standard cookstoves in the market. A few NGOs and research institutions have established testing centres, but they too have limited testing capabilities, and the tests are only limited to stove efficiency and emissions using standards developed by international NGOs.

The international stove community has started to address the issue of lack of internationally agreed standards for stoves and in the past three years there has been a series of meetings and forums to work on the standards for stoves. In June 2013 the International Standards Organization (ISO) Technical Committee 285 was formed to develop and approve internationally recognized standards. The Committee is comprised of experts from participating national committees (TBS included) and external liaisons. Standards developed will define clear methods and quantitative values to evaluate how the tested stove impacts fuel use, emissions, safety, and quality.

With increasing demand for clean cookstoves and fuels throughout the country, there is a clear need for establishing cookstove certification procedures and centres and support capacity building at technical and research institutions, vocational training centers and NGOs to undertake not only testing of developed stove models but also research and development activities on clean cookstoves and fuels. Furthermore, the government and all stakeholders should support TBS to adopt the new clean cookstoves and fuels standards currently developed by ISO to suit local conditions and traditional cooking practices, and implement a certification mechanism for cookstoves in the market like any other consumer product. Interventions include supporting TBS to develop standards based on internationally agreed standard through establishing Standards Working Group with TBS and developing country (TBS) standards. Others include standards capacity development through identifying institutions and NGOs in the regions which can facilitate cookstoves testing and training capacity, supporting infrastructure and equipment for testing and training, training stove testers to conduct TBS/ISO testing procedure and protocols, training stove and clean fuel produces on TBS/ISO standards, developing liaison with other

regional or international institutions to increase knowledge and capacity, and developing simple manuals for stove makers on how to make stoves that can be certified by TBS.

2.4 Sector Coordination

Clean (also termed as improved) cookstoves subsector is predominantly informal, largely donor driven and operated between multiple development partners and networks, with weak coordination within the sub sector. This affected visioning, strategizing and planning for biomass clean cookstoves market development. Altogether, there still is inconsistent understanding of the sub sector and its corresponding value chains. The multiple business models and technologies implemented resulting from weak coordination and information sharing mechanisms which lead to duplication of efforts on a single similar research. The industry is still unclear as to which specific business models are worth being pilot tested, rolled out or rollback.

The informality among sector operators limit their access to formal business development, development services such as finance, technical assistance, insurance, research and development, skills development, technology and investments among others. Automatically, policy-based incentives are less effective in an industry driven within informal settings.

Strategic partnerships would scale-up efforts to overcome policy related constraints at central and local governments. Policy and strategy development process still exclude majority group in this biomass sub sector constituency. Potential collaboration between public, private and citizen sectors is of significance, and if well utilized, it will lead to multiple level benefits in the target sub sector and many others. Cooperation with public institutions for instance could mobilize more resources to support industry development interventions, particularly policy research, strategy development, regulation and enforcement related measures.[1]

2.4.1 ICS Taskforce, CCFAT and other networks

Noticeable changes in the ICS sector are beginning to take shape. Key players in the ICS sector are working to transform the ICS sector. Two years ago they have formed the ICS Taskforce, coordinated by the Tanzania Renewable Energy Association (TAREA), and supported by SNV, COSTECH, TaTEDO and others with the goal to promote ICS, enhance coordination of the sector, raise public awareness and improve quality of ICS in the market place. Coincidentally, from July 2012 several clean cookstoves and fuels stakeholders came together to form the Clean Cookstoves and Fuel Alliance of Tanzania (CCFAT). CCFAT Goal was to strengthen local actors and stakeholders working in the cookstove and fuels sector influence the government to facilitate the increased innovation in designing, producing, marketing and use of clean cookstoves and fuel through better government policies, increased public awareness, micro-finance opportunities and capacity building through information sharing, training and campaigning.

Both ICS Taskforce and CCFAT are open to stakeholders with interest to clean cooking stoves and fuels and may include one with the following resources; influence on policy; financing capacity; knowledge and experiences on clean cookstoves and fuels; experience in the commercialization of clean cookstoves and fuels; knowledge and experience on crosscutting issues between the clean cookstoves and fuels sector and gender and health. Therefore the major priority areas for intervention are to enhance collaborative efforts among stakeholders to ensure an enabling environment for market growth and enable securing of funds and obtain supporting activities for the operation of the alliance.

Since ICS taskforce is almost accomplishing most of the planned activities and remaining with only one item on the ICS task force agenda, which is on ICS CAP development and marketing, some ICS stakeholders have indicated an option of merging the two platforms by consolidating interests of the two platforms. However, stakeholders will collectively have to decide and agree on which platform, chapter or a working group will take over the implementation of this ICS CAP. The clean cookstoves and fuels stakeholders from the two platforms have developed this document and have agreed to move forward with the view of improving performance of the sector and players after consideration and accommodation of agreed interests of all members and stakeholders in the clean cookstoves and fuels.

Some of these interests include equal rights and opportunities of all members I the platform to be agreed and democratic elections of office bearers. Members of both the ICS Taskforce and CCFAT have spearheaded the development of this country action plan to guide development and commercialization of the ICS sector in Tanzania.

Stakeholders have demonstrated their commitment to mobilizing themselves and the clean cook stoves and fuels sector and now the platform/ chapter/ working group to be agreed by majority of stakeholders will need support for implementation of this country action plan as a whole or part of it. This will allow for the following:

- **Strengthen the agreed coordinating platform/ chapter/ working group to enhance collaborative efforts among stakeholders to create an enabling environment for market growth.**
- **Secure funding for the operation of the agreed coordinating platform/ chapter/ working group including supporting activities, office and Executive Committee through membership fees, services, publications and projects development and implementation on its behalf and on behalf of third parties.**

2.4.2 Information packaging, sharing and dissemination, exchange fora, and newsletters

In order to strengthen the coordination of all stakeholders, all research carried out in relation to clean cookstoves and fuels by any organization or actor shall be published in the alliance website so as to ensure information sharing at all areas and levels. This will help make information available so as to avoid repetitive research and on the contrary use the resources available to fill in the existing information gaps available.

Also as a way to get updates in the sector as they come it is necessary to create some e-newsletters that shall be published monthly or quarterly news and ongoing events and research that shall also provide updated information as they come up. Technical and critical information shall be also published.

2.4.3 Lobbying and advocacy

After identifying, mapping and networking of all the stakeholders at all different levels in this subsector, there is a need to lobby onto different existing issues. In this sub sector there needs to lobby for the government intervention in the sector so as to formalize it and make sure it receives priority consideration leading to allocation of an implementable budget share from the Ministry of Energy and Minerals. This since it is a sector in the biomass section that touches almost every citizen in the country then this should be looked at closely so that it does not exacerbate the climate change problems in the country and the region. The agreed coordinating platform will continue advocating for creation of energy specific department in local government authorities so as to be an independent sector (just like others such as forest and natural resources or health departments). This shall set a common base for planning and decision making of the countries' energy needs from the grassroots level.

2.5 Infrastructure and Facilities

Once the overarching standards have been established there is the need to establish laboratory and field testing procedures and protocols incorporating efficiency, IAP, safety, durability as well as gender sensitive and appropriate for both traditional and modern cooking practices. There is also a need to establish dedicated ICS and fuels training centres.

2.5.1 Testing facilities

Apart from the fact that more than 90% of Tanzanians cook by using biomass stoves and fuels, there is limited access to testing facilities for these technologies in Tanzania. Few NGOs have embarked on testing thermal efficiencies of their technologies but conformity to established quality levels by the artisans and those trained by them remains in question. Most testing facilities are limited at Universities and research institutions while local producers are scattered all over and most of them lack required resources and consultation fees for such testing. The agreed coordinating platform/chapter/ working group will strive to address the challenge of testing facilities to allow for quality clean cooking stoves and fuels dissemination. At the start, in collaboration with TBS, R&D and academic institutions, and key stakeholders from the private sector, establish cookstoves and Fuel Testing Facility in Tanzania. At later stages agreed coordinating entity will strive to build capacity of local producers and distributors to conduct elementary field testing procedures and protocols of their stoves and fuels. Others include establishing lab and field testing procedures, including efficiency, IAP, safety, durability, as well as appropriateness for women and traditional practices. Partnership with other regional and international testing centres will be encouraged to speed up capacity building. Encourage and facilitate private sector participation in testing activities and initiatives of ICS.

2.5.2 Training on ICS and Fuels facilities

The agreed coordinating entity will embark on supporting existing training entities and facilities and organizations on ICS and fuels. It will also support establishment of more others in close collaboration and partnership with the private sector. Ongoing training facilities and organizations will be supported to attain new levels and internationally acceptable standards, and equally important, where appropriate, formalization of such trainings offered and accreditation. At the beginning zonal training facilities will be promoted but with a target of having one in each region by 2025.

2.5.3 Clean cookstoves and fuels clusters

Formation of clusters on clean cooking technologies is considered an appropriate way to build an inclusive value chain for clean cookstoves and fuels. This process entails the involvement of a wide range of stakeholders in the development of new cookstove designs, local manufacturing projects, distribution efforts, marketing techniques, awareness campaigns, and other components of the value chain. Women are a particularly important component of the value chain as they are responsible for the cooking; therefore, their preferences around design, taste, cooking times, fuel supply challenges, and other cultural considerations must be taken into account.

Clusters can increase the productivity with which companies can compete, nationally and globally, while fulfilling the common aim of providing technical, social and economic solutions to the problems of household air pollution, the excessive use of firewood, the improvement of fuel efficiency, the appropriation of technology, and social responsibility. Clusters can bring together local and international manufacturers and distributors of cookstoves and fuels, implementers, and universities. Benefits might include access to latest technologies, improved know-how, improved market access, higher levels of innovation and creativity, improved access to capital, higher productivity, and lower costs. Interventions include creation of clean cooking technologies clusters; supporting capacity building for enterprise development; investing in women entrepreneurs; and developing social marketing efforts that target women. Other actions include clusters formation plan meeting involving all market chain actors to map the market - participatory market chain development.

2.6 Knowledge Transfer and Innovation

The purpose of knowledge transfer is to catalyse and facilitate innovation. In knowledge transfer, expertise, knowledge, skills and capabilities are transferred from the knowledge-base (for example, a university or college, a research centre or a research technology organisation) to those in need of that knowledge (for example a company, social enterprise or not-for-profit organisation). Hence, knowledge

transfer involves the interface between universities and business, and involves the commercialisation of skills and expertise possessed by higher education.

The sub-sector of cookstoves in Tanzania is characterised by low growth in technology investments, low-technology production, and low-skilled labour and associated productivity hindrances. There are poor linkages between research institutions and producers (private sector enterprises, NGOs, etc). Most of researches conducted at Universities have no direct linkage or collaboration with producers. On the other hand, producers are not aware on how they can improve their production processes through collaboration with Universities. At Universities some research which could lead to improvement of production processes and quality of products and services are lacking inputs from majority of stakeholders or beneficiaries.

An understanding and awareness for academics on issues regarding health, environmental, gender, and economic benefits of clean cookstoves and fuels is important. This move could foster the tendency for academics to conduct research which leads to creation of knowledge that is relevant and digestible to companies in the clean cookstoves and fuels value chain and society. Providing practical training placements for university undergraduate is another area of knowledge transfer. The involvement of students in problem solving tasks at different steps of cookstoves and fuels value chain may expose students to challenges and thinking, hence fostering innovation and generation of new ideas. This paves a way for creation of self-employment by creating own companies and employing others. Interventions include developing and launch awareness campaigns at Universities; developing a programme to support student projects in clean cookstoves and fuels; planning and conducting workshops for clean cookstove issue to encourage knowledge sharing and cooperation among cookstove program implementers, funders, and the government. Other actions include organising seminars for both staff and students on clean cookstoves and fuels; preparing proposals seeking funds to support best final year student projects; and developing training / workshop materials on clean cookstoves and fuels.

2.7 Effective Monitoring and Evaluation

The objective of the monitoring and evaluation is to enable the sector to accurately and consistently monitor and evaluate progress through thorough and widely accepted monitoring and evaluation practices. The main purpose of Monitoring and Evaluation of the CAP is to link and guide the overall CAP strategy towards informed decisions for achieving the planned targets and expected outcomes

The agreed coordinating entity will support development of an effective monitoring and evaluation system for clean cookstoves products and supply networks. Both quantitative and qualitative monitoring indicators for a clean cooking stove and fuels will be established and employed for the tracking CAP performance. Performance monitoring indicators for clean cookstoves and fuels will also be developed. Efforts will be made to collect data and develop monitoring indictors for an effective clean cookstoves and fuels supply value chain. Data collection centres will be established and regular reporting format, frequency and hierarchy for reporting products performance, demand and supply, revenues, etc., information put in place.

Well planned and coordinated monitoring and evaluation will enable the clean cookstoves and fuels sector to accurately and consistently collect and report progress of each initiatives being undertaken in the country in relation to clean cook stoves and fuels. To do this, **Secretariat of coordinating entity in collaboration with other strategic partners and stakeholders will develop a national monitoring and evaluation system** that is easily utilized by implementing partners and has an online and offline reporting system that acts as a unified platform for collecting data, aggregating results, and reporting to stakeholders.

2.7.1 Building the evidence base

From the ICS sector various studies had been done in collaboration with different stakeholders on Market intelligence study on improved cookstoves (Musa, Musa., 2013), Improved cookstove assessment and testing by Rajab and Ndilanha (2013), TaTEDO, to mention few out of a very large pool

of research case studies can give some picture on what the baseline stage was so as to know all the gaps that is still to be addressed. In obtaining the baseline for realization of any change that can happen in the sector in the near future.

2.7.2 Update understanding on the sector and consumer needs

A study to segment market of clean cooking stoves and fuels will be undertaken to update and supplement what is available and unveil existing potentials, needs and preferences. Efforts will be made to also package ICS impact results and demonstration for influencing policy and decision makers. Packaging and disseminating information on ICS market trends will also be carried out.

As such, **market baseline and segmentation survey** should map existing initiatives (i.e, research, training, donor support, etc) on clean cook stoves and fuels building on the study already complete by SNV. The agreed coordinating entity should work with government, district councils and NGOs, businesses, CBOS and communities to access and/or generate key data on health, environment, cook stove usage, fuel use, income, etc. The baseline study should also undertake IAP impact assessment study and have a special focus on women's and child health.

Once the baseline survey has been completed it is important to bring together sector knowledge in an easily accessible online platform for sector wide use. In order to achieve this development of information toolkits, discussion groups, and dissemination formats will be facilitated to reach most targeted stakeholders.

Other key interventions that will be carried out under monitoring and evaluation sub topic include:

- Establish data collection centers in each Region/District
- Develop monitoring framework and gender sensitive indicators
- Build monitoring and evaluation into projects so that the sector has accurate data.
- Provide a unified platform for collecting data, aggregated results, and reporting to stakeholders
- Develop on and offline reporting system that acts as a unified platform for collecting data, aggregating results and reporting to stakeholders
- Create an agreement about data use and permissions
- Provide case studies and best practice information to partners regarding M&E
- Incentivize data collection for stoves that are not already accessing carbon finance

Table 2 below includes a summary of detailed planned CAP activities aimed at fostering enabling environment for clean cookstoves and fuels.

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
a) Policies, Strategies and regulation	Review, comment and prepare policies, strategies, regulatory frameworks, and plans relevant to clean cookstoves and Fuels	Support and lobby MEM and development partners for the development of the Biomass Energy Sector policy	Biomass Energy policy by the end of 5 years	Agreed coordinating entity, EDG, MEM, CAMARTEC, TIRDO, TEMDO
		Support establishment of ICS development clusters with government participation	ICS development clusters	Agreed coordinating entity, REA, MEM, key stakeholders
		Lobby REA and local government authorities (LGA) to fund improved cookstoves and fuels more substantially	% increase of funding of ICS from REA and LGAs	Agreed coordinating entity
		Coordinate inputs for budget process and development plans for MEM energy dept., that includes cookstoves and clean	ICS budget inputs in LGA and central government plans	Agreed coordinating entity

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
		fuels significantly		
		Advocate for policy frameworks that support tax relief and incentives for Clean cookstoves and fuels producers in Tanzania	Tax relief and incentives on ICS	Agreed coordinating entity, MEM, MoF
		Support consideration and inclusion of ICS energy production and use as a significant part of energy NAMA	ICS as part of energy NAMA	Agreed coordinating entity, VPO, UNIDO, MEM
		Advocate and lobby to MEM and DPs for the establishment of regulatory framework for implementation of biomass policy and strategy.	Regulatory framework for Biomass policy and strategy	Agreed coordinating entity
b) Standards and certification	Support TBS to develop clean cook stoves and fuels standards based on ISO standard.	Establish ICS standards development working group in collaboration with TBS	ICS standards development WG	Agreed coordinating entity, TBS
		Support follow up and enforcement of ICS standards implementation	Number of follow ups and enforcements	Agreed coordinating entity, TBS
		Establish certification system and procedures for all quality clean cooking stoves and fuels	ICS Certification system, certification procedures	TBS, Agreed coordinating entity, VETA
c) Infrastructure and facilities	Support establishment and operationalization of ICS Testing facilities	Identify and support establishment of testing facility suitable sites	Number of Identified ICS testing sites	Agreed coordinating entity, TBS, R&D, universities, EDG
		In collaboration with TBS, R&D and academic institutions, and key stakeholders establish cookstoves and Fuel Testing Facility in Tanzania	Number of cookstoves testing facilities	TBS, R&D institutes, universities, Agreed coordinating entity, REA
	Support dedicated ICS and fuels training facilities	Identify existing dedicated ICS and fuels training facilities and centres	List of dedicated ICS and fuels training facilities/centres/ organizations	Agreed coordinating entity
		In collaboration with public and private sector support ongoing ICS and fuels facilities/ centres	Number of ongoing ICS and fuels training facilities/ organizations supported	Agreed coordinating entity, Private sector, public sector, VETA, NGOs, CBOs, social enterprises, SIDO
		In collaboration with interested public and private sector establish zonal/regional ICS and fuels training	Number of new ICS and fuels training facilities/ centres	Agreed coordinating entity, Private sector, public sector, VETA, NGOs,

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
		centres/facilities	established	CBOs, social enterprises, SIDO
	Support capacity building of academic institutions to host such ICS testing facilities	Identify current testing capacities of academic institutions and vocational training centres	Analytical report on existing ICS testing capacities	Agreed coordinating entity, REA, MEM, COSTECH
		Establish lab and field testing procedures, including efficiency, IAP, safety, durability, as well as appropriateness for women and traditional practices	Number of ICS testing laboratories, ICS field testing procedures	R&D, universities, VETAs, TBS, Agreed coordinating entity, REA
		Establish regional testing sites/expertise	Number of regional testing sites	R&D institutes, TBS, REA, Agreed coordinating entity, VETA
		Provide funding for equipment and training for testing facility	Amount of funds provided, number of trainings	Agreed coordinating entity, REA, TBS
		Build human capacity at laboratory testing and local levels	Number of experts/ technicians / producers capable of testing ICS	Agreed coordinating entity, REA, TBS,
		Support establishment of ICS standard procedures	Standard procedures	TBS ICS working group, Agreed coordinating entity
		Partner with other regional and international testing centres to speed up capacity building	Number of Partnerships	TBS, ICS testing labs
		Expand research and testing on quality control of clean fuels	% increase of types of stoves and fuels tested	Agreed coordinating entity, TBS, ICS testing labs
	Support capacity building of local producers and distributors to conduct elementary field stove testing procedures	Train and sensitize cookstoves producers and distributors on testing requirements and on protocols	Number of local producers trained on ICS field testing	Agreed coordinating entity, TBS, REA
		Encourage and facilitate private sector participation in testing activities and initiatives of ICS	Number of private sector participating in ICS testing	Agreed coordinating entity
	Facilitate establishment and running of clean cook stoves and fuels clusters	Clusters formation plan meeting involving all market chain actors to map the market - participatory market chain development	Agenda and minutes of a ICS cluster formation meeting	Agreed coordinating entity
		Creation of clean cooking technologies clusters at district level/ regional level	Number of Clean cookstoves and Fuel clusters	Agreed coordinating entity

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
			formed	
		Support capacity building for ICS enterprise development within clusters level	Number of ICS EDS conducted within clusters	Agreed coordinating entity, REA
		Invest in women entrepreneurs to participate and benefit from such clusters	Number of support provided to women entrepreneurs	Agreed coordinating entity, REA
		Develop social marketing efforts that target women	Number of social marketing efforts	Agreed coordinating entity, REA
d) Sector coordination	Strengthening CCFAT coordination capacity and other networks related to ICS sector	Conduct a thorough mapping of all stakeholders in ICS and clean cookstoves and develop an effective database	Increased networks by 75% in five years	All actors
		Enhance networking and information sharing on ICS development with stakeholders within and outside the country	Number of ICS stakeholders networked by CCFAT	Agreed coordinating entity,
		Encourage ICS related researches	Updated statistics	Researchers
		Publishing and disseminating reports and findings on ICS.	A research pool of facts and findings.	Public and private sectors
		Advocacy and lobbying for energy representative at district level authority	Energy desk or department in LGA	Alliance members (Private and public sectors)
		Secure funding for the operation of the CCFAT office and Executive Committee	Operational and effective coordinating entity office	Agreed coordinating entity, DPs, REA
		Create a resource library for CCFAT stakeholders to increase access to information & the knowledge base	Resource Library at Coordinating entity office	Agreed coordinating entity
		Lobby for incentives necessary to facilitate the growth of the clean cook stoves and fuels sector.	Number and type of incentives	Agreed coordinating entity, DP, REA
		Identify, package and coordinate information sharing on linkages between ICS, energy, health, environment, poverty and climate change issues	Number of linkages and information shared	Agreed coordinating entity
e) Knowledge transfer and	Build capacity of training	Develop and launch awareness campaigns at Universities and	Number of ICS knowledge related	R&D institutions, universities, VETA,

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
innovation	institutions, R&D organizations, VETA, and local producers on innovations and knowledge transfer	research organizations, VETA on ICS impacts to communities	training, Number of ICS innovations	local producers, Agreed coordinating entity, REA
		Develop a programme to support student projects and internships in clean cookstoves and fuels	Number of ICS projects and internships	R&D, universities, VETA, private companies, NGOs, local producers
		Plan and conduct workshops for clean cookstove issue to encourage knowledge sharing and cooperation among cookstove program implementers, funders, and the government.	Number of ICS workshops in target groups	Agreed entity
		Organise regular seminars for both staff and students in education and health institutions on benefits and impacts of clean cookstoves and fuels	Number of seminars in education and health facilities	Agreed coordinating entity, REA
		Solicit funding for awarding best final year students projects in ICS	Number of best students received ICS awards	Agreed coordinating entity, REA, DP
		Develop training / workshop materials on clean cookstoves and fuels	Number of training manuals and guides on ICS	Agreed coordinating entity, REA
f) Effective monitoring and evaluation	Building the Evidence Base (packaging and disseminating ongoing initiatives and results)	Map existing initiatives and benefits of clean cookstoves and fuels building on studies already concluded by key players including UNDP, WB, SNV, TaTEDO, REA,MEM, etc.	Number of mapped ICS initiatives and benefits	Agreed coordinating entity, REA, MEM
		Work with District councils to create energy development clusters at the district level bringing together representation from health, community, gender, forestry, natural resources and agriculture	Number of district energy clusters	Agreed coordinating entity, LGAs, REA, MEM, COSTECH
		Work with district councils to access and/or generate the data on ICS usage linkages with health, environment, poverty levels, deforestation, fuel use, income, etc).	Data on ICS usage and linkages to other sectors	LGAs, Agreed coordinating entity, REA, MoHSW, MEM, MNRT, VPO
		Packaging ICS impact results, documentation, dissemination and demonstration for influencing policy and decision	Number of ICS reports on impacts,	Agreed entity

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
		makers.	demonstration	
		Update understanding on the sector and consumer needs (market segmentation study)	Market segmentation report	Agreed coordinating entity, REA
		Packaging and disseminating information on ICS market trends.	ICS market trends	Agreed coordinating entity, REA
	Develop and implement awareness campaigns on the above enabling environment parameters and ICS to general public and target stakeholders	Prepare gender friendly dissemination strategies	ICS dissemination strategies	Agreed coordinating entity
		Develop, produce promotional posters, flyers, educational brochures, manuals, radio advertisement targeting influencers, media, and policy makers for support	Number of promotional materials produced	Agreed coordinating entity, REA
		Publish and distribute awareness materials	Number of promotional materials distributed	Agreed coordinating entity, REA
		Support door-to-door awareness campaigns	Number of door to door awareness campaigns	Agreed coordinating entity
		Undertake consultation with key decision makers in relevant ministries	Number of consultation with MEM, REA and DPs	Agreed coordinating entity
		Prepare budget inputs and submit them to the ministry of Energy and Minerals	Copy of budget inputs	Agreed coordinating entity
		Lobby for budget increase allocation, up to 10% for clean cookstoves and fuels	% of budget increment for clean cookstoves	Agreed coordinating entity
	Establish ICS energy data collection and dissemination systems	Establish ICS data collection points at village, district and national levels in the country	Number of ICS data collection points at village, districts and national levels	LGAs, Agreed coordinating entity
		Support development of online ICS data communication and storage system between district and national level	Online ICS data system	Agreed coordinating entity
		Develop ICS monitoring framework and gender sensitive indicators	A monitoring framework and set of indicators	Agreed coordinating entity
		Strengthen and provide effective storage and communication system for	Number of stored information/ reports and	Agreed coordinating entity

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
		monitoring and evaluation findings, reports of ICS products and projects performance to stakeholders	disseminated	
		Create an agreement about data use and permissions	Copy of agreement on ICS data use	Agreed coordinating entity
		Incentivize data collection for stoves that are not carbon financed	Number of incentive in place for ICS data collection	Agreed coordinating entity, REA, MEM, LGAs, private sector, DPs
		Build capacity of ICS actors on M&E so that the sector has an accurate and consistent data	Number of ICS stakeholders and actors with M&E skills	Agreed coordinating entity, REA, MEM, DPs, private sector
		Identify, package and disseminate ICS best practices to stakeholders, partners and general public.	Number of case studies and best practices documented and disseminated	Agreed coordinating entity, ICS stakeholders
	Support development of an effective monitoring and evaluation system for clean cookstoves products and supply networks	Develop monitoring indicators for a clean cooking stove and fuel	List of monitoring indicators for clean cooking stoves and fuels	Agreed coordinating entity, TBS
		Develop performance monitoring indicators for clean cookstoves and fuels	List of performance monitoring indicators for clean cooking stoves and fuels	Agreed coordinating entity, TBS
		Develop monitoring indictors for an effective clean cookstove and fuel supply value chain	List of monitoring indicators for an effective supply value chain of clean cooking stoves and fuels	Agreed coordinating entity, TBS
		Establish regular reporting frequency and hierarchy of reporting products performance and supply	A guide on regular reporting frequency and hierarchy for products performance and supply chain	Agreed coordinating entity, ICS actors, LGAs

3. Enhancing Demand for Clean Cookstoves and Fuels

3.1 End User Training

The techniques and habits used in operating clean cook stoves bear a potential to make it inefficient or unclean. Equally important type and quality of fuel used in a clean cookstove could make it inefficient and or unclean. For example, wet firewood, regardless of the type of stove used could turn out producing a lot of smoke and emissions. As such, agreed coordinating entity, through its secretariat and individual members will promote efficient cooking techniques, stoves, cooking habits and quality fuels. This will be achieved through, among others, development and dissemination of ICS stoves and fuels user manuals, leaflets, fliers both through organized events and producers and distribution/ retailer centres. Equally important, suppliers, retailers and local level vendors will be trained on the same since are the people meeting most end users of the technologies.

3.2 Undertake Marketing and Awareness Raising Campaigns among Consumers

Over the years, marketing of ICS and or clean cook stoves and fuels in Tanzania has concentrated on environmental conservation. Following research findings on the number of death emanating from indoor air pollution, linkages of cookstoves to poverty, time and cost savings, environmental hazards, health issues, employment opportunities; awareness campaigns will build on all the above mentioned issues. A diversified level of interest from potential users will characterise awareness raising campaigns.

A number of methods will be used including mass media, road shows, physical demos, drama, and leaflets both through agreed coordinating entity secretariat and individual members and stakeholders. Events such as Clean Cookstoves and fuel day/ week with presentations, competitions, exhibitions and demos will be established.

Other marketing and awareness raising methods will include developing and disseminating clean cook stoves and fuels catalogue for different clean cook stoves, availability, and features. Agreed coordinating entity will also support the private sector (local producers, distributors, retailers) on development and dissemination of promotional materials for clean cook stoves products (leaflets, brochures, drama, demonstrations, etc). Last but not least, local producers will be supported and encouraged to brand their products. Private sector and local producers will contribute to costs of such marketing activities.

3.3 Support for Innovative Distribution Models

Most top down clean cookstoves and fuels distribution models have failed because of not taking into consideration the facts on the ground. As such, CAP will establish and devise user needs and requirements for development of innovative distribution models. Distributors and local producers will be facilitated by this user needs and preferences assessment to support them in designing their distribution and channels and models. Identification, packaging, and adaptation of best practices in dissemination of ICS will be employed in some cases to develop working Tanzanian market. Involvement of the private sector will be emphasized. Agreed coordinating entity will solicit funding from different DPs and its members for supporting the private sector on innovative distribution models development for ICS.

3.4 Support Development of After Sale Services Centres

Producers face different challenges to deliver effective customer service. These challenges include the ability to determine what the customer wants as an additional service, and how customers could be

better served to maintain the trust promised to them. On the other hand it is difficult for consumers to access cookstoves and spare parts in rural and remote areas. The exercise for monitoring stoves performance becomes even impossible or excessively expensive. Distributors and trained technicians may not be available locally, which contribute to improper use and loss of confidence in the product. Interventions include ensuring consumer satisfaction by providing quality after-sales services and options for warranties, as well as raise the level of supplier/producer accountability and strengthen their customer relationships. Others include creation of proximity of services to end-users with support services which include training on the use of the product, maintenance or provisions of materials or parts, repair and servicing, warranties for replacement in case of damage or defects, can be carried out. Other actions include identification, collection and packaging of best practices on after-sales service guidelines and implementation mechanisms under existing cookstove interventions.

3.5 Strengthen Business Skills for Clean Cooking Stoves and Fuels Entrepreneurs

Most local producers lack business skills in undertaking clean cookstoves business. Agreed coordinating entity will facilitate business development skills within ICS sector. Producers and distributors of ICS will be trained on Enterprises Development Skills (marketing, book keeping, business planning, economies of scale, production costs and pricing, etc). Business extension strategies will be facilitated through business coaching and mentoring of growing and new ICS businesses.

3.6 Linking Potential Consumers of Clean Cook Stoves and Fuels to Financing and Health Sector

Agreed coordinating entity will bring forth and promote development of effective linkages between clean cook stoves/ fuels and other sectors such as finance (MFIs) and the health sector. Microfinance institutions have a wide reach to communities which could positively impact on the enlargement of demand base for ICSs. As another example, promotion of stove prescription from clinical doctors will be sought for respiratory related infections resulting from unhealthy cooking technologies. Equally important, agreed coordinating entity will support match making workshops, fairs and events for stove producers/ distributors with relevant financial institutions. Efforts will also be made to encourage and promote financial institutions to develop and accommodate clean cookstoves consumer financing schemes in their products. Agreed coordinating entity will also embark on forging relations with other NGOs with women and youth groups such as Care, WWF, TaTEDO, SNV and others to facilitate widening of clean cook stoves and fuels demand base.

3.7 Expansion and Scaling up of Demand of Specific Clean Cook Technologies

Agreed coordinating entity will support the expansion of the charcoal briquette and biomass pellet industry through a number of actions including identifying charcoal briquettes and biomass pellet producers, conducting needs assessment, supporting scaling up of fledging enterprises, and development of market networks of charcoal briquette and biomass pellet producers. Agreed coordinating entity will also promote the use of charcoal briquettes and biomass pellets by a series of actions including developing sensitization strategies, lobbying across the Alliance and the Government for adoption of charcoal briquettes and/or biomass pellets within institutions, providing marketing and business development support to SMEs, and funding pilot projects, scaling up, and marketing campaigns targeting the urban charcoal segments.

Agreed coordinating entity will support introduction and scaling up of improved charcoal production methods into communities and local actors involved in inefficient charcoal production. More efforts will be put into place to recognize/ certify and incentivize charcoal produced using improved methods.

Other intervention will include promoting the use of biogas in households and institutions by developing sensitization strategies, lobbying across the Alliance and the Government for adoption of biogas within institutions, providing marketing and business development support to SMEs, and funding pilot projects, scaling up, and marketing campaigns targeting the urban charcoal segments.

Agreed coordinating entity will also support the introduction and scaling up of uptake for LPG in urban charcoal segments, including working with LPG industry and trade associations to identify potential barriers for LPG greater adoption. Support to innovative distribution and marketing models for LPG will also be facilitated.

Equally important, agreed coordinating entity will embark on supporting the development of NG subsector through lobbying for NG to be used for domestic purposes in Tanzania. Efforts will be made to develop a strategy to popularise and gain support of stakeholders including the government for greater investment in domestic NG. Agreed coordinating entity will support establishment of local information and resource centres for clean cooking technologies energy entrepreneurs.

Table 3 below includes a summary of detailed planned CAP activities aimed at fostering enabling environment for clean cookstoves and fuels.

Area of focus	**Primary activities**	**Specific Actions**	**Indicators**	**Implementers**
g) End user training (cooking techniques, stoves, cooking habits, fuels)	Development of user guides, manuals and other efficient ICS use techniques and habits	Develop and disseminate user manual, leaflets, and fliers for end users on efficient cooking techniques, habits and fuel use.	Copies of user manuals, guides, leaflets, fliers	Agreed coordinating entity
		Training suppliers and retailers on efficient cooking techniques, efficient habits and fuel use.	Number of trained suppliers on efficient cooking techniques and habits	Agreed coordinating entity
h) Undertake awareness raising campaigns among consumers	Clean cooking stoves information packaging and dissemination	Identify, package, document and disseminate information and data on ICS benefits including savings, environment issues, health issues, poverty issues, and employment issues.	Number and type of information packages on ICS benefits disseminated	Agreed coordinating entity, NGOs, CBOs, Private sector
		Identify, package and disseminate information on availability of ICS products and actors (dealers, retailers, after sale services)	Number of information packages on ICS actors availability disseminated	Agreed coordinating entity, NGOs, CBOs, Private sector
		Identify and disseminate information on consumer financing mechanisms availability	Number of information packages on ICS consumer financing disseminated	Agreed coordinating entity, NGOs, CBOs, Private sector
		Support establishment of local information and resource centres for clean cooking technologies energy entrepreneurs	Number of information and resource centres established and disseminating information to	Agreed coordinating entity, LGAs, REA, COSTECH, CAMARTEC

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
			cookstoves sector actors	
	Clean cooking stoves and fuel performance demonstrations and exhibitions	Facilitate performance demonstration of ICS in different strategic areas including market places, roadshows, schools and at health facilities	Number of demonstration of ICS performance and roadshows	Agreed coordinating entity, COSTECH, NGOs, DPs, REA, MEM
		Organize and support ICS trade fairs and exhibitions in different districts of Tanzania	Number of ICS trade fairs and exhibitions	Agreed coordinating entity, REA, NGOs, Private sector, DPs
	Linkage development between clean cookstoves and health issues	Involve health practitioners in ICS initiatives and encourage them to prescribe clean cooking stoves for respiratory infections related to IAP	Number of ICS prescribed by health practitioners for respiratory diseases	Agreed coordinating entity, MoHSW, private sector
i) Marketing of products (branding, media, leaflets, demos)	Promote ICS products through information dissemination and event organization	Support awareness campaigns (media coverage of ICS, demos, drama, leaflets	Number of media coverage on ICS, demos conducted, leaflets disseminated and drama conducted	Agreed coordinating entity, private sector, individual members
		Establish Clean Cookstoves day (presentation, competition, exhibitions and demos)	Number of clean cooking stove days conducted	Agreed coordinating entity, REA, COSTECH, CAMARTEC, Private sector, NGOs, DPs
		Develop and disseminate clean cooking stove catalogue for different clean cooking stoves and fuels, availability, and features.	Number of copies of clean cooking stoves catalogues disseminated	Agreed coordinating entity, COSTECH, REA, Private sector, DPs
		Support the private sector (local producers, distributors, retailers) on development and dissemination of promotional materials for clean cook stoves products (leaflets, brochures, drama, demonstrations, etc)	Number of promotional materials (leaflets, brochures, demonstrations, drama)	Agreed coordinating entity, COSTECH, REA, DPs, NGOs
		Encourage and support local producers of clean cookstoves and fuels to brand their products.	Number of ICS branded	Agreed coordinating entity, COSTECH. Private sector, REA, DPs, NGOs
j) Support for innovative	Establish and meet user needs	Conduct cooking user needs assessment	Analytical report on user cooking	Agreed coordinating entity

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
distribution models	and requirements through innovative distribution models		needs	
		Support stove producers and distributors to meet user requirements and needs/ preferences	Report on identified cooking user requirements addressed by ICS producers and distributors	Agreed coordinating entity
		Identify, package, assess compatibility, adapt, and promote appropriate and effective best practices in distribution and dissemination of clean cook stoves	Number of identified ICS best distribution models employed	Agreed coordinating entity, ICS stakeholders
		Solicit funding for supporting the private sector on innovative distribution models for ICS	Amount of funds raised for supporting private sector on ICS innovative models	Agreed coordinating entity, REA, COSTECH, DPs
k) Support development of after sale services centres (warranties, spares, etc)	Ensure availability of clean cook stoves after sale services	Ensure consumer satisfaction by providing quality after-sales services and options for warranties, as well as raise the level of supplier/producer accountability and strengthen their customer relationships.	Number of clean cooking stoves actors providing after sale services	Agreed coordinating entity
		Create proximity of services to end-users with support services which include training on the use of the product, maintenance or provisions of materials or parts, repair and servicing, warranties for replacement in case of damage or defects, can be carried out.	Number of ICS distributors and producers with local dealer/ retailer networks	ICS actors and stakeholders, Agreed coordinating entity
		Collect best practices on after-sales service guidelines and implementation mechanisms under existing cookstove interventions.	Number of identified best after sale services identified and disseminated	Agreed coordinating entity, ICS stakeholders
l) Strengthen business skills for clean cooking stoves and fuels entrepreneurs	Ensure business development skills within ICS sector	Training producers and distributors of ICS on EDS (marketing, book keeping, business planning, economies of scale, production costs and pricing, etc)	Number of ICS producers and distributors received EDS	Agreed coordinating entity, REA, COSTECH, Private sector
		Extend business coaching and mentoring of growing and new ICS actors	Number of ICS actors received business coaching	Agreed coordinating entity

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
m) Linking potential consumers of clean cooking stoves and fuel to financing	Develop effective linkages between clean cooking stoves/ fuels and the health sector	Support match making workshops, fairs and events for stove producers/ distributors with relevant financial institutions	Number of match making events and participants between ICS actors and FI	Agreed coordinating entity, REA, MEM, COSTECH, ICS stakeholders
		Encourage and promote financial institutions to develop and accommodate clean cookstoves consumer financing schemes in their products	Number of FI with financial schemes favouring ICS sector development	FIs, Agreed coordinating entity, COSTECH, REA, MEM.
n) Expansion and scaling up of demand of specific clean cooking technologies	Support the expansion of the charcoal briquette and biomass pellet industry	Identify charcoal briquettes and biomass pellet producers	List of producers of charcoal briquettes and biomass pellets	Agreed coordinating entity, NGOs, Private sector, social enterprises, Consultants
		Conduct needs assessment	TNA report	Agreed coordinating entity Consultant
		Support scaling up of fledging enterprises	Number of enterprises supported to scale up	Agreed coordinating entity, REA, COSTECH
		Support the development of market networks of charcoal briquette and biomass pellet producers	Number of distributors with distribution networks	Agreed coordinating entity, cookstoves and fuels distributors, Private sector
	Promote the use of charcoal briquettes and biomass pellets	Develop/support sensitization strategies	Report with strategies for charcoal briquettes sensitization	Agreed coordinating entity, NGOs, pellet and charcoal, briquettes Producers
		Lobby across the Alliance and the Government for adoption of charcoal briquettes and/or biomass pellets within institutions	Number of institutions adopted the use of charcoal briquettes and pellet for cooking	Agreed coordinating entity, MEM, COSTECH, NGOs, Private sector, institutions
		Provide marketing and business development support to SMEs	Number of actors provided with marketing and EDS	Agreed coordinating entity, pellets and briquettes actors
		Fund pilot projects, scaling up, and marketing campaigns targeting the urban charcoal segments	Number of pilot scaling up projects for use of charcoal briquettes and biomass pellets	REA, agreed coordinating entity, DPs, COSTECH, Private sector

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
	Support the expansion of use of certified sustainably produced charcoal	In collaboration with NGOs, private sector and public institution raise awareness of potential communities and end users on certified sustainable produced charcoal	Number of potential communities and end users of charcoal aware of certified sustainable produced charcoal	TBS, FCC, REA, Agreed coordinating entity, COSTECH, MEM, TFA, EWURA, NGOs, DPs, Private sector, TRA, LGAs
		Design and implement incentives and penalties for both sustainable charcoal producers/ users and inefficient charcoal producers/ users respectively	Number of incentives and penalties given to communities and end users of charcoal	TBS, FCC, REA, Agreed coordinating entity, COSTECH, MEM, TFA, EWURA, NGOs, DPs, Private sector, TRA, LGAs
	Promote the use of biogas in households and institutions	Develop/support sensitization strategies	Report with strategies for biogas sensitization	Agreed coordinating entity, NGOs, BCEs
		Lobby across the Alliance and the Government for adoption of biogas within institutions	Number of institutions adopted the use of biogas	Agreed coordinating entity, MEM, COSTECH, NGOs, Private sector, institutions
		Provide marketing and business development support to SMEs	Number of actors provided with marketing and EDS	Agreed coordinating entity, pellets and briquettes actors
		Fund pilot projects, scaling up, and marketing campaigns targeting the urban charcoal segments	Number of pilot scaling up projects for use of biogas	REA, Agreed coordinating entity, DPs, COSTECH, Private sector
	Support the uptake of LPG in urban charcoal segments	Work with LPG industry and trade associations to identify potential barriers to greater adoption	Report with barriers on adoption of LPG	Agreed coordinating entity, LPG actors
		Support innovative models for marketing and distribution of LPG	List of innovative models for marketing LPG	REA, COSTECH, DPs, Agreed coordinating entity, Private sector
	Support the development of CNG	Lobbying for CNG to be used for domestic purposes in Tanzania	Number of policy briefs, consultations and workshops with TPDC, MEM, REA, private sector, COSTECH, DPs on NG	TPDC, MEM, REA, private sector, COSTECH, DPs, Agreed coordinating entity

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
		Develop a strategy to gain support for greater investment in domestic CNG	Document with Strategies for increased investment in CNG	TPDC, MEM, REA, private sector, COSTECH, DPs, Agreed coordinating entity
		Support establishment of local information and resource centres for clean cooking technologies energy entrepreneurs	Number of information and resource centres established and disseminating information to cookstoves sector actors	Agreed coordinating entity, LGAs, REA, COSTECH

4. Strengthen Supply for Clean Cookstoves and Fuels

4.1 Support Local Producers to Improve Quality of Stoves and Fuels

Quality stoves and fuels should possess inherent characteristics that fulfil requirements of customers, which include saving fuel costs and time for obtaining the fuel, protection of the environment, health, safety, and conservation of energy and natural resources. In this case, the plan should aim for enhanced reputation for quality, an increased market share, greater customer loyalty, lower liability costs, fewer production or service problems – which yields higher productivity, fewer complaints from customers, lower production costs, and higher profits to manufacturers, materials suppliers and distributing agents. Interventions include training producer entrepreneurs on how to improve quality of products, better understand consumer preferences and act on their feedback, attract investment, and market their products. Other actions include building the capacity of entrepreneurs to focus on client-based product development and promotion.

4.2 Develop Efficient Innovative Supply Chains

Most suppliers lack effective and efficient distribution models for ICSs. Agreed coordinating entity will support both integration of clean cookstove technologies into existing businesses and distribution channels and where appropriate develop and adapt to efficient innovative supply value chains through analysing existing clean cook stoves and fuels supply value chains, identifying and analyse other successful existing supply value chains models outside and inside the sector, and finally supporting adaptation and adoption of existing distribution models to include clean cook stoves and fuels products. Agreed coordinating entity will also strive to link local clean cookstoves and fuels producers and distributors. Where relevant, an agreed coordinating entity will strive to uplift clean cookstoves status not to remain as a very special market product requiring very specific attention. As much as possible, an agreed coordinating entity will promote clean cook stoves and fuels to be seen as any other product sold and purchased in a market and benefiting from market forces.

4.3 Create Awareness around the Need for Greater Finance of Clean Cookstoves and Fuels

Most distributors and local producers of improved cookstoves lack finance for scaling up their businesses. Agreed coordinating entity will support clean cookstoves and fuels producers and distributors to access such required financing through a number of means including awareness raising around financial institutions regarding business opportunities within clean cookstoves and fuels sector, awareness workshops for clean cookstoves and fuels suppliers on business financing opportunities, matchmaking fair between clean cook stoves and fuels suppliers/ producers and financial institutions. Other means include mobilizing funding from national and international sources for clean cook stoves and fuels support, linking actors in clean cook stoves and fuels to tap existing and emerging carbon finance opportunities both nationally and internationally.

4.4 Increase Access to Finance

Agreed coordinating entity will support businesses linkages development between clean cookstoves and fuels producers and distributors to access finance. Specifically it will raise awareness around financial institutions regarding business opportunities and cases within clean cookstoves and fuels sector and conduct awareness workshops for clean cookstoves and fuels suppliers on existing business financing opportunities. Strategically, in collaboration with DPs and other stakeholders agreed coordinating entity

will facilitate matchmaking fairs and events between clean cook stoves and fuels suppliers/ producers and financial institutions. The private sector, financial institutions, DPs and local producers will be influenced to contribute for organization costs of such events. It will also mobilize funding from national and international sources for clean cook stoves and fuels and support actors in clean cook stoves and fuels to tap existing and emerging carbon finance opportunities. For sustainability reasons, some services to acquire funding from FIs will be provided at a cost.

4.5 Training and Capacity Building

The challenges of up-scaling clean cookstoves lies in understanding the dynamics of stove adoption by end users in terms of acceptance of the technology disseminated and if it will fulfill the objectives of clean cookstoves in terms of ease of usage, reduced fuel use, and reduce emissions to improve indoor air quality. Furthermore it is equally important for the technology to fit the preferences of users across the intended region or culture and if a clean cookstove will be suitable to cook staple foods.

An important aspect of up-scaling strengthen supply of clean cookstove is to build technical business skills through entrepreneurial training on the supply value chain, including stove producers suppliers and retailers. On the demand side (households and institutions), effective product use and maintenance skills, and creation of awareness on the benefits of clean cookstoves are of equal importance. With the current state of the supply chain (informal) it, therefore, calls for the formalization of the supply chain sector for the government and local and international organizations to plan and implement support for the sector to grow and reach scales which shall reduce the cost of production and hence cost of products to the consumers. Furthermore with a formal sector it will be easy for the government organs (including TBS) to control the quality of products reaching consumers.

Capacity building to stove producers should include marketing skills and knowledge on all aspects of clean cookstove design, properties of materials of construction, and quality control. The importance of quality control and especially use of jigs and fixtures to increase production capacity, reduce the cost of production, assure the high accuracy of the parts for interchangeability, reduce quality control expenses, and less skilled labor to be used in production is essential in small scale industries of this nature where parts are fabricated separately and assembled to make a product.

Participation of women in the supply and demand side capacity building should be encouraged as women are traditionally the main cooks in most cultures in Tanzania. Women should also be involved in the development of clean cookstove design. The participatory approach to stove design and development involving women will increase the likelihood of a clean cookstove technology to be accepted Capacity building should include development of teaching materials, manuals, information packs, and awareness campaign. Training of trainers at research institution and vocational training centers should be periodically conducted to update on technology development and to have uniform training approach to cookstove entrepreneurs and users. The highlights of actions and activities needed to enhance supply of clean cookstoves through capacity building include identifying types of training required for producers distributors, and retailers through baseline survey on stove technologies, production facilities, and marketing; identifying potential stove producers who have potential for up-scaling production through survey and collecting profiles of stove producers; identifying region training centers and local capacity builders through contacting technical institutions, NGOs, consultants/ experts, research institutions, and vocational training centers in the regions. Others include building training capacity in selected region centers through contacting experts in the identified types of training, developing standard training manuals, conducting training of trainers, and developing training facilities; training and awareness creation to stove users through baseline survey on household level training requirements, developing training manuals, identifying village level potential trainers, developing awareness and promotion packs, and sensitizing women to participate.

4.6 Research & Development

There is a need for our academics to translate research and teaching activities into tangible impact for the socio-economic development of the country. Their research and knowledge transfer agenda should

be focusing on the development of a thriving global clean cookstoves and fuels industry that is constantly innovating to improve design and performance, while lowering the cost of cookstoves and fuels. Challenges to be addressed include designing affordable products to people, especially low-income population groups, addressing cultural preferences, and reaching greater scale in the manufacturing and distribution of clean cookstoves and fuels. Interventions include increasing participation of R&D institutions in issues regarding clean cookstoves and fuels; and undertaking workshops for clean cookstove issues to encourage R&D, knowledge sharing and cooperation among cookstove program implementers, researchers, funders, and the government. Other actions include increasing the number of research activities and research proposals; and organising annual seminars to present new findings and other achievements on clean cookstoves and fuels.

4.7 Enable Women Participation in Stoves and Fuels Production and Distribution Cycles

Women not only they will play a crucial role for the promotion of clean cookstoves and fuels and will be one of the major target of awareness campaigns, but also are and will be a major stakeholder in the overall production and supply chain of clean cookstove and fuels.

This sector significantly involves women as they are key actors when it comes to cooking and using cookstoves and fuels. By developing and strengthening the clean cookstoves and fuels sector, thousands of job and income opportunities for women and youth will continue to be created. The sector will also enable women to develop their business and entrepreneurial skills by building on their present knowledge of cooking processes and the impacts/benefits of traditional and new techniques.

Key examples which have already shown the potential for job creation for women include Mama Jiko Bora Entreprise and Mama Shigela in the Lake Zone who have already established businesses producing, distributing and selling improved clean stoves. Other initiatives include Women Power who are training women leaders to become Renewable Energy entrepreneurs by retailing renewable energy products including improved cookstove in their communities. Another example is the production of clean fuels such as ARTI's charcoal briquette project in Bagamoyo, Kibaha and Dar-es-salaam which involves women up to 50% all along the value chain compared to the usual wood charcoal sector that creates jobs mostly for men. Others include SEECO ICS production, SEDC briquettes, and Mlandizi Briquettes supported by TaTEDO.

However agreed coordinating entity will need to increase the understanding of the role of women in the sector as well as to research on the potential new roles for women in the entire value chain. Therefore, it is of immediate importance to commission a study into the role of women to understand the challenges and opportunities for women in the sector. Agreed coordinating entity will continue to ensure women play a key role in the clean cookstoves and fuels sectors. The study would help identify the issues and opportunities facing women in the cookstove sector and more broadly in the country, assess the role, opportunities and barriers for women participation in the sector. From this study we can then develop pilot programs that support women to fully participate in the clean cookstoves and fuel sector and fully take advantage of the available opportunities.

Table 5 below includes a summary of detailed planned CAP activities aimed at fostering enabling environment for clean cookstoves and fuels.

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
o) Product Quality Improvement	Support local producers to improve quality of stoves and fuels	Support local ICS producers and distributors to better understand consumer preferences and act on their requirements	Report on end user needs and requirement assessment	Agreed coordinating entity
		Train ICS entrepreneurs (producers and distributors) on how to improve quality of products based on customer needs and requirements	Number of actors on clean cooking technologies trained on products quality improvement	Agreed coordinating entity
		Train local ICS producers, distributors and local dealers on marketing ICS and fuels and on attracting investments.	Number of actors on clean cooking technologies trained on marketing and attracting investments	Agreed coordinating entity
		Building the capacity of entrepreneurs to focus on client-based product development and promotion	Number of actors on clean cooking technologies capacitated on customer consideration in products development and production	Agreed coordinating entity
p) Improved clean cookstoves and fuels supply value chain	Support development of efficient innovative supply value chains	Analyse existing clean cooking stoves and fuels supply value chains	Analytical report on existing clean cookstoves and fuel supply value chains	Agreed coordinating entity, ICS stakeholders,
		Identify and analyse other successful existing supply value chains outside the sector	Analytical report on other existing supply value chains outside cookstoves sector	Agreed coordinating entity, ICS stakeholders,
		Support adaption and adoption of existing distribution models to include clean cooking stoves and fuels products	List of existing distribution models adapted and adopted to include clean cooking technologies	Agreed coordinating entity, ICS stakeholders, private sector
		Linking local Clean cookstoves and fuels producers and distributors to potential markets and existing distribution networks	List of potential markets linked to producers and distributors of clean cookstoves	Agreed coordinating entity, ICS stakeholders, private sector,

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
			and fuels	LGAs
		Develop inclusive business development models and dealer supply networks	Number of inclusive clean cookstoves and fuels businesses developed	Agreed coordinating entity, Private sector, stove producers
q) Improved access of Clean cookstoves and fuels actors to finance	Support clean cookstoves and fuels producers and distributors to access finance.	Create awareness around financial institutions regarding business opportunities within clean cookstoves and fuels sector	Number of FIs informed on business opportunities within clean cookstoves and fuels sector	Agreed coordinating entity, Private sector, stove producers
		Conduct awareness workshops for clean cookstoves and fuels suppliers on business financing opportunities.	Number of clean cook stoves actors informed of business financing opportunities	Agreed coordinating entity, FIs, stove producers
		Conduct matchmaking fair between clean cooking stoves and fuels suppliers/ producers and financial institutions	Number of match making between clean cookstoves/ fuels actors and FIs	Agreed coordinating entity, Private sector, FIs, stove producers
		Mobilize funding from national and international sources for clean cooking stoves and fuels	Amount of funds from local and international organizations mobilized for clean cooking technologies sector development	Agreed coordinating entity, Private sector, stove producers, REA, COSTECH, EDG
		Support actors in clean cooking stoves and fuels to tap existing and emerging carbon finance opportunities	Number of actors in clean cooking technologies benefited from carbon finance opportunities	Agreed coordinating entity, REA, DPs, private sector
r) Training and Capacity Building	Support capacity building and training on clean cooking stoves and fuel supply	Conduct training needs assessment and capacity building for clean cooking stoves and fuel producers, distributors, and retailers	TNA, number of producers, distributors and retailers trained on identified needs	Agreed coordinating entity, REA, COSTECH, ICS actors
		Conduct baseline survey on existing clean cook stove technologies,	Baseline report on available clean	Agreed coordinating

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
		production facilities, and markets	cookstoves and fuels, production facilities and markets	entity, private sector
		Identify potential stove producers who have potential for up-scaling production and document	List of potential stove producers with potential for scaling up	Agreed coordinating entity, stove producers and distributors
		Identify potential training facilities and centers and local capacity builders	List of potential training facilities/ experts and centres on clean cooking technologies	Agreed coordinating entity, ICS actors, training centres
		Develop training manual, guides and reference materials.	Number of training manuals, guides and reference materials developed and disseminated	Agreed coordinating entity
		Build capacity of actors in supply of clean cooking stoves and fuels on improved production, distribution and marketing strategies	Number of clean cooking stoves actors knowledgeable on improved production of stoves and fuels, distribution and marketing strategies	Agreed coordinating entity, Trainers
		Sensitize women participation in clean cookstoves and fuels business	Number of women participating in clean cooking stove technologies businesses	Agreed coordinating entity, REA, MEM, LGA, ICS actors
		Develop local level (village) capacity *builders linked to private sect*or	List of local level capacity builders in villages linked to private sector	LCB, private sector, Agreed coordinating entity, LGAs
s) R&D (introduction of new technologies, effective linkages between research institutions and	Increase participation of R&D institutions in research issues regarding clean cookstoves and fuels	Undertake workshops to forge linkages between R&D and clean cookstoves actors (program implementers, researchers, funders, and the government).	Number of R&D organizations linked to clean cookstove actors	Agreed coordinating entity, R&D organizations, cookstove actors and stakeholders, MEM, REA,

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
producers)				COSTECH
		Support development of research activities and research proposals	Number of research proposals and activities on clean cookstoves developed and undertaken	Agreed coordinating entity, R&D organizations, COSTECH, cookstove actors
		Organise quarterly and annual seminars/ workshops to present new findings and other achievements on clean cookstoves and fuels	Report on new findings and achievements on clean cookstoves linked to R&D undertakings	R&D, CCFAT, COSTECH
t) Enable women participation in stoves and fuel production and distribution cycles	Develop women capacity to participate in supply network for clean cookstoves and fuels	Fundraise to support women enterprises in clean cooking stoves and fuel	Amount of funds fundraised supporting women cookstoves enterprises development	Agreed coordinating entity, COSTECH, REA
		Conduct workshops promoting women participation in clean cooking stoves and fuel businesses	Number of women participating in clean cookstoves businesses as a result of organized workshops	Agreed coordinating entity, women in cookstoves businesses
		Train women on EDS and marketing of clean cooking stoves and fuels	Number of women in cookstoves business knowledgeable on EDS	Agreed coordinating entity, Women actors in cookstoves
		Support women enterprises in accessing financial opportunities in clean cooking stove and fuel	Number of women in cookstoves businesses accessing financial opportunities	Agreed coordinating entity, FIs, REA, COSTECH
u) Improved access of suppliers to information on clean cookstoves and fuels	Support awareness raising of suppliers on clean cooking technologies	Support establishment of local information and resource centres for clean cooking technologies energy entrepreneurs	Number of information and resource centres established and disseminating information to cookstoves sector actors	Agreed coordinating entity, LGAs, REA, COSTECH
v) Expansion and	Support local	Work with existing partners and	List of existing	NGOs, Training

Area of focus	Primary activities	Specific Actions	Indicators	Implementers
scaling up of demand of specific clean cooking technologies	artisanal stove producers to improve quality of their products and their buying power of raw materials	other organizations to identify and organize artisanal cookstove producers requiring quality improvement	artisanal cookstove producers received quality improvement methods and skills and facilities	institutes, private sector, LGAs, Agreed coordinating entity, REA, COSTECH, MEM
		Establish cookstove producer clusters where support in expertise, facilities and materials can be accessed by cookstove producers	Number of producers cookstove clusters supporting artisanal stove makers by facilities and skills	Cookstove producers, Agreed coordinating entity, LGAs, REA, COSTECH

5. Way Forward

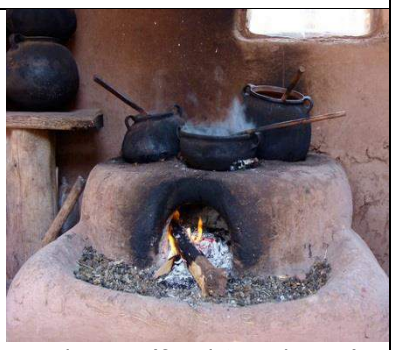
The agreed coordinating entity through contributions of its members and other development partners will embark on planning the implementation of priority activities identified in this CAP. It will identify and start by leveraging on partners similar ongoing activities and slowly introducing other planned activities as per resources availability. An ICS working group made up of thematic area coordinators from different areas/aspects of the sector is aimed to be established to advice and support agreed coordinating entity/ organization in implementation and performance monitoring of planned activities. Most agreed activities are expected to be implemented through the coordination of its members, with strong track record in the sector and with appropriate expertise, but also might outsource such services in case of limited in-house expertise.

The following specific activities are included in the proposed way forward:

- Identify and make use of a neutral location for the agreed coordinating entity office.
- Identify and coordinate more potential ICS and fuels stakeholders and available opportunities.
- Introducing proposed ICS CAP and PID vision, objectives, outputs and outcomes, activities and benefits to potential members, stakeholders and development partners through consultative workshops, visits, organized events and written materials (brochures, leaflets, presentations, etc.) for awareness and funding possibilities.
- Identify partners' and stakeholders' ongoing activities that agreed coordinating entity could leverage CAP and PID on and benefit in the first place.
- Fund raising for initial implementation of planned priority activities.
- Implementation of priority activities for year one.

It is envisaged that agreed coordinating entity will provide a strong coordination of the clean cooking stoves and fuels subsector in a more focused manner through effective networking of members and stakeholders, establishment of working groups, information dissemination, regular publishing and dissemination of research and market findings, and facilitation of training opportunities and information exchange fora on ICS and fuels in Tanzania. Agreed coordinating entity will also lobby and advocate to the government on the dire need for formalization and commercialization of the sector under consideration. All clean cooking technologists and fuels and stakeholders will have equal opportunities to access agreed coordinating entity and other opportunities within its mandate available in the sector. The agreed coordinating entity shall be committed to significantly contribute to a sustainable depletion of natural resources through clean and efficient energy supply and use. Agreed coordinating entity will partner and collaborate with other strategic partners to develop programmes and projects that will fundraise and give it a niche in the sector development.

Appendix 1: Categories of Stoves and Examples

<table>
<tr><th colspan="3">Fuelwood or Firewood stoves</th></tr>
<tr><td> 
Three stone fire</td><td> 
Mud stove (fixed stove)</td><td> 
Mud stove (fixed & multi-pot)</td></tr>
<tr><td> 
Metal-clad stove</td><td> 
Metal clad rocket stove (portable)</td><td> 
Fixed ceramic stove</td></tr>
<tr><th colspan="3">Charcoal stoves</th></tr>
<tr><td> 
Tradition charcoal stove</td><td colspan="2"> 
Improved charcoal stove (metal-clad)</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Biogas stove
  </td><td>LPG stove
  </td><td>LPG stove
  </td></tr>
<tr><th colspan="3">Gasifier stoves</th></tr>
</table>

Ethanol gel stove

Appendix 2: ICS stakeholders and their roles

Who Is Involved?	What Do They Do?	Comments
Multilaterals / Donors – USAID, EU, UNDP, World Bank	Involved at specific tasks. Coordination often lacking.	No clear policy on clean cookstoves and fuels specifically.
Government Ministries & Agencies Ministry of Energy and Minerals, Ministry of Health Ministry of Natural Resources and Tourism	Policy Makers in relevant ministries. Provide policy framework and guidelines on improved cookstoves	There isn't any clear integrated policy that provides incentive/enabling environment for commercialization of ICS sector specifically. Government agencies (and donors) are only involved with specific tasks at key stages and maintain a facilitative role on a continuing basis where necessary.
Parastatal Organisations COSTECH, SIDO, CAMARTEC, TIRDO, TBS, Rural Energy Agency (REA).	COSTECH, SIDO and CAMARTEC - have been working and disseminating stoves for a long time. REA is supporting investments in rural energy.	These organizations alone cannot serve the whole country and are furthermore very dependent on donor funding, thus mainly operate on program basis. REA receives subsidy from the government in addition of other funding from DPs.
Micro Finance Institutions - VICOBA, SACCOS, Banks	Provides micro financing	MFI's are still reluctant to engage in ICS loan provision, although some are engaged in ICS promotion.
International and Local NGOs – TaTEDO, PFD, SNV, CCFAT, TAREA, SEDC, Sunseed Tanzania, ARTI-TZ	Have been, training and disseminating stoves for a long time	These organizations alone cannot serve the whole country and are furthermore very dependent on donor funding, thus mainly operate on program basis.
Local Manufacturers & Suppliers of Stove Components Green Ceramics, SECCO, Kiwia and Laustern LTD,	Mainly produce liners pellets and respective stoves.	Resources are limited and capacities need to be further strengthened.
Local Low Quality Manufacturers – Informal Stove Makers /Artisans - in small groups or individuals - who are mainly located in big towns/cities	They are the main category who make and supply stoves to the consumers though the quality of their products is often questionable.	Informal sector with limited resources and capacities that require further strengthening (both technical and business skills).
Local Quality Manufacturers - SECCO, M&R, ENVOTEC, ESTEC, MHM-ADVENT, Kiwia and Laustern, Mama Jiko Bora, Mama Shigella, TREE…	Local producers for improved cook stoves	Lacking capital investment to commercialize and make mass production – no or low enabling environment.
Rural Stove Builders – Masai Cookstove & Solar	Local men and women builders making brick, cement and metal stoves, primarily for wood fuel	Lack training, capital investment and coordinated strategy to expand their market.
International Manufacturers – Envirofit, Stovetech, SIMGAS	Import finished stoves and disseminate locally often at subsidized price	Mass production has advantage for scaling and last-mile distribution, but prices are still high and local acceptability of stoves is a major challenge
Local Entrepreneurs L's Solutions, TREE, SEECO…		
Social Enterprise – ARTI-Energy, TaTEDO…	Develop efficient distribution networks, promotion & sensitization campaigns, build entrepreneurship capacity.	Promoting biogas, but not on a large scale, and engage in ICS as well.

Appendix 3: Overview of Ongoing ICS Initiatives

Item	Responsible	Initiative	Location
1	TaTEDO	Institutional cookstoves	Zanzibar, Dar es salaam, Kilimanjaro, Simanjiro, etc
		Improved charcoal production	Coast, Morogoro, Mbeya
		Institutional biogas	Dar es Salaam
		Charcoal briquettes	Morogoro, Mlandizi, Kibaha, Dar e Salaam
		Household ICS	Dar es salaam, Simanjiro, Meru, Shinyanga, Mwanza, Kilimanjaro, etc.
2	ARTI	Importation and distribution of clean cooking technologies and services	Dar es salaam, Country wide
		Sales of RETs	Country wide
3	UDSM	Capacity development	Dar es salaam, Country wide
		Research and development Standards	Dar es salaam, Country wide
4	TAREA	Promotion of renewable energy technologies	Country wide
		Awareness and capacity development Research and training	Country wide
5	Kiwia and Laustern	Development and production of briquettes and pellets and related cooking stoves	Arusha, Singida
		Marketing of briquettes and pellets cooking technologies	Country wide
6	TREE	Production of cookstoves	Dar es salaam
		Sales of cookstoves	Dar es salaam
7	CAMARTEC	Promotion and capacity development for clean cookstoves	Arusha, countrywide
		Research and Development	Countrywide
8	SIDO	Capacity development	Country wide
		Financing/ loans for RE products	Country wide

Item	Responsible	Initiative	Location
9	L's Solution	Importation and distribution of clean cookstoves	Arusha
		Sales of clean cookstoves	Country wide
10	SEECO	Production and marketing of ICS	Dar es salaam
		Sales of cookstoves	Country wide
11	ENVOTEC	Production of ICSs and marketing	Dar es salaam, Country wide
		Research and development	Dar es salaam
12	SUA	Capacity development of ICS	Morogoro
		Intellectual properties	Country wide
13	Stovetech	Production of domestic cookstoves	Dar es salaam
14	SIMGAS	Mass production and sales of biogas plants	Dar es salaam, Arusha, Kilimanjaro
		Financing biogas plants	EAC
15	Masai Cookstove and Solar	Production and financing of clean cookstoves	Arusha
16	SNV	Tanzania Domestic Biogas Programme - Promotion of biogas and BCEs in Tanzania	Countrywide
		Supporting ICS Task force - coordination	Dar es salaam, Arusha, and Mwanza regions
		EnDev-TICS - local ICS producers support	Mwanza, Bukoba, Mara and Geita regions
		Opportunities for Youth Employment (OYE) – trainings, internships and jobs for youth in clean energy sector	Countrywide programme but initial focus on Lake Zone, Northern Zone and coastal areas
		Integrated Renewable Energy Services (IRES) – last-mile distribution of solar and ICS	Lake Zone and Northern Zone of Tanzania
17	WWF	Renewable Energy promotion platform	Dar es salaam
18	M&R Appropriate Technologies	Domestic woodstoves	Dar es salaam
		Institutional woodstoves	Dar es salaam
19	ESTEC	Domestic wood stoves	Arusha

Item	Responsible	Initiative	Location
		Institutional wood stoves	Arusha
20	COSTECH	Promotion of ICS science and technology	Dar es Salaam
		Research and Development	Country wide
21	CARE	Promotion of cooking technologies	Dar es salaam and Tanga
		Capacity building and financing	EAC region
22	Kilimanjaro Metal Shapers	Domestic wood stoves	Arusha
		Institutional wood stoves	Arusha
	Rogarth Kimario	Institutional woodstoves	Arusha
	Sokola workshop	Domestic charcoal stoves	Morogoro
		Domestic wood stoves	Morogoro
	Mazimbu workshop	Domestic charcoal stoves	Morogoro
	Green ceramics	Domestic wood stoves	Dar es salaam
		Institutional wood stoves	Dar es salaam
	Greenstar JB makers	Domestic charcoal stoves	Dar es salaam
		Domestic woodstoves	Dar es salaam
	Five Men Group	Domestic charcoal stoves	Dar es salaam
		Domestic woodstoves	Dar es salaam

Appendix 4: List of CCFAT Members and Founder Members

SN	Name of member/ founder member	Organization	Contacts
1.	Agane Shaidi	Bagamoyo Briquette Company	0712 884080
2.	Dr. Klaus Winkler	TAREA	0786 086343
3.	Dr. Leonard Rweyemamu	M&R Appropriate Technology	0784 478752
4.	Dennis Tessier	ARTI -TZ	0715 235126 dennis@arti-africa.org
5.	Sylvester J. Mwambije	Envotec	0713 605137 envotec@gmail.com
6.	Estomih N. Sawe	TaTEDO	0787 289865 edirector@tatedo.org
7.	Hassan Rajab	UDSM	0754 265773 hmrajabu@gmail.com
8.	Erick L. Soka	Triangle (T) Limited	0684 812525 kochamaruu@yahoo.com
9.	Mukhaisi Mandozana	Triangle (T) Limited	0756 146027 mukhaisi@cmg-triangle.com
10.	Mary Mbeyela	African women in Mining Network TZ	0754 284072 afwimntz@yahoo.com
11.	Hassan Bussiga	SEDC	0713 791369 Bussiga@yahoo.com
12.	Mkoma Masanyiwa	MEM	0769 535374 masanyiwam@gmil.com
13.	James Ngeleja	NEMC	0713 785193 jlngeleja@gmail.com
14.	Frank Njiku	ENVICON	0718 824098 njikuf@yahoo.com
15.	Evody T. Ndumiwe	ENVICON	0713 227427 evody77@yahoo.com
16.	Erick S. Mwambije	Envotec Service Ltd	0786 937083 esyjam@gmail.com
17.	Kisioki L. Moitiko	ICSEE Masai stoves & Solar	0684 145680 kisiokim@yahoo.com

Appendix 5: List of ICS Taskforce Members*

SN	Name	Organization	Contact details
1.	Arfaxad Ndilanha	REA	0713 420380 andilanha@rea.go.tz
2.		Ministry of Natural Resources and Tourism	
3.	Estomih Sawe, Gisela Ngoo	TaTEDO	0787 289868 energy@tatedo.org
4.	Sylvester J. Mwambije	Envotec	0713 605137 envotec@gmail.com
5.	Matthew Matimbwi	TAREA	0755 086462 info@tarea-tz.org
6.	Martijn Veen, Finias Magessa, Francis Songela, Tayeb Noorbhai	SNV	0688 236378 mveen@snvworld.org
7.	Arda Riedijk	Round Table Africa	arda.riedijk@gmail.com
8	Masanyiwa Mkoma	MEM	0769 535374 masanyiwam@gmail.com
9.	Joseph Ismail	Tanzania Bureau of Standards	0655 757477 joseph.ismail@tbs.tz.org
10.	Edward Furaha	Tanzania Private Sector Foundation	0782 516699 info@tpsftz.org
11.	Dr. Hassan Rajabu, Prof. Kimambo	University of Dar es salaam	0785 319352 hmrajabu@udsm.ac.tz kimambo@udsm.ac.tz
12.	Prof. Kweka	SUA	0786 698806 aminire@yahoo.com
13.	Hassan Bussiga	Sustainable Energy Development Centre	0713 791369 energy.knowledge@sedc.or.tz
14.	Andrew Mnzava	Commission for Science and Technology	andrewmnzava@gmail.com

* Institutional representation in the ICS Taskforce changed over the years since its launch in 2011, and several of the people involved at the start are no longer present in 2014. The latter explains the gaps in the table.

Appendix 6: References

CAMCO . 2013, Tanzania Biomass Energy Strategy (BEST). Ministry of Energy and Minerals.

EEP. 2013. Analysing Biquette Markets in Tanzania, Kenya and Uganda. Energy and Environment partnership/ Southern and East Africa.

IEA. 2013. Tracking Clean Energy Progress 2013. IEA input to the clean energy. International Energy Agency.

Ishengoma R. 2013. Biomass Energy Potential: Opportunities and Challenges for Tanzania. Ministry of Energy and Minerals.

MARGE and African Solar Designs. 2013. Value Chain Study on the Renewable Energy and Biofuels Industry in the EAC region. Eastern African Community, Industrial Development Department

MEM. 2014. Status of Renewable Energy and Bio-fuels Development in Tanzania. Paper presented to the National Consultative Forum on Renewable Energy including Biofuels Value Chain 24th January, 2014, Serena Hotel – Dar es Salaam. Ministry of Energy and Minerals – Tanzania.

MEM.. 2013. National Liquid Bioenergy Policy (final Draft 2). Ministry of Energy and Minerals – Tanzania.

MEM. 2011. Miaka 50 ya Sekta za Nishati na Madini. Wizara ya Nishati na Madini

MEM .2003. The National Energy Policy. Ministry of Energy and Minerals – Tanzania.

MNRT. 2013. Tanzania National Forest Resources Monitoring and Assessment (NAFORMA) Brief report. Tanzania Forest Services Agency.

MNRT. 2014. An Overview Of The Forestry And Beekeeping Sub Sector: Achievements, Challenges And Priorities For Financial Year 2014/15. Ministry of Natural Resources and Tourism.

Mwihava N. C.2006. Status Of Energy in Rural Tanzania and Implication to Poverty Reduction. Ministry of Energy and Minerals. Tanzania.

REA. 2011. Baseline Survey Report for Energy Access and Use in Tanzania Mainland - Rural Energy Agency, Ministry of Energy and Minerals.

Sida. 2013. Evaluation of Sida financed interventions for increased access to Electricity for poor people. Drawing on international experience and case studies in Tanzania and Mozambique. Swedish International Development Assistance, Sida.

UNDP. 2012. Nationally Appropriate Mitigation Action Study on Sustainable Charcoal in Uganda. United Nations Development Programme.

URT. 2013. *Tanzania Census: 2012 Population and Housing Census General Report.* Central Census Office, National Bureau of Statistics, President's Office, Planning and Privatization. Dar es Salaam, Tanzania.

URT. 2005. National Strategy for Growth and Poverty Reduction. President's Office, Ministry of Planning, Economic and Empowerment. Dar es salaam, Tanzania

VPO. 2012. National Climate Change Strategy. Vice President's Office Division of Environment United Republic of Tanzania.

World Bank. 2009. *Environmental crisis or sustainable development opportunity: Transforming the charcoal sector in Tanzania. Washington DC, Africa Environment Unit.*

World Bank. 2011. *Wood Based Biomass Energy Development for Sub-Saharan Africa: Issues and approaches. .*Washington D.C.