

CATERPILLAR®



TRAINING MANUAL

THE CLEAN COOKING
SOLUTIONS EDUCATIONAL
PROJECT

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FOREWORD

The adoption and sustained use of improved cook stoves are critical performance parameters of the cooking system that must be monitored just like the rest of the stove's technical requirements to ensure the sustainability of their benefits.

Cook stoves have long been identified as a promising option to reduce the negative impacts of cooking with traditional open fires. Interventions for disseminating ICS dates back to the 1970s and until the new millennium were mainly designed for increasing fuel efficiency, often because of a perceived link between deforestation and household energy.

Improved cook stoves are starting to recapture the attention of governments, development organizations and donors and it is in that vein that students need to be educated on the benefits of improved cook stoves.

Ghana consumes little energy compared to developed nations; however, over 50% of the energy that they do use goes into cooking food. The average rural family spends 20% or more of its income purchasing wood or charcoal for cooking. Living in the city provides no refuge either as the urban poor frequently spend a significant portion of their income on the purchase of wood or charcoal. A recent World Health Organization report has revealed that smoke related diseases account for more than 13, 400 deaths in Ghana. The report further asserts that the country's forest cover has reduced by 70 per cent over the last 40 years partially due to cooking fuel harvesting.

Improved stoves are more efficient, meaning that the stove's users spend less time gathering wood or other fuels, suffer less emphysema and other lung diseases prevalent in smoke-filled homes, while reducing deforestation and air pollution.

This Manual will enlighten participants on the need to adopt cook stoves in their daily activities due to its enormous benefits including the protection of the natural environment.

HOW TO USE THIS MANUAL

This Manual is intended to equip Junior and Senior High Schools with the relevant information, education and skills required for the promotion of clean and efficient household cooking solutions. This Manual is tailored to meet specific needs in understanding conservation of forest resources, the promotion of clean Cook stoves and the health implications of relying on traditional Cook stoves

This Manual is in Ten (10) Modules

- **MODULE ONE: INTRODUCTION**
- **MODULE TWO: THE SUB-SAHARAN AFRICA CASE**
- **MODULE THREE: THE IMPROVED COOK STOVE**
- **MODULE FOUR: GOVERNMENT OF GHANA'S POSITION ON IMPROVED COOKSTOVE**
- **MODULE FIVE: THE GhACCO NETWORK**
- **MODULE SIX: HEALTH IMPACTS OF TRADITIONAL COOKSTOVES**
- **MODULE SEVEN: ENVIRONMENTAL IMPACTS OF TRADITIONAL COOKSTOVES**
- **MODULE EIGHT: ECONOMIC IMPACTS OF TRADITIONAL COOK STOVE**
- **MODULE NINE: EMPOWERMENT AND LEADERSHIP**
- **MODULE TEN: ENTREPRENEURSHIP**

Each module has been prepared to help trainers with facilitation skills needed to educate Junior and Senior High Schools on the need to adopt improved cook stoves.

In addition to the training modules in this Manual, there is a supplementary training on material on Leadership and Empowerment for the girl child that is recommended to always go in tandem with this training.



Introduction to Improved Cook Stove and Clean Fuels

Session rationale:

This session is to expose Participants to the reality in the energy sector with statistics and why there is the need for citizens to embrace the Improved Cook stoves.

Session Objectives:

- Issues confronting the energy sector of Ghana will be discussed to bring the subsequent modules into proper perspective
- The reasons for the facilitation of Clean and efficient household cooking solutions

Facilitator's tips: Most participants are new to the subject so there is the need to introduce the subject by telling them about the project and why there is the need to promote clean cooking solutions. (Read the hand book carefully for answers)

Directions

- Let participants appreciate the energy issues confronting Ghana today and let them appreciate the necessity of clean cooking by doing a comparative analysis between Ghana and the developed nations (not more than 10 minutes)
- Put participants in a plenary session of 5 in each group and let them present to the class whether their homes use improved cook stoves or wood fuels – this plenary can set the tone for further discussions (not more than 30 minutes)
- Please show to participants the improved cook stoves and let them try to label it on their own to set the tone for the module 2 (5 minutes)
- There is the need to let participants after the plenary sit in two major groups (improved cook stove group and the traditional cook stove group for further illustrations later in module 2) this is to give vivid touch to the participants to ensure full participation.

Materials: Flip Chart Paper, Flip Chart Stand/Board, Marker Pens and Masking Tape

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Plenary session and Discussions

Energy is arguably one of the major challenges the world is confronted with today. Even though it is not categorically stated in the Millennium Development Goals (MDGs) it has implications for the achievement of a number of them. It is needed to meet the most basic needs of poor men and women especially heat for cooking and mechanical power.

It is for this reason that the Global Alliance for Clean Cook stoves is facilitating the creation of a thriving global market for clean and efficient household cooking solutions.

In Ghana, the bulk of energy supply is met from wood fuels (firewood and charcoal) which account for over 70% of total primary energy supply and about 60% of the final energy demand with its negative health and environmental impact (Ghana Action Plan, SE4ALL, 2012). 74% of Ghanaians depend on this energy source as their major source of cooking fuel according to the 2010 National Household Census.

This staggering demand for fuelwood is threatening and according to a UNDP report, the country's tropical forest area is currently 25% of its original size. This trend of wood use is unsustainable and a widespread increase in stove efficiency could significantly reduce the resource stress and environmental impact.

THE IMPROVED COOKSTOVE

While in the early years, conservation of forest resources was the main driver in the efforts to establish clean Cook stoves (Smith 2000, IPCC 2007), our contemporary setting also focuses on health and broader environmental impacts. The clean cook stoves are improved over the traditional ones to cater for combustion efficiency as well as reduction in emissions.



Fig 1: Improved Cook stoves being depicted

Traditional cooking methods deplete resources, degrade local environments, multiply the time needed to collect fuels and cook meals, and create indoor air pollution that threatens the well-being of most vulnerable members of households.

CLEAN FUELS

The efficiency and safety of the improved cook stove is highly improved when it is fuelled by a cleaner alternative other than fuelwood or under-standardized processed biomass.

Clean fuels are attained by optimising the use of currently accessible fuels, for example by focusing on processing fuel to increase its cleanliness and efficiency.

Some improved forms of cooking fuel include:

- **Biomass** refers to all organic matter derived from living or recently living organisms, plant and animal-based. Wood is the most common form of biomass used for cooking. Other forms of biomass are sometimes not as convenient to burn, such as sawdust, charcoal dust, grass, urban waste wood, and agricultural residues. Processing the biomass into compact, evenly sized pieces, such as pellets or briquettes can improve the efficiency of transportation and use for cooking.
- **Biogas** is a mixture of methane and carbon dioxide produced during the digestion of organic matter, including food and agricultural waste, animal dung, human waste and other sources of biomass. Biogas is well suited for households and commercial farms where sufficient animal manure can be collected on a daily basis, or in communities that produce substantial agricultural waste.
- **Ethanol** is an alcohol fuel made from a variety of plant-based biomass. Alcohols are produced by fermentation and distillation from plants that are rich in sugar or starch, like sugar cane, maize, grain, cassava, sweet potato, etc. Straw, grass and wood can also be used, though with an additional step to digest fibrous plant materials. Ethanol can be further processed into gel fuel, which minimizes spillage.

- **Liquefied Petroleum Gas (LPG)** is a naturally-occurring by-product of natural gas and oil production. LPG is stored and distributed in pressurized metal cylinders in a variety of sizes to cater to different consumer needs. LPG is sold by refineries or processing plants to transporters, distributors and retailers for household consumption through a variety of distribution and pricing models.

The Sub-Saharan Africa and Ghana Case

Session Rationale:

This session brings to bare the Sub-Saharan Case of the developing regions relying on Solid Fuels. It also discusses the distribution of people with access to improved Cook stoves by developing regions

Session Objective

This is to enlighten participants on the energy access situation in Developing Countries

Facilitator's tips: there is the need to project this presentation on the wall before discussion starts due to the fact that you will be dealing with statistics and let the participants understand that developed countries are different from developing countries (give examples).

Directions

- Ask participants to share their views with all on what they understand by a first class nation and a third class nation which is the same as developed and developing (10 Minutes).
- As they sit in the two groups of traditional cook stove group and improved cook stove group, let them identify as groups why Ghana is in the developing nations and why china is in the developed nations (20 Minutes).
- In participant's own words let them write on their papers which country they will want to go-whether Ghana or China and why. Ask them to share their thoughts with all (10 Minutes).
- Facilitator has to direct this part of the presentation carefully so it does not degenerate in discussing other things not relevant to the issue at hand for participants
- Let participants understand that Ghana can be like China if they ensure good cook stoves practises (10 minutes discussions)

Materials: Flip Chart Paper, Flip Chart Stand/Board, Marker Pens and Masking Tape

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Discussions and Presentations

Fig2: Distribution of developing regions relying on solid fuels

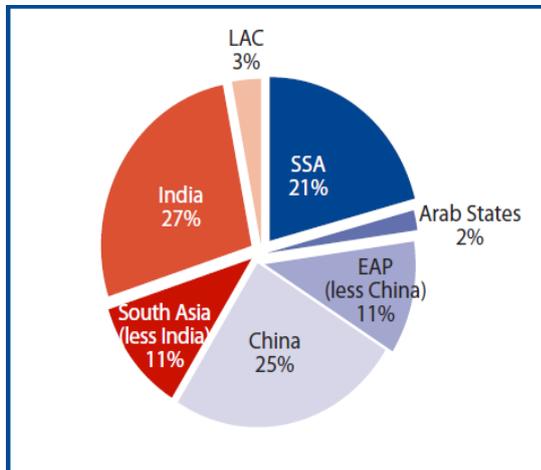
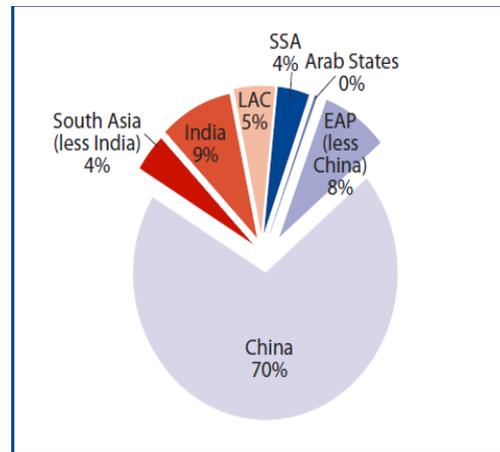


Fig3: Distribution of people with access to ICS by developing regions



Source: extracted from the "Energy Access Situation in Developing Countries" (UNDP, 2009)

The promotion and adoption of improved Cook stoves has become an urgent need for governments and the international community. Many varying types of Cook stoves have been developed across the globe in a number of projects to suit the end users while maintaining its underlying purpose of increasing efficiency and improving combustion.

In Ghana, the level of fuel consumption far exceeds the rate of forest growth due to the heavy dependence on the raw material for energy needs. While Ghana is endowed with a number of energy resources that could be exploited (including hydrocarbons, hydropower, solar and wind), wood fuel still accounts for 70% of total primary energy supply.

The use of the fuelwood has contributed immensely to deforestation and responsible for emissions of greenhouse gases that contribute to climate change. Health-wise, the exposure to Indoor Air Pollution is estimated to cause 16,600 deaths per year in Ghana.

The Improved Cook Stove

Session Rationale:

This session discusses the Improved Cook stoves in details with the prototypes for participants to understand how efficient the Improved Cook stoves are as compared to the Traditional Cook stoves.

This session also discusses in details the two basic types of the Improved Cook stoves which are the Natural Draft Improved Cook stoves and the Forced Draft Improved Cook stoves

Session Objective:

- This session is for participants to know the different types of Improved Cook stoves
- This session also analyses the efficiency and effectiveness of the Improved Cook stoves compared with the Traditional Cook stoves.

Facilitator's tips: Projection of the pictures in this session is key to understanding this part of the presentation.

Directions

- Participants should be made to discuss what they preferred in plenary sessions of 5 what the benefits are with improved cook stoves as compared to traditional cook stoves (15 minutes)
- Facilitator needs to project on the board the two types of cook stoves
- Better still some cook stoves can be brought to class for easy understanding
- With this part of the presentation, facilitator should use more local examples in their presentation
- It will be easy if facilitator is able to identify public places where such improved cook stoves are used such as the Accra Mall etc.
- There is the need to distribute plain sheets of paper for participants to sketch the improved cook stoves (25 minutes)

Hint: all sections especially this one should be interactive since some participants already know the improved cook stoves. So peer learning is important

Materials: Flip Chart Paper, Flip Chart Stand/Board, Marker Pens and Masking Tape;

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Plenary session that has interactivity component

There are two basic types of Improved cook stoves;

1. The Natural Draft Improved Cook stove
2. The Forced Draft Improved Cook stove

The Natural Draft Improved Cook Stove

- Improved versions of open flames stoves to trap heat inside the stove and direct it to the pot
- No insulation in the stove design and so also prone to smoking due to cooling near the walls
- Relatively easier to build
- Easier to operate as there are no batteries
- No moving parts and less likely to break down
- Airflow cannot easily be regulated to change heat setting



Fig 4: Natural Draft Improved Cook Stove

The Forced Draft Improved Cook stove

- This system forces air into the stove to raise flame temperature and intensity.
- Reduces emissions by encouraging complete combustion.
- Alternative designs exist where fans are powered by batteries to force airflow



Fig 5: A Young girl cooking on The Forced Draft Improved Cook Stove

Government of Ghana's Position on Improved Cook stove

Session Rationale:

This session discusses the Government of Ghana's Position on Improved Cook stoves. This session puts in perspective the development and use of efficient biomass production and the production and use of Improved Cook stoves.

It also discusses the direct interventions the Government of Ghana has taken to facilitate the use of Improved Cook stoves.

Session Objectives

- Participants to be made aware of Government of Ghana's intervention in the Energy sector
- Participants should be well informed of the legal framework regulating the sector

Facilitator's tips: Government Acts in the handbook should be printed and discussed in detail in terms of relevance of the Acts to improved cook stoves project

Directions

- Key terms such as Conventions, Acts, Legal frameworks, Action Plans, etc. should be discussed first before the actual presentation starts on improved cook stoves
- This part of the presentation should focus more on Government's participation in improved cook stoves with relevant examples.
- This part of the presentation should not be more than 20 minutes
- Some materials such as Acts and conventions should be printed and shared with participants
- Government's positions should be made clear with no ambiguities on their position on improved cook stoves. The hint is that Government supports it fully and proper government actions should be given like support for the drafting of handbooks and manuals.

Materials: Flip Chart Paper, Flip Chart Stand/Board, Marker Pens and Masking Tape

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Facilitator led discussions and with emphasis on key terms discussed

Ghana as a signatory to many international conventions has strived over the years to facilitate the means of curbing global concerns through international and local partnerships as well as policy formulation and implementation.

The Renewable Energy Act 832 (2011) lays out a comprehensive legal framework for the development and use of more efficient biomass production while promoting the production and use of improved and more efficient wood fuel utilization technologies (e.g. improved Cook stoves); it also promotes the establishment of dedicated woodlots for wood fuel production.

Direct actions with regards to cook stove improvement and adoption, the Government through its Ministries has;

- Initiated activities for laboratory test on improved cook stoves to ascertain and assure end users of product efficiency. Particularly, the Global Alliance and the UNDP have supported the installation of Testing Centres at the IIR of CSIR and KNUST respectively.
- Development of standards for improved cook stoves – an ongoing project led by the Ghana Standards Authority.
- Been in dialogue with local banks and financial institutions to partners in structuring financing for wider promotion and marketing of Improved Cook stoves by the private sector (Ghana Action Plan, SE4ALL, 2012).

The Government of Ghana, under the UN Sustainable Energy for All (SE4ALL) initiative has set a target to have two (2) million households adopt improved cook stoves by 2020. The Ghana Alliance for Clean Cook stoves (GhACCO) network, however, has a higher target by fostering the adoption of five (5) million clean Cook stoves and fuels by four million Ghanaian household by 2020 through the promotion of partnerships among members and actors to ensure synergy in influencing policies and stimulating action that inure to its goals.

THE SE4ALL INITIATIVE AND THE CLEAN COOKSTOVE AGENDA

The Sustainable Energy for All (SE4ALL), Ghana Action Plan is the vehicle for accelerating progress on the achievement of universal access to sustainable energy by 2030 globally. The program is designed to assist countries to analyze constraints as well as initiate concrete commitments and actions towards its set objective.

With particular reference to their work on clean cook stoves, their objectives include;

- i. Improving access to LPG as a clean cooking fuel and
- ii. Improve access to improved cook stoves by wood fuel users

They also explore the potential of using biogas for cooking in public institutions and commercial facilities.

Their activities have mainly focused on

- Setting regulations for the improved cook stove sector
- Awareness creation
- Capacity building
- Woodlot establishment

WHAT TO KNOW ABOUT THE GHANA ALLIANCE FOR CLEAN COOKSTOVES (GhACCO)

Session Rationale:

This session is to educate participants on the Ghana Alliance for Clean Cook stove (GhACCO) Network which includes partners as the Ghana Standards Authority, SE4ALL, CSIR-IIR, Manufacturers and Distributors improved cook stoves, NGOs, Energy Commission, Ministry of Power, Ministry of Health (MoH), Ghana Health Services, UNDP and Technology Consultancy Centre (TCC) - KNUST and their role in educating citizens on the Improved Cook stoves. Membership is made up of producers, manufacturers, distributors, academia, Civil Society Organisations (CSOs), NGOs, smack artisans, engineers, research institutions, individuals, media, businesses, microfinance institutions, etc.

Session Objective:

- Participants should be aware of the institutions both private and government sectors that are part of the GhACCO network
- Participants should know the responsibilities and Objectives of members in the GhACCO Network

Directions

- All 8 organizations that form part of the GhACCO network should be discussed one after the other with their key roles
- Full name of GhACCO should explained to participants
- Nominate 8 students to come to the front of the class and each of them represents an organization in the network and their key roles.
- Merge all 8 students to form GhACCO so they understand the alliance.

Hint: Terminologies and key words should be identified and explained in all sessions

Materials: Flip Chart Paper, Flip Chart Stand/Board, Marker Pens and Masking Tape

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Both Demonstrations and Facilitator led

The Ghana Alliance for Clean Cook stoves (GhACCO) has been established as a strong stakeholder platform to lead the front to catalyze a revolution in the cook stove sector and mobilize high level national and donor commitments towards the goal of universal adoption of clean cook stoves and fuels in Ghana. The network has an overriding target to foster the adoption of clean cook stoves and fuels by 4million households in Ghana and distribute 5million cook stoves by 2020.

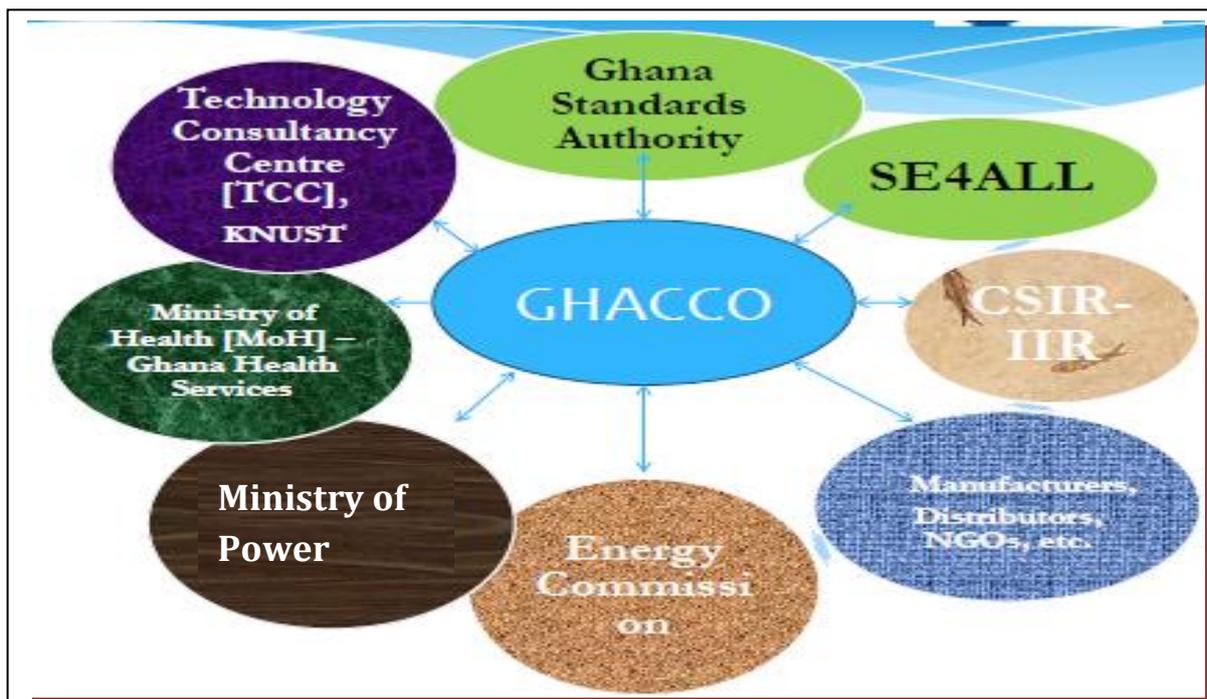


Fig 6. A Structural representation of the GHACCO Network

The network has the following Objectives.

1. To support the development of a thriving national market for clean cook stoves
2. To create a platform for enhancing capacity development of member and promoting best practices in the cook stoves sector.
3. To mobilize resources for actors in the sector to upscale the production and distribution of clean cook stoves.
4. To strengthen coordination, innovative ideas, influence policy and enhance information sharing among members, state sector to upscale the production and distribution of clean cook stoves.
5. Create a collective voice for actors in the clean cook stoves sector
6. Promote awareness and raise the profile of the sector's positive work in

Ghana at the international level

7. Standardize issues in production, operations, implementation, technical requirements of products quality and services in the cook stoves sector.
8. Sensitize and educate citizens on the benefits and importance of using clean cook stoves.

HEALTH IMPACTS OF THE TRADITIONAL COOKSTOVES

Session Rationale:

This session introduces participants to the harmful effects of using the traditional cook stoves. These health effects include lung cancer, acute respiratory infections (ARI), chronic obstructive pulmonary diseases (COPD), disability adjusted life years (DALYs), Blindness, etc.

Session Objectives

- Participants become aware of the number deaths attributable to solid fuels by gender
- Participants become aware of the share of deaths attributable to solid Fuels by diseases
- Participants become aware of the measures to prevent smoke related illnesses

Directions

- Discussions in this session should have pictures projected on the board
- This session should not only be discursive but involve group exercises on the causes of smoke related illnesses
- Facilitator should focus the discussions on child related illnesses caused by smoke before generalizing the causes of illnesses caused by smoke
- Discussion on statistics should be in simple English with no ambiguities
- Test participants' understanding of smoke related illnesses by letting each one give examples
- It is good to explain that the improved cook stove has little or no smoke emitted and for that matter smoke related illnesses cannot be caused using the improved cook stoves
- This part of the presentation should not be more than 35 minutes to ensure effectiveness.

Materials: Flip Chart Paper, Flip Chart Stand/Board, Marker Pens and Masking Tape

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Facilitator led discussions

The health implications of wood fuel use on its users result from the incomplete combustion which produces toxic fumes that are inhaled.

COOKSTOVE COMBUSTION



It is the incomplete combustion of cook stove fuels that yield the resultant negative impacts. When fuelwood combustion is incomplete, it produces Particles (carbon monoxide, sulphur dioxide and nitrogen oxide) and Carcinogens (hydrocarbons) which are harmful.

GENERAL EFFECTS ON HEALTH

Before particular effects are discussed, a general understanding of the mechanism in which the smoke from fuelwood impacts its negative consequence on the human body will be useful.

Firstly, research has shown that most of the toxic substances found in cigarette smoke are also present in smoke from traditional cook stove. Once these are inhaled, the substances are carried along in the blood stream and is carried everywhere the blood goes in the body.

EFFECTS:

This way, its effects may be experienced in any part

I. IMMEDIATE (ACUTE)

- a. Irritation or Allergy
- b. Acute Respiratory Infection
- c. Trigger Asthma Attack

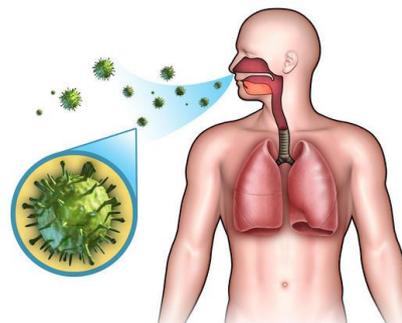


Fig 7: Depiction of acute respiratory infection

II. LONG TERM (CHRONIC)

- a. Reproductive (Ectopic, Infertility, Abnormal babies, Low Birth Weights)
- b. Age Related Disorders (Hypertension, Diabetes Mellitus, Weaken Bones and Joints, Memory Loss)
- c. Respiratory Systems/Lungs (Chronic cough, Repeated Chest Infection, Worsened Asthma)
- d. Cancer (Bladder, Cervix, Stomach, Lung, Pancreas, Colon, Blood)

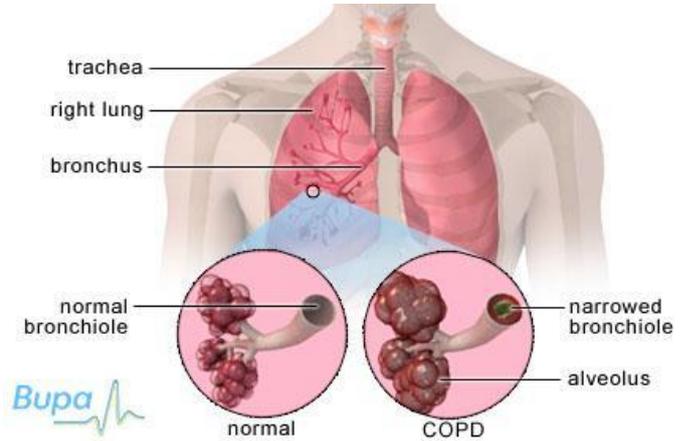
Some of the effects are discussed below;

ACUTE RESPIRATORY INFECTIONS

Acute respiratory infections (ARI) are the leading causes of burden of disease worldwide and account for the deaths of 4-5 million children under five in developing countries each year.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

There is good evidence linking smoke from solid fuel use in developing countries with three important diseases— pneumonia (particularly in children), chronic obstructive pulmonary disease (COPD), and lung cancer (Dherani *et al.* 2008; WHO 2004a). Smoke from incomplete combustion of solid fuels contains many substances known to be toxic to human health through a variety of mechanisms.



DISABILITY ADJUSTED LIFE YEARS

In Ghana, exposure to indoor air pollution is responsible for the annual loss of 502,000 disability adjusted life-years (DALY) (Ghana Action Plan, SE4ALL, 2012).

Fig 8: Number of COPD deaths per 1 million attributable to solid fuels by gender

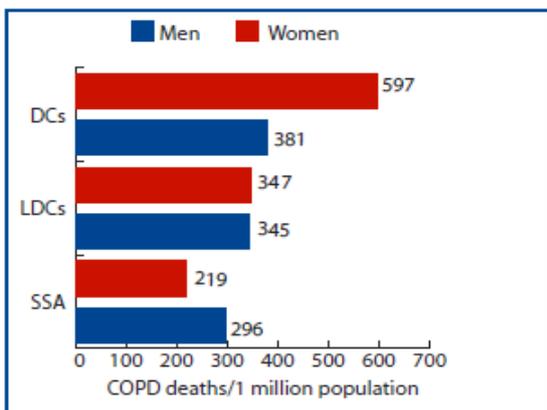


Table 1: Share of deaths attributable to solid fuels by diseases

	Deaths attributable to solid fuel use (%)			
	Pneumonia	COPD	Lung cancer	Total
Developing countries	49	39	5	38
LDCs	55	52	0.2	52
Sub-Saharan Africa	53	45	1	51
World	49	35	2.7	32

LOW BIRTH WEIGHT AND PRENATAL MORTALITY

LBW is considered to be a major determinant of perinatal and infant mortality and is a significant risk factor for subsequent malnutrition and infectious disease. The relationship between cooking stove smoke and LBW in developing countries is also being studied

CHILD BIRTH AND PNEUMONIA

For example, just over half of all pneumonia deaths (55 per cent) in children under 5 years of age in LDCs are attributable to solid fuel use.

Globally, pneumonia remains the single most important child killer and is responsible for 2 million deaths every year. New-borns and infants are often carried on their mother's back while she is cooking, or kept close to the warm hearth.

Consequently, they spend many hours breathing polluted air during their first year of life when their developing airways and their immature immune systems make them particularly vulnerable. Indoor smoke is one of the underlying causes and to blame for nearly 800 000 child deaths annually.

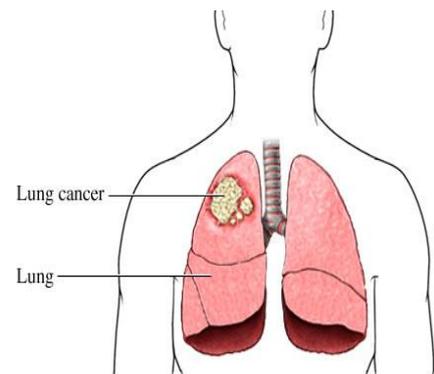
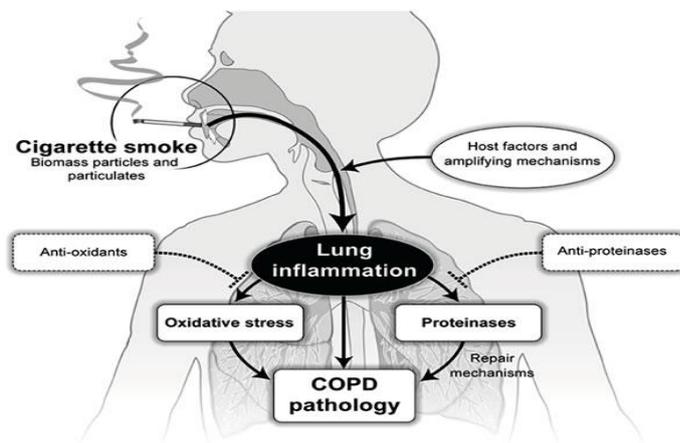


Fig 1: Child helplessly exposed to smoke

LUNG CANCER

Cancer-causing substances are found in the fumes from traditional cooking stoves. And extracts of biomass fuels have shown significant mutagenicity in the laboratory.

Fig 10: Effect of smoke inhalation



Source: Webmd.com

Environmental Impacts of Traditional Cook stoves

Session Rationale:

This session introduces participants to the environmental impact of the traditional cook stoves. Some of these environmental impacts of traditional cook stoves include deforestation and forest degradation, air pollution, biodiversity loss, Global Warming etc.

Session Objectives:

- Participants become aware of the human actions having hazardous environmental consequences

Facilitators Tips: This part of the presentation focuses on the human actions causing environmental hazards so this should be discursive.

Directions

- Let each participant give examples of effects of human actions to the environment that is not necessarily related to smoke
- Narrow the discussions now to smoke related environmental impacts but it should still be examples from the participants
- Note, all these submissions should be written on the boards for all to see
- There is the need to have card boards for participants to write their thoughts on environmental impacts and later exchanged with the partner sitting by for marking
- This activity should be participant led and facilitator comes in to stream line discussions.

Materials: Flip Chart Paper, Flip Chart Stand/Board, Marker Pens and Masking Tape

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Facilitator led discussions

Many of the same pollutants that negatively impact health—notably black carbon, (non-methane) volatile organic compounds, and carbon monoxide, plus methane—also affect climate change.



Fig 11: A woman cooking with a traditional cook stove

DEFORESTATION AND FOREST DEGRADATION

In Ghana, wood fuels account for over 70% of total primary energy needs with 74% of the population dependent on this fuel source. The heavy dependence on wood fuel by the country's population has resulted in an increasing demand for the energy source over the past years. With this trend, it is forecasted that Ghana is likely to consume more than 25 million tonnes per year by 2020.



Fig 11: A view of deforested land

AIR POLLUTION

Lack of access to clean, efficient and modern cook stoves in the home can impact health in many ways. The most important direct health effects result from the air pollution caused by burning solid fuels, often indoors on open fires and inefficient stoves (Bruce *et al.* 2000; WHO 2006).



Fig 12: A polluting traditional cook stove

BIODIVERSITY LOSS

Loss of biodiversity begins gradually, as the most available preferred fuel species are cut selectively. Subsequently there evolves a change in tree species composition, with a reduction in stem size distribution, plant densities and leaf area index.



Fig 13: Degraded land due to wood fuel use

CLIMATE CHANGE

Burning solid biomass is inefficient at converting energy to heat for cooking, and releases a toxic mix of health damaging pollutants that contribute to climate change at regional and global levels.

Economic Impacts of Improved Cook stoves

Session Rationale:

This session introduces participants to the economic impacts of the improved cook stoves. Some of these economic impacts include time saving, job creation opportunities, health cost savings etc.

Session Objective

- Participants are educated on the need to shift from the traditional cook stoves to the improved cook stoves.
- Participants are educated on the personal safety risks posed by fuel gathering or by the use of traditional stoves in households

Facilitator's tips: economic impacts should be related to the participants through direct examples. This session should be 45 minutes

Directions

- This session should be choreographed for easy understanding
- Let three participants pretend to fetching fire wood while their colleagues are learning for them to realise that its time consuming since they will miss classes
- Let them understand that the improved cook stoves does not need such tedious work
- Another choreographed session can be organised- with this session let one participant play a doctor and some participants play the role of patients who have had some related illnesses as a result of traditional cook stoves. It means that those who are ill cannot go to work and will be fired. They will lose their income and this may cause subsequent social issues which has economic implications.

Materials: Table/ chairs/ doctor's kits/ clothes/ etc.

Medium of Presentation: PowerPoint Presentations; Question and Answers

Activity: Choreography

Economic Savings made from improved Cook stoves over the use of traditional open fire will include;

- **Time Savings**
 - ❖ Adopting improved cook stoves affords poor households (particularly women and children) the savings in time for other productive ventures.
 - ❖ Time is saved on
 - the drudgery of collecting fuel far from home
 - duration of cooking time
 - time spent in cleaning soot laden pots

- **Health Cost Savings**
 - ❖ With Indoor Air Pollution (IAPs) contribution to a number of diseases, improved cook stoves will effectively serve to curtail costly expenditure on healthcare and medication.
 - ❖ Again, it curbs the risk of getting hurt from fuelwood search and collection.
 - ❖ In places of conflict especially, women and young girls are saved from being victimized from rape as a result of search for fuel wood in remote and secluded areas.

- **Job Creation Opportunity**
 - ❖ The improved cook stove supply chain offers opportunities for alternative livelihood to empower particularly poor households and women.
 - ❖ Local entrepreneurs can be involved in the fabrication, engineering, and retail/distribution of the improved cook stoves.

WHY THE NEED FOR A SHIFT

Stoves occupy a central place in the health, environmental, economic, and social lives of families in developing countries. Improved Cook stoves therefore can provide a number of benefits.

- They can reduce indoor and outdoor air pollution by providing more complete combustion, decrease indoor exposure by providing better ventilation, and

decrease burns by elevating the cooking surface off of the floor.

- Improved stove efficiency can boost household economics and empower women by reducing the time, dangers, drudgery and expense involved in obtaining and preparing fuel, leaving more time for childcare or economic activities.
- Reducing fuel consumption can also serve to improve soil fertility and reduce deforestation, soil erosion and desertification.
- Local economies benefit from jobs associated with stove construction and repair, and national economies from reduced dependence on importation of fossil fuels like kerosene and LPG.
- Improved stoves can also have subtle but important social benefits like improved cooking convenience because they can be made to any height and require less attention to tend the fire.
- Improved stoves have been a major element of the appropriate technology movement for decades.



Empowerment and Leadership

Session Rationale:

This session introduces participants to becoming confident and is also empowering them to be leaders of change in their communities. There is the need to empower the youth of today to take up the challenges of tomorrow and empowerment and leadership will enhance the worldview of the youth to surmount daunting/ challenging tasks that confront them.

Session Objective

- Participants become aware of their inner potentials to be leaders
- Help participants to discover their capabilities to take up responsibilities
- Taking personal interest of potential leaders among the participants for grooming to be empowered

Facilitator's tips: some participants may be shy from the beginning of the discussion and there is the need to help them come out of such nature by engaging them to talk about themselves and their future ambitions in life. This session should be 35 minutes

Directions

1. Make sure participants are comfortable discussing about themselves by first talking about yourself (facilitator)
2. Let participants define a leader and suggest to them a refined definition
3. Let participants give you examples of women in leadership position (local & international)
4. Ask participants why they think such women are leaders
5. Share with participants some qualities of a leader and break the myth about female leadership by telling them some very useful success stories
6. Let participants tell you what empowerment is all about
7. Make sure you identify some names of participants so it is easy to call them to lead the discussion.
8. Let participants name someone from their class who is a leader and ask why they

think that person is a leader and carefully write down such points for discussion

9. Explain to participants some important attributes of the importance of strong leadership such as clear vision, a thinker, dedicated and hard worker and a ready to serve person

Activity: Participants led discussion with inputs from facilitator

Personal empowerment is about looking at who you are and becoming more aware of yourself as a unique individual.

Personal empowerment involves developing the confidence and strength to set realistic goals and fulfil your potential. Everyone has strengths and weaknesses and a range of skills that are used in everyday situations, but all too often people remain unaware of, or undervalue, their true abilities.

A person aiming for empowerment is able to take control of their life by making positive choices and setting goals. Developing self-awareness, an understanding of your strengths and weaknesses - knowing your own limitations is key to personal empowerment.

Taking steps to set and achieve goals - both short and longer-term and developing new skills, acts to increase confidence which, in itself, is essential to self-empowerment.

Cycle of Self - Empowerment

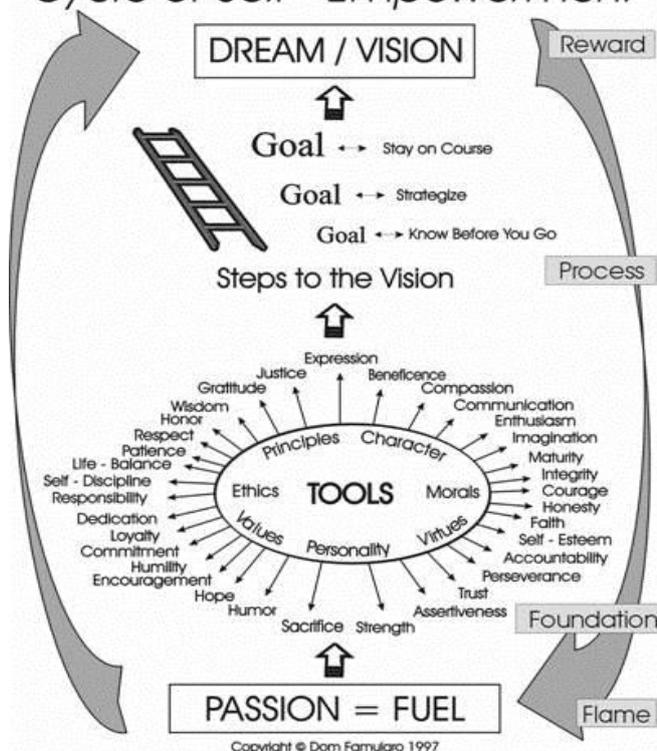


Fig 14: Cycle of Self-Empowerment

These usually centre on the idea that personal empowerment gives an individual the ability to:

- Take control of their circumstances and achieve their own goals in their personal and working life.
- Become more aware of their strengths and weaknesses and therefore be better equipped to deal with problems and achieve goals.
- Enhance the contribution they make both as an individual and as a member of a team.

- Take opportunities to enhance personal growth and a sense of fulfilment.

Developing personal empowerment usually involves making some fundamental changes in life, which is not always an easy process. The degree of change required will differ from person to person, depending on the individual starting point.

WHAT IS LEADERSHIP

Leaders help themselves and others to do the right things. They set direction, build an inspiring vision, and create something new. Leadership is about mapping out where you need to go to "win" as a team or an organization; and it is dynamic, exciting, and inspiring.

Yet, while leaders set the direction, they must also use management skills to guide their people to the right destination, in a smooth and efficient way.

An effective leader is a person who does the following:

1. Creates an inspiring vision of the future.
2. Motivates and inspires people to engage with that vision.
3. Manages delivery of the vision.
4. Coaches and builds a team, so that it is more effective at achieving the vision.

Why is Leadership important?

In a competitive environment, effective leadership is an essential requirement in order to achieve goals. To do this, leaders must be able to provide inspiration, motivation and clear direction to their team.

Effective leadership provides many benefits and will assist the individuals to achieve success and stability. In the absence of effective leadership, people often grow slowly and may lose their direction and competitiveness. Some of the ways in which leadership can benefit a person include:

- **A clear vision:** setting a clear vision and communicating it effectively provides an understanding of the clear direction and allows people to clearly understand their roles and responsibilities.
- **Effective planning:** a structured approach is able to generate a plan of action

that will most effectively meet the personal goals. An inclusive planning process also provides the opportunity for people to identify, contribute to, understand and achieve well defined objectives.

- **Inspiration and motivation:** the commitment and enthusiasm of a leader shapes the common goals of the individuals and provides inspiration and motivation for people to perform at a high level.
- **New ideas:** encouragement of people to openly contribute and discuss new ideas in a positive environment makes use of their diverse experience and ideas to improve a society.

Session Rationale

This session is to imbibe in participants the ability to identify opportunities and turn it into reality. One major requirement of turning opportunities into reality is being an entrepreneur.

Session Objective

This session is to let participants understand that entrepreneurship is an art that can be mastered and perfected easily by having an enquiring mind on issues and always identifying opportunities in challenging times

Facilitator's tips; practical Ghanaian examples such as Kwame Despite of Peace Fm, Kofi Amoabeng of UT, Kennedy Adjapong of Oman Fm etc are all good examples of local entrepreneurs.

Directions

1. Let participants give you four entrepreneurs in Ghana and why they think such people are entrepreneurs
2. Support them with examples if need be
3. Tell them true stories of where some of these entrepreneurs started life from. Eg Oprah Winfrey etc.
4. Let participants tell you what they want to become in future and identify those who want to be entrepreneurs and help them articulate what they want to do to be entrepreneurs.

Activity: Participants led discussion with inputs from facilitator

Entrepreneurship is an art of finding profitable solutions to societal challenges or transforming the old order into new ones. It is usually viewed as a;

- Craft
- Range of skills united around a purpose
- Talent – inbuilt character
- Calling

The Entrepreneurs are therefore the people who in times of crisis or challenges don't complain. They rather define the situation and make gain from it. Entrepreneurs are not only visionaries but they make things happen too.

MODERN VIEWS ABOUT ENTREPRENEURSHIP

- To initiate changes and exploit them
- To explore and maximize opportunity to obtain result
- To innovate new things and create “unique” or at least distinct in meaningful areas.
- To earn “economic result” not only by use of competence but also by leadership.
- To allocate resources to opportunities rather than problems.
- To create “effectiveness” rather than efficiency.
- To create a better tomorrow.

QUALITIES OF ENTREPRENEURS

- Visionary: they a foresight into a desired future
- Determined: they do not give up easily
- Ambitious: they are not satisfied with mediocre circumstances

- Charismatic: their warmth attract the people around them
- Well connected (networking): develop close acquaintance with influential people and make advances to catch them.
- Positive mental attitude; a settled mode of thinking
- Hardworking: industrious and zealous
- Time conscious: they do things in time and have a sense of urgency.

COPING ABILITIES OF AN ENTREPRENEUR

- I am self-disciplined
- I don't let things drift by.
- I have the full support of my family
- I can cope under pressure
- I am ready to work 7days- a week if necessary
- I get on well with other people and motivate them
- I persist when the going gets tough. I am tenacious.
- I Can learn from mistakes and ready to take advice
- Patient and don't expect quick results
- I am healthy and enthusiastic and aware of risks
- Have specific goals including the need to look after myself and my family

Pictorial Depiction of Types of Improved Cook stoves



Ahibenso Improved Stove



Gyapa Improved Stove



Anomena Manufactured LPG improved Stove



Cook Clean Improved Stove



Abellon Stove and Briquettes



Improved Cook stove & briquettes from Asa Initiative



Toyola Energy Improved Cook stove



Envirofit Improved Cook stove



Global Bamboo





Ghana Girl Guides

Initiative on the use of
clean cookstoves and fuels

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LOCATION

Headquarters: Makola, Accra Central, Adjacent ECG Office,
in the same building with EPP Books.

Training Centre: Achimota, a few metres drive from the Forestry Department,
close to the Achimota Police Station.