UNITE for the Environment
Community Conservation Projects
(Training on Fuel-efficient stoves)
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INTRODUCTION

What are community conservation projects?

Community conservation projects are projects that are implemented and owned by local community members with guidance of conservation organizations. The main objective of community conservation projects is to improve the lives of local people while conserving natural resources such as forests, wetlands, water bodies and others

In community conservation projects, conservation organizations may help in designing the projects with consultation of the community members as well as giving technical advice on how these projects can be maintained but usually the local community members take a lead in the overall implementation and management.

During planning and implementation of community conservation projects, it is very important to identify the key stakeholders to involve, define the responsibilities of each stakeholder, identify the resources needed and design how the program is going to be implemented and monitored.

Why work together in implementing community conservation projects?

Community conservation is about actively involving people in projects that are sustainable, improve livelihoods and help conserve natural environment.
In implementing community conservation projects, different stakeholders assume different responsibilities. Such stakeholders may include government institutions, NGOs, Schools, Local community members, Local government administration and religious institutions.

These should come together to ensure the success of the project and everyone's contribution and ideas should be considered at all stages.

Working together is the best way to achieve conservation results. This is so because different ideas from different parties are represented and the local communities together with conservation organizations get involved in conservation activities.

Benefits of community conservation projects

- Conservation organizations learn a lot from local community members and at the same time local community members learn from conservation organizations. This exchange of knowledge, information, skills and ideas can lead to success of the projects
- A shared sense of responsibility and community pride is built.
- Things get done quicker and often more cheaply because of input from different angles.
- Trust is developed between different groups.
- Skills and capacity are increased.
- Enforcement costs reduce since the communities manage the projects on their own

Challenges faced in implementing community conservation projects

- Time and money constraints
- Lack of skills and technical knowledge

- Sustaining enthusiasm over time (Usually communities conservation projects start with a lot of interest and vigor from community members but gradually the interest declines)
- Because different stakeholders are involved, communication is key in implementing community conservation projects. However this is sometimes under looked

How to address challenges facing community conservation projects

It is important that when these challenges come up, they are addressed at a group level while involving all the stakeholders. This can be through

- Involving all parties in all processes at all stages such as planning, decision-making and monitoring.
- Identifying, setting priorities and sharing responsibilities to help guide activities.
- Being flexible and listening to what people involved are saying.
- Setting up systems to check and monitor the progress of the project.
- Communicating well with all stakeholders so that they are kept up to date on what is happening

Examples of community conservation projects that can be implemented around Kibale National Park

- Fuel-efficient stoves
- Tree-planting
- Waste management and composting programs
- Problem animal barriers and remedies
- Bee keeping
- Sustainable agriculture

FUEL-EFFICIENT STOVES AS A COMMUNITY CONSERVATION PROJECT

What is fuel?

Fuel is any material that is burned to produce energy in form of heat or power.
Sources of energy used in Uganda include;

a) Firewood: This is the most commonly used source of energy in most Ugandan communities including local communities around Kibale National Park. Firewood is among the lead causes of habitat loss in Uganda and other developing countries.
b) Charcoal: This is the second most source of energy and it is dominantly used in urban and trading centers. The need for charcoal also has adverse effects on the environment.
c) Electricity: Middle and working class in urban and trading centers mostly use this source. It includes solar and hydro electric power
d) Petroleum products: These are used broadly in all communities. Such products include Kerosene, Petroleum and Diesel.
e) Gas: This is the least used energy source. It is used by a few in urban centers

Uganda faces a fuel crisis marked by an increasing imbalance between the supply and the demand of the fuel products by households, institutions and industries.

The most commonly used form of fuel especially in the rural communities is wood and charcoal and we need to understand that people can not live without depending on the above two but the amount used, rate of utilization and wastage has caused negative impacts on natural resources.

What are the impacts of fuel usage on Kibale National Park and its environs?

- Due to the ever-increasing demand for fuel wood, it has resulted in habitat loss
- The demand for fuel wood has resulted in encroachment on some of the protected areas such as the forests
- Usually it is the pupils who collect the firewood for household usage. This has a negative impact on school attendance

How can these challenges be addressed?

- Use of fuel-efficient stoves, which use less wood
- Use of alternative and renewable sources energy like solar and electricity

However most of the alternative sources of energy cannot be afforded by most rural communities around Kibale National park hence the need for Fuel-efficient stoves, which are relatively affordable

What is a fuel-efficient stove?

These are improved stoves that use less fuel wood. Fuel-efficient stoves are able to achieve maximum transfer of heat to the food because they heat at least 90 % of the saucepan's surface area and have insulation around the combustion chamber and the fire passages hence reducing heat loss and reducing the quantity of fuel wood needed.

Advantages of fuel-efficient stoves

a) The stoves have been tested and proven to be economical in firewood consumption, with an efficiency averaging 30% compared to the traditional 3-stone stove at 15.6%. This means that by using the improved stove, you double the amount of energy transferred from the wood to the food being cooked.

b) Fuel-efficient stoves hardly produce smoke during their operation. A bit of smoke is produced only when lighting the fire.

c) Once lit, the stove fire does not stop unless firewood fed into the stove is stopped. There is no need of straining one's lungs to blow air into the stove to fan the flame as it is with the traditional 3-stone fire. This is done by the air chamber below the feeding shelf.

d) The stoves can be constructed using local materials including anthill soil and sand for the body whereas vermiculite, sawdust, pumice, etc are used for thermal insulation.

e) The stoves are safe-to-use. Firewood is neither toxic nor highly inflammable. The shielded fire is out of reach and therefore less likely to cause burns to children and the users.

f) The stoves use less firewood leading to reduction in the deforestation rate.

g) The stoves are less pollutant because of their nearly smokeless operation, attributed to the shelf-fitted rocket elbow combustion chamber.

Objectives of a fuel-efficient stove community project

- To reduce pressure on forest resources in and around Kibale National park
- To achieve firewood savings and achieve efficient combustion
- Household savings on wood, charcoal and other sources of cooking fuel

Roles of different stakeholders in implementing fuel-efficient stove program

- UNITE: Conduct the training, provide seeds for Sesbania Sesban and Musizi to the schools and offer technical advice and monitoring
- Teachers and other participants: Pass on skills, build stoves in their homes and in the communities, guide conservation clubs and students in managing tree nurseries and integrate fuel efficient stoves in their lessons
- Parents: Organize materials, plant Sesbania Sesban and Musizi trees, report and carry out periodic maintenance.
- Students: Build model stoves in the community, help parents organize materials, work with teachers to manage tree nurseries and monitor usage.

Types of fuel-efficient stoves

There are two common fuel-efficient stoves used in Uganda. These are: Rocket-Lorena stove and Shielded stove

Rocket-Lorena stove: This is a fuel-efficient stove that has two cooking points and a chimney. In the Lorena stove, the saucepan seats are deep enough to have the saucepans submerged into the stove's hot gases' passage. This increases the surface area of the saucepan being exposed to the fire, which results into increased heat transfer into the saucepan. Rocket-Lorena stoves can either be rectangular or circular.

Shielded stove: This is relatively similar to a rocket-Lorena stove only that it has one cooking chamber and no chimney. In a shielded fire stove the saucepan seat should be deep enough to have the saucepan submerged into the stove's body but should have some small space on the sides of the sauce pan to act as gas outlet. This increases heat transfer into the saucepan at the same time allowing proper combustion. Shielded stoves are usually round in shape and can either be fixed or mobile. People with small kitchen structures mostly use them.

Of the two, the Rocket-Lorena stove is better and more efficient

Things to consider when preparing to build a Rocket-Lorena fuel-efficient stove

1. Shelter

Ensure that there is a properly built kitchen in place to house and protect the stove from interference and unfavorable weather conditions such as rain.

2. Tools

The tools required when building fuel-efficient stoves include:

Tool	Purpose
Hoe	Digging foundation base and mixing ingredients
Spade	Mixing ingredients
Jerry can	Fetching water
Sieve	Sifting ingredients
Trough	Measuring materials by volume and carrying mixtures
Trowel	Smoothing plaster / stove finish
Measuring tape	Taking measurements

3. Stove construction materials

- Clay/Anthill soil
- Saw dust/dry chopped grass/dry banana leaves
- Water
- Sand

4. Purchase and delivery of materials

Purchase the construction materials and deliver them outside the kitchen where the stove is to be built at least a day before the construction date.

5. Mapping out the stove

Choose a corner in the kitchen to be occupied by the stove. This will save it from accidental damage and it will also be useful in preventing the stove from direct intake of cold air.
Do not position the stove firebox along the axis of the doorway to avoid direct intake of cold air

7. Preparation of materials

The preparation will depend on the construction materials chosen. It is very important to have some processes such a mixing mud done a before the actual construction

If you are using the grass and clay/anthill soil, use the machete (panga) to chop dry grass into small pieces of approximate length 1 cm.

Using the sieve, sift the clay (or anthill soil) to obtain fine ingredients.

Mix the chopped dry grass and clay (or anthill soil option) volumetric ratio 1:1.

Slowly add water to the mixture just to make it moldable.

Blend the mixture using feet similar to the way it is locally done when preparing mud for brick making.

Building a Rocket –Lorena stove

The size of the stove usually depends on the size of the saucepans that will be used when cooking. For example, a home that frequently uses two saucepans with diameter 26 cm and 23 cm, the bigger saucepan should be positioned directly above the combustion chamber while the smaller one takes the other position towards the chimney

The size of the combustion chamber should be around 12 X 12 cm and when using a circular option it should have a diameter of 13.5 cm. This will be the inner diameter of the chimney. The stove designed for 26 cm bigger diameter and 23 cm smaller diameter saucepans will have the resulting outer dimensions of 107 X 56 cm.

Draw the outline of the stove foundation on the platform. The bigger saucepan should be positioned directly above the combustion chamber while the smaller one takes the other position. In the event that a measuring tape is not available, use the palm width. The width of an average palm of a mature person approximates 10 cm.

Wet the position to be occupied by the stove. Using the mixture prepared, lay down a 2 cm high base for the stove, bordered by the marked out line.

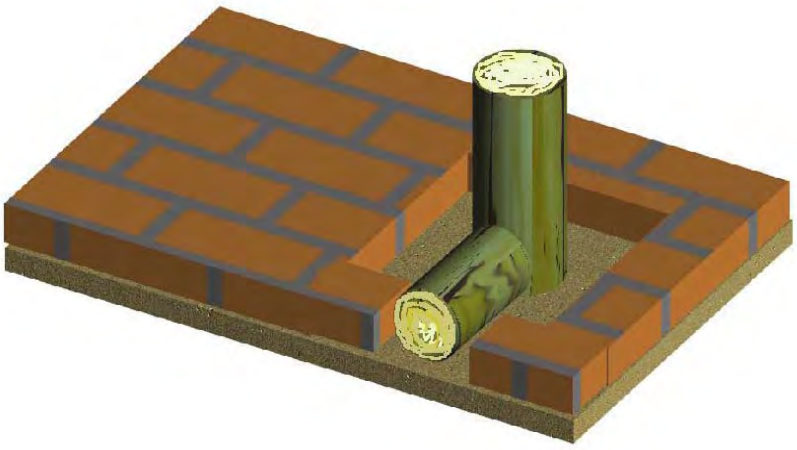
Lay the foundation mud on the 2 cm high mixture.

While setting the foundation the combustion chamber base should be catered for. For example if the bigger saucepan diameter is 26 cm, build a 12x12 cm wide combustion chamber.

You will need some material to mould the combustion chamber shape during stove construction. In order to build a square cross section combustion chamber of 12 X 12 cm for support use square cross section of same size (12 X 12 cm) covered in polythene material

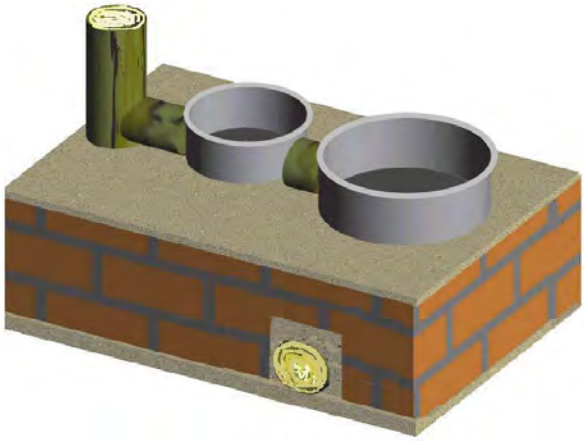
For the option of a circular combustion chamber use diameter of 13.5 cm and this can be through cutting a banana stem, and removing its outer layers to reduce its diameter to 13.5 cm.

Cut it into segments one of which is to be positioned vertically and the other one horizontally.



Continue constructing the stove up to the level at which the vertical banana stem just gets covered.

Measure out the positions of the saucepans, the chimney and the 10 cm gaps between them.



Wet the outside of the saucepans (to ease their removal from the mixture)

Position the big saucepan such that the centre of its bottom sits at the centre of the vertical banana stem, then put the smaller saucepan in the other position.

Place a vertical banana stem in the chimney position. Place horizontal banana stem segments each of length 10 cm between saucepans and the chimney position

Note: The diameter of the Banana stems should also be equal to the one used for the combustion chamber.

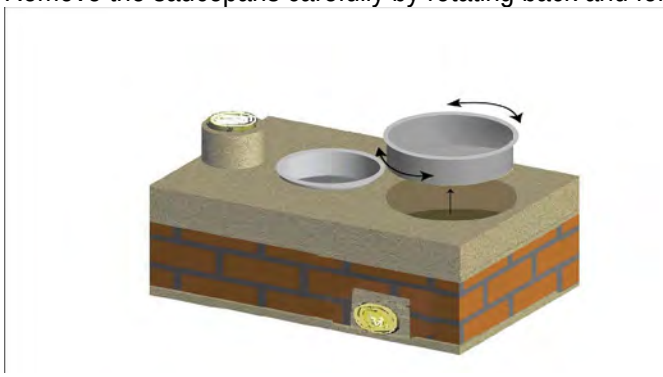
Place bricks/stones in the saucepans to hold them in position..

Fill the space around the saucepans with the insulation mixture.

Build the insulation mixture around the saucepans up to the saucepan rim height. The horizontal banana stems should also be covered.

Using the mixture, build around the vertical banana stem to form the chimney. The banana stems occupy the fire (hot flue gases) passage and will be removed at a later stage.

Remove the saucepans carefully by rotating back and forth while lifting out.



Cut out thickness of the layer around the saucepan seats to create room for the hot gases to have contact around the saucepans.

If you do not have a measuring tape, use the length of the first segment of your index finger, which approximates 2.5 cm

Roll an iron bar and fit it around the saucepan seats to form a strong neck.

Using the insulation mixture, build 2 saucepan supports of 2.5 cm high inside each saucepan seat.

Plaster the stove body to give it a good finish. You may use any of the materials that are used to plaster mud walled huts (e.g. a mixture of sand, cow dung, water etc)

Use wet fingers and a trowel to smooth the finish such that the stove is completely without cracks

If available use the spirit level to ensure that the top surface is horizontal.

Leave the stove to dry for 4 weeks, while covered with a waterproof material such as polythene sheet (kavera) or banana leaves

The stove should be shielded from sunshine

Do not allow children or animals to play on or near it.

After 4 weeks of drying, remove the now shrunk banana stems from the stove body

Smooth the hot gases passage using wet hands.

By this time if the stove body may have cracked during the drying process, seal the cracks using the original form of mixture that was used to build it.

Fit a firewood shelf in the stove's firewood feed chamber

The outside finishing of the stove may be made using the methods commonly applied for the finishing of mud walled huts in the community e.g. using a mixture of sand, cow dung and water. This helps the stove body surface from cracking and fairly makes it water proof and fine looking

Use the form of insulation mixture to complete the construction of the chimney to direct the smoke (stove exhaust) outside the kitchen through the wall.

Using Rocket-Lorena Fuel-efficient stove

The stove is now ready for use. It is suitable for use in cooking common types of food including bananas (matooke), potatoes, cassava, beans, posho, rice, water etc. though it may not be suitable for use in roasting

When using the stove it is advisable to use small amounts of dry chopped firewood. It is also important to observe the following recommendations

- Always use dry firewood split into thin pieces. Wet firewood loses its heat value in driving off excess water. It also produces a lot of polluting smoke.
- Always use a saucepan lid to cover food when cooking. This creates cooking pressure leading to faster softening of food and saving fuel.
- Cut the food into smaller pieces. The technique reduces the amount of energy required to cook.
- It is recommended to use Sesbania Sesban and Musizi wood because these two have a high woody and soft biomass, are relatively smokeless, burn easily and take a lot of time to get used up
- Soak the dry-preserved foods (beans, peas, etc) for at least 5 hours, before starting to cook. This cuts down the amount of energy to cook such kind of food.
- Avoid filling too much water in the saucepan. It takes a lot of energy to boil it, hence fuel wastage.
- Light the fire after preparing the food for cooking

Cleaning the stove

The stove should be cleaned only when it is not in use (i.e. it should be cold). All this is part of preventative maintenance

Fuel-efficient stove cleaning schedule

Part	Cleaning procedure
Saucepan seat	Sweep out the soot and ash from the saucepan seats at least twice a week.
Fire passages	Sweep out the soot and ash at least twice a week
Combustion chamber	Slide out the firewood shelf and remove the wood ash from the firewood feed chamber. Place back the firewood shelf after removing the ash. This should always be done before lighting the fire.
Chimney	Get a dry banana leaf; remove the lamina from the mid rib. Bend the mid rid at many points along its length to make it soft. Insert it into the chimney from the top (outside the kitchen). Push it down the chimney and lift it out several times. This will remove the soot from the chimney. Collect the soot from the bottom of the chimney through the second pot seat and remove it from the stove. This should be done every 2 weeks to avoid clogging.

Stove body	Clean the outer surface atleast twice a week to remove the dust

Note: The chimney is fragile because it is made from mud. Care should be taken to avoid breaking it during the cleaning process.

Stove maintenance and repair

It is advisable to perform regular stove inspection to identify faults and provide the necessary remedy to check further damage. This can be ensured through following the cleaning schedule above. If this is done and the stove is periodically repaired, it addresses the challenge of maintenance.

It is strongly recommended that one should not wait for major repair needs but should address maintenance needs when it is early enough

The major areas that require periodic repairs are

Stove part	Fault to be checked
Chimney	Wear and tear
Combustion chamber insulation	Cracks, wear and tear
Firewood shelf	Cracks, wear and tear
Saucepan seat	Wear and tear
Saucepan supports	Wear and tear
Stove body	Cracks, wear and tear

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