



NatureUganda



# POLICY BRIEF

*Promoting efficient energy saving stoves as a technology to save forests, a technology to save time, a technology to contribute to climate change mitigation and a technology to improve health among the local community groups.*

*Lessons and practices to inform policy and future investments in energy saving stove technology in pursuing forest conservation, livelihoods improvement and climate change mitigation.*



## ENERGY SAVING STOVES SAVE FORESTS, IMPROVE HUMAN HEALTH AND CONTRIBUTE TO CLIMATE CHANGE MITIGATION

NatureUganda implemented a Programme "Integrating livelihoods and Conservation; People Partner with Nature for sustainable living in Buzenga parish in Rubirizi District around Kasyoha-Kitomi Central Forest Reserve and Echuya Central Forest Reserve in Rubanda and Kisoro Districts" (PPN) since 2015.

The long-term objective of the Program is to improve and qualify the management of natural resources, especially forested Important Bird Areas (IBAs), on which local livelihoods depend for food, fuel, etc. and for critical ecosystem services, such as water, soil conservation and reduced vulnerability to natural disasters such as landslides, and climate changes. The Programme is built on the assumption that best practices within participatory forest management based on the genuine involvement of local women and men, duty bearers and other key stakeholders will contribute to improved livelihoods and poverty reduction of local communities by securing access to natural resources and ecosystem services, also in the future. Since 2018, the project refocused to "Reducing the depletion of forested IBAs and contributing to the realization of best participatory forest management practices for the benefit of all." This focus aimed to build livelihoods sustainability and climate change resilience around Echuya and Kasyoha-Kitomi Central Forest Reserves through:

- i. Increasing capacity of project partners and stakeholders to integrate Ecosystem-based Adaptation (EbA) approach to climate change into policies, plans and practices;
- ii. Increasing community resilience to climate change through EbA interventions; and
- iii. Supporting stakeholders to advocate for mainstreaming of EbA into national and local government decision making processes and local practices to combat climate change and its effects.

However, in 2020 the project added a component to pilot Energy Saving Stoves (ESS) in Buzenga parish around Kasyoha -Kitomi Central Forest Reserve as a technology to save forests, a technology to save time,

a technology to contribute to climate change mitigation and a technology to improve health among the local community members. This component aimed to tackle:

- i. High dependence of households on forest resources, especially for fuelwood;
- ii. Low use of Energy Saving Stoves (ESS); and,
- iii. Lack of knowledge/skills to construct the ESS and/or efforts, and perhaps the cost of installing the ESS.

By December 2022, the project demonstrated the relevance and application of EbA approach as a tool for tackling climate change effects and built capacity for implementing resilience adaptation and mitigation technologies. Further, the project demonstrated how to mainstream climate change adaptation and resilience concerns into livelihood improvement and sustainable forest management/ conservation as well as mainstreaming adoption of Climate Smart technologies into district level policy and planning processes. In addition, the project established foundations for decreasing dependency and use of fuelwood from Kasyoha-Kitomi CFR by the target beneficiaries in Buzenga Parish through; i) increasing adoption of efficient biomass energy use technologies (Energy Saving Stoves); and, ii) increasing biomass stock through tree planting and agroforestry practices.

### Ecosystem based Approach

The Convention on Biological Diversity defines EbA as "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change". It clarifies that adaptation to climate change is about enabling people and local economies to thrive in the face of a changing climate. In this regard, Ecosystem-based Adaptation (EbA) approach seeks to; i) protect biodiversity and ecosystems; ii) enable people to harness biodiversity and ecosystem goods and services to sustain or improve livelihoods; iii) promote adaptation technologies and practices; iv) integrate adaptation into broader sustainable development or broader climate change adaptation strategies.

### Biomass energy in Uganda

A total biomass stock in Uganda in 2015 was estimated to be 284.1 million tons with a potential sustainable biomass supply of 45 million tons. Biomass is the most



essential energy source for most of the Ugandan populace, accounting for 90% (MEMD; Energy and Minerals Strategic Plan 2014), providing almost all the energy used to meet basic energy needs for cooking and water heating in rural areas, most urban households, institutions, and commercial buildings (Table 1).

Source of Energy	Contribution (%)	
Biomass	Fuel wood	78.6
	Charcoal	5.6
	Residues	4.7
Petroleum products	9.7	
Electricity	1.4	
<b>Total</b>	<b>100</b>	

Fuel wood requirements have contributed to the degradation of forests as wood reserves are depleted at a rapid rate in many regions (MEMD; Energy balance 2012).

### Biomass energy around Kasyoha-Kitomi (Rubirizi District)

Biomass energy potential: According to the Rubirizi District Renewable Energy Strategy (2019-2024), the district is endowed with privately owned woodlots and natural forests and woodlands (Kasyoha-Kitomi and Kalinzu Central Forest Reserves, Kyambura Wildlife Reserve and Queen Elizabeth National Park) from which woody biomass is obtained. The trees for firewood and charcoal are acquired mainly from home gardens, bushes, private woodlots, trees scattered in agricultural farmlands, community and village forests, central forest reserves, wildlife protected areas and also through purchase from wood vendors (Rubirizi District Local Government Production Department, 2014). Fuel wood is also obtained from crop residues (Table 2).

Crop	Estimated production (tons)	Estimated number of residues (tons)	50% residues targeted for energy (tons)
Coffee	1,500	500	250
Maize	2,000	600	300
Sugar canes	710	313	157
Cotton	1,100	330	165
Cassava	780	234	117
<b>Totals</b>		<b>1,977</b>	<b>989</b>

Inefficient utilization of biomass energy due to limited access/use of efficient energy technologies result into energy losses or wastage while inadequate knowledge regarding the use, importance, socio-economic and environmental benefits that are derivable from biomass energy use technologies exacerbate energy waste.

Biomass energy demand: Biomass mainly in form of firewood, charcoal, farm residues and wood wastes are predominantly used at the household level for cooking and boiling water.

**Households:** The fire wood consumption per house hold stand 3.7 tons per annum whereas that of charcoal is 1.3 tons. The number of households using fire wood and charcoal are 24,187 and 4,180 respectively. It can be deduced that the annual fire wood consumption is (24,187 households' x 3.7 tons per annum) = 89,492 tons. The annual charcoal consumption stands at (4,180 households x 1.3 tons per household) =5,434tons. Introduction of improved stoves comes with a potential to reduce these demand figures by at least 40% 35,792 tons of wood and 2,174 tons of charcoal) is an attractive option. Rubirizi District Local Government Production Department, 2014

High biomass users for cooking include public institutions (schools, military installations) and commercial entities for hospitality (hotels, restaurants), brick burning, tobacco curing and lime baking, among others. For example, it is estimated that 240 schools in Rubirizi consume 36,000 tons of fuel wood per year, while commercial use is on increase as more business are set up.

The case of Rubirizi District is more likely to reflect the status of biomass energy demand in other districts or regions of Uganda.





## Energy Saving Stoves

Energy Saving Stoves (ESS) are devices that generate heat from burning firewood, charcoal, agriculture residues or dung and make that heat available to heat food or water. They feature a combination of heat generation and heat transfer to a cooking pot or container in a more efficient combustion, safer and less smoky cooking environment than the traditional cook stoves or three-stone-fires.

Using traditional cookstoves for household cooking in developing countries requires extensive local wood fuel collection and is linked to local environmental problems and localized tree depletion. Open fires and traditional cookstoves are inefficient at converting energy into heat for cooking. It is estimated that up to 3.7 tonnes of wood is required for cooking per family per year. Global Alliance for Clean Cookstoves: Results Report 2013 (<http://cleancookstoves.org/binary-data/RESOURCE/file/000/000/285-1.pdf>).

Cookstove programs have been implemented in many countries with the objective to reduce wood fuel use and hence reduce deforestation, and improve the health conditions of users by reducing in-door pollution or carbon emissions (<https://doi.org/10.1016/j.rser.2014.02.019> Get rights and content). Although there is no documented statistics, it is widely acknowledged that reduced smoke and therefore reduced in-door pollution reduces health risk of pollution related health conditions.

However, the success of the cookstoves programs depends on several factors such as: compatibility of technical parameters of stoves with social expectations,

consistency with local needs and culture, attitude of the users who are often afraid of adopting new technologies, and the cost of constructing and maintaining cook stove (<https://doi.org/10.1016/j.rser.2014.02.019> Get rights and content). As such, programmes that use a “bottom-up” strategy, where users and local artisans play participatory roles in establishing a self-sustaining industry ensures success of the program.

Nature Uganda's PPN promoted the adoption of ESS in Buzenga parish with the aim to conserve Kasyoha - Kitomi forest by improving efficient combustion of fuelwood thereby decreasing amount of fuelwood used that would result in decreasing dependency and use of fuelwood from Kasyoha-Kitomi forest by slowing down uptake of wood fuel whilst achieving the same cooking energy supply. It was also intended to reduce smoke inhalation with resultant health benefits, as well as reduce greenhouse gas emissions

The ESS programme activities that were implemented included: training cookstove promoters, raising awareness about efficient fuel wood use and its relationship with forest conservation and human health, demonstrating energy saving technology at Climate Smart Demonstration Schools at Buzenga and Mugogo Primary Schools) and in 11 climate smart villages in Buzenga parish and facilitating construction of ESS at household level. A total of 320 household ESS and 2 School Cookstoves were installed with direct intervention of the project while 160 cookstoves have been installed outside the targeted parish by households that have adopted the ESS technology. ESS promoted by the project were constructed using local materials (sand, red soil, black top soil, wood ash, sawdust/dry chopped grass, sweet potato vines, a mortar, wire mesh, and water) that are readily



available and affordable by the majority of the targeted beneficiaries. The undertaking by Nature Uganda contributes to both national and international energy and climate change, forestry, biodiversity policies as follows:

Uganda's Renewable Energy Policy (2007) objective "Utilize biomass energy efficiently, so as to contribute to the management of the resource in a sustainable manner" through i) Increasing the adoption of efficient fuelwood stoves ii) Promoting efficiency in intensive wood burning industries, iii) Offer training opportunities for "Jua Kali" artisans for manufacture, installation and maintenance of efficient cook stoves.

Uganda's Climate Change Policy (2015); through promoting energy-efficient firewood cook stoves as well as promoting conservation and efficient utilization of biomass energy to reduce GHG emissions, especially at consumer levels (industries, households, commercial and institutional buildings).

Uganda's Nationally Determined Contributions (NDC 2022); whose objective is to pursue a low-carbon development pathway and reduce the vulnerability of the population, environment and economy to the impacts of climate change by implementing measures and policies that build resilience.

#### Uganda Forestry Policy (2002);

- » Policy Statement 5: on Collaborative partnerships with rural communities will be developed for the sustainable management of forests.... that would define the rights, roles and responsibilities of partners and the basis for sharing benefits from improved forest management...paying specific focus on wide stakeholder participation, collective responsibility and equity, and on improving the livelihoods of forest-dependent communities.
- » Policy Statement 7: on conservation of forest biodiversity ....Uganda's forest biodiversity will be conserved and managed in support of local and national socio-economic development and international obligations.

Paris Agreement: (2015): whose objective is to substantially reduce global greenhouse gas emissions to limit the global temperature increase in this century to 2 degrees Celsius while pursuing efforts to limit the increase even further to 1.5 degrees.

Global Biodiversity Framework 2022: Target 1: Ensure that all areas are under participatory integrated biodiversity inclusive spatial planning and/or effective management processes addressing land and sea use change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.

#### Lessons

Lesson 1: The experiences from the field demonstrate that behavioural change and practice towards adoption of ESS is possible when multiple but mutually reinforcing approaches are applied. Combining theory (awareness, sensitization, training, information provision), practice (demonstrations of ESS), facilitating construction of ESS, and advocacy about energy saving influences behavioural change and practice among the household and community as a whole.

Lesson 2: Energy Saving Stove technology is liked by the community because of the benefits accruing from its use; namely, less wood demand, healthy cooking environment and time saving. However, upscaling its adoption could be hampered by the affordability of construction and maintenance costs.

#### Issues for policy intervention

- a. Designing and enforcing measures for promoting Energy Savings Stoves technologies that are affordable (by majority rural household, heavy wood fuel consumers and commercial users), durable and efficient. The ESS technology options would be derived from policy-oriented research and technology innovation advancement favouring use of locally available materials.
- b. Increasing adoption of Energy Saving Stoves through a combination of collaborative and synergistic approaches encompassing software (awareness and sensitization on the value and benefits), building capacity for ESS construction and maintenance, integrating ESS into over-all livelihood enhancement agenda (health, social development, energy, economic, forestry, food and nutrition and environmental management) and, Climate Change Agenda (reducing emissions, tackling deforestation). Uganda



## ABOUT NATUREUGANDA

NatureUganda, the East Africa Natural History Society (EANHS) in Uganda, is a membership, research and conservation organization established to undertake conservation actions using scientifically proven methods for the benefit of the people and nature. It is the oldest membership organisation in Uganda, having been founded (as EANHS) in 1909 as a scientific organization with the primary aim of documenting the diversity of wildlife in East Africa.

By the mid-1990s, EANHS-Uganda had attracted many members and broadened the scope of activities in scientific research, conservation action, public awareness raising and advocacy. At this point it was realized that a formal registration within Uganda would be necessary as a response to the increasing activities. The Society was therefore registered as a non-profit, independent national organization in 1995 with the operational name of NatureUganda The East Africa Natural History Society. Her sister in Kenya is NatureKenya - The East Africa Natural History Society.

NatureUganda has been the national Partner of BirdLife International since 1995, and the society's programmes are based on the four well-established pillars of BirdLife global strategy, namely Species, Sites, Habitats and People.

NatureUganda's mission is promoting the understanding, appreciation and conservation of nature. In pursuing its mission Natureuganda strives to:

- Create a nature-friendly public
- Enhance knowledge of Uganda's natural history
- Advocate for policies favorable to the environment
- Take action to conserve priority species, sites and habitats.

NatureUganda has its secretariat in Kampala- Naguru, and services its 2,000 members and supporters through branches in Gulu, Mbale, Busitema and Mbarara.

Inspired by the original purpose of the East African Natural History Society to document natural history of East Africa, NatureUganda's work is hinged on scientific information generated through well laid down research and monitoring programmes. Considering that 90% of Uganda's GDP is derived from Natural Resources (tourism, forestry, fisheries), biodiversity conservation is a priority for the country. NatureUganda supports biodiversity protection and economic development through its research, monitoring and conservation programme, which provides quality scientific information mainly using birds as indicators to support local and national governments to make informed decisions. The support is provided through established partnerships with government agencies including Uganda Wildlife Authority (UWA), National Forestry Authority (NFA), National Environment Management Authority (NEMA), Wetlands Management Department (WMD) among others.

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