# Dynamic market for improved cooking devices in Kenya





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## **About Energising Development**

The Energising Development Partnership Programme (EnDev) aims to provide poor people in developing countries with sustainable access to modern energy services, thus contributing to the achievement of the Millennium Development Goals.

EnDev activities focus on those energy services and resources which are reliable, affordable, socially acceptable, and environmentally sound. Long-term sustainability is a core criterion for activities to be supported within the framework of EnDev and special attention is given to the developmental effects of the energy activities implemented. This means aiming to establish or enhance self-sustaining markets for affordable energy technologies, fuels and services adapted to the needs, without creating a long-term dependency on external donor funding.

The technologies and services predominantly promoted in EnDev's country programmes include photovoltaic energy, grid densification, micro-hydropower, energyefficient cooking stoves and biogas.



#### Introduction



## Introduction

EnDev Kenya has initiated a dynamic market for improved cooking devices with over 1.3 million disseminated stoves. This massive output tremendously reduces health hazards and the pressure on forests.

Forests are vital to Kenyan society. 77 percent of the country's primary energy supply is based on traditional biomass, mainly wood. Kenyan forests are also important groundwater distillation areas. Moreover, the East-African country produces 70 percent of its electricity with water.

The forest cover has declined to a low of 1.7 percent, however. This is by far under the global recommended cover of ten percent. One important reason for deforestation is the massive use of firewood for cooking which has also been driven by the rapidly growing population. Due to the huge demand, the supply of wood energy is not



Caroline Adhiambo is preparing Ugali, the traditional side dish in Kenya. She mixes maize flour into water and heat the mass in a pan on an open fire. When the dough becomes harder she has to turn it very quickly to prevent it from burning. This work is tough. Even tougher though is to cook in a cloud of smoke, Caroline explains

## **Rocket stove builder**

"To build a good rocket stove, you have to meet the measurements exactly, otherwise you lose efficiency. And of course, you need good material," explains Shadrac Ananda, professional stove builder in Kenya. Shadrac is small and wiry. He wears his hair short, a red polo shirt and an appealing grin on his face. This morning, he arrived in Rawa, Northwest of the Kenyan city Kisumu, bringing along a sack of cement and a sack of lime. He will also need sand and bricks, but this material has to be provided by the client.

His client is Felgona Atieno. The young woman has been cooking for her family on a Jiko Kisasa stove. The old stove has a lot of cracks now. Felgona heard Shadrac Ananda at a public meeting, where he explained about the high efficiency of rocket stoves. She therefore decided to buy one. Shadrac will build it for her.

The 21-year-old young man has built hundreds of stoves already. "The combustion chamber is the heart of the stove. I really concentrate on building it perfectly." It is formed like an elbow starting at the opening for the firewood in the front and turns upright in the center of the stove. Just above the combustion chamber, he forms an opening based on the exact measures of the cooking pot the customer wants to use.



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sustainable. The country consumes much more firewood than nature is producing. This excessive consumption leads to further deforestation, which in turn aggravates land degradation and droughts.

Consequently, firewood consumption has to decline on a large scale. Modern stoves can save up to 70 percent of wood fuel in comparison to open fires. What is more, efficient stoves save lives since they provide almost smokeless cooking. After all, the acrid smoke of inefficient cooking with biomass and coal is responsible for the death of nearly two million people each year according to the World Health Organization.

These have been good reasons for promoting improved cooking devices and for establishing Energising Development Kenya. The project started in November 2005 and is part of the ongoing global German-Dutch-Norwegian Energy Partnership programme, Energising Development (EnDev). The project promotes access to modern energy, including efficient cooking energy.

The intention of the Kenyan programme is to develop a sustainable market for modern cooking devices. This is done through the support of sustainable production and marketing of improved cook stoves. The purpose is to develop a sustainable market for modern cooking devices.

The approach has been very successful. But what are the reasons for this success? What are the key elements of the approach? Which lessons can be learned? What are the achievements since November 2005? This report details the required preconditions, discusses the methods used and provides an outlook. The aim is not only to deliver the facts and methods but also to provide an inside view into Kenyan kitchens, to portray various people and to show how they became part of the solution. Then he widens the opening by about one centimeter. "This enables the hot gases of the fire to flow around the pot and rise into the open producing a stack effect. Fresh oxygen flows back through the opening to the wood at the bottom and makes the fire breathe."

## "The combustion chamber is the heart of the stove."

Shadrac Ananda is not only a good stove builder, he is an excellent sales person, too. "I go to public meetings, visit schools and markets and explain the advantages of the rocket stove to people," he tells us. A good opportunity is a "baraza", a local community meeting where everyone from the village comes together. "If I can't convince them, I build one stove for free, for example for the wife of the village chief. If she likes the stove, she tells her friends and I gain a lot of new contracts." Ananda has made good money since joining the stove business. "I have built a house in my village, purchased a cow and have 45,000 Kenyan Shillings (410 Euro) in the bank."



#### **Executive summary**

EnDev Kenya was launched in November 2005 with the aim to promote the use of improved cook stoves to an ever-increasing number of people. The goal of the project is to supply more than 3.73 million Kenyans with modern cooking energy by the end of 2014. To reach these targets, EnDev Kenya has been following a marketbased approach. Instead of simply distributing the required stoves, EnDev Kenya supports interventions that create a sustainable market for modern cooking devices. On the one hand, the project is designed to create awareness. On the other hand, it trains groups and individuals to become professional stove builders and producers, educates them in technical terms, but also in marketing and organizational issues.

In the meantime, a vibrant stove market has developed. EnDev Kenya supports this development and ensures the quality of the stoves by continuously training the stove producers. Since 2005, both goals have been exceeded by far. As early as December 2011, EnDev Kenya (phase 1 and 2) had already helped to disseminate 1.3 million stoves, providing approximately 6.5 million people with modern cooking energy.

Thanks to the high distribution rate, very positive effects on the environment and the climate have been achieved. Every stove saves around 0.72 tonnes of carbon dioxide annually, which reduces the emission load to about 0.94 million tonnes per year. All stoves together save 1.42 million tonnes of firewood.

The modern cook stoves also have a socio-economic impact. To date, more than 3,000 people have been trained. A majority of them – around 2,400 people - are still working as stove builders, producers, marketers or installers - either part time or full time. On average, a stove builder makes between 75 and 150 Euro a month, which is a fair income in the countryside.



worked for four hours to build their rocket stove.

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Users benefit from modern cooking devices. Stoves for private households save up to 60 percent of firewood, whereas institutional stoves can save up to 70 percent. With an improved cook stove, women not only cook faster, they also need less time collecting firewood. Time they mostly spend for productive work, such as working in the fields for instance. In many regions, women have to buy the firewood. In these households, modern stoves help to save money and lead to extra income for the families.

In conclusion, the dissemination of modern stoves helps to reduce poverty and supports Kenya in reaching its Millennium Development Goals. As a further benefit, it reduces deforestation, which enables the country to reforest the land.



If Velma Achieng (right picture) is lucky, she does not have to carry the firewood all by herself but finds a motor-cyclist who drives it home.

## **Firewood gathering**

Velma Achieng lives in Rawa, a little village close to Kisumu, the Kenyan city on Lake Victoria. Velma cooks her meals on a Jiko Kisasa stove. The stove saves 40 percent of firewood in comparison to a three-stone-fire. This makes life much easier since she no longer needs to gather firewood so often. Firewood is scarce around Rawa. There are only a few public places where Velma Achieng can gather firewood. Every square meter of land is privately owned and used to grow bananas, avocados, corn or beans. To collect firewood, she has to walk two kilometers. There is a little forest behind barbed wire. "The forest is private. Sometimes I may take the firewood for free, sometimes I have to pay 50 Kenyan Shillings (45 Eurocent) to the owner. This is less than buying the firewood in the local market, but it is still some money for this region."

## "Sometimes I may take the firewood for free, sometimes I have to pay."

Velma Achieng collects dry wood, pulls it out of the bush and ties the branches into a huge bundle. She and her friends need two hours for gathering and transporting the firewood back home. This is very time consuming but less expensive than buying all the firewood. The places where they can find cheap firewood, however, are becoming rare.



goes with friends. This is less dangerous and less boring

## EnDev Kenya and its goals

EnDev Kenya was initiated in November 2005. The project covers roughly twenty districts in the Transmara, Western and Central clusters.

It targets households and institutions, such as schools, colleges, and small-scale businesses in rural areas. EnDev Kenya promotes stoves which mainly are using firewood or charcoal. Even though firewood has become rare in many regions, there is no alternative to it. Other sources like liquid gas, biogas, ethanol and plant oil are neither available in most regions nor affordable for the majority. For this reason, EnDev Kenya focuses on wood-burning stoves.

The project was set up in two phases. Phase I ended in December 2009. The aim of phase I was to support 2.5 million people with modern cooking energy. Phase II will end in December 2012 targeting an additional 1.02 million people.

Disseminating stoves helps to reach many important goals: Efficient cooking technologies are an important tool for protecting health, especially of women and children. Less firewood consumption also reduces unsustainable deforestation. Besides, an initiated market for cook stoves generates income and job opportunities. What is more, the consumers save money.



30 years. Because of their experience and their quality products the women earn a fair income.

#### What has been achieved so far?



## What has been achieved so far?

Within six years and up to the end of 2011, the interventions of EnDev Kenya succeeded in the dissemination of roughly 1.3 million improved cook stoves. Calculating one stove per family, the project has delivered clean, healthy and efficient cooking technology to as much as 6.5 million people. Today, 38 percent of all households in the project regions prepare their meals with improved cook stoves, while countrywide only 13 percent of households use modern cooking devices.

To sustain this development, EnDev Kenya has also helped to establish the Improved Stoves Association of Kenya (ISAK). ISAK was formed in 2007. The aim of the association is to bring together all stove builders, companies and institutional bodies as well as to provide a forum and a lobby for modern cooking technology. This is important for at least two reasons. Firstly, the exchange of information helps stove builders to professionalize their work economically and technically. Secondly, cooking energy has not yet reached the attention it deserves in society, and so requires lobbying for more support.

The initiators also convinced two banks which now provide special loans for institutions, for example schools. Private schools, for instance, can take a loan and finance the rates of the loan with the savings accumulated from spending much less for wood fuel. Not many institutions have taken advantage of this offer so far. High interest rates and the need of collaterals scare a lot of institutions.

Apart from the general success, the positive effects can also be seen in the fields of health and poverty, climate and environment.

## Fish restaurants in Kisumu

Restaurant owner Joyce Apondi Okelo uses a rocket stove Close to Kisumu beach, there are two dozen restaurants serving tilapia fish all afternoon. Hundreds of people from the city come to the water front of Lake Victoria to have their lunch here. Joyce Apondi Okelo starts working very early in the morning. She has bought about two hundred tilapias on the market. Now she has to prepare the meals. In the past, she cooked on an open fire. The black soot along the walls and on the ceiling tells the whole story.

## "Cooking was a nightmare. We were standing in the smoke all day"

The restaurant owner remembers: "Cooking was a nightmare. We were standing in the smoke all day. The fume hurt our eyes and we hardly could see our customers." Today she uses two Rocket Stoves, has an almost smoke-free kitchen and – more importantly – a smoke-free restaurant. This is why many more customers come to her restaurant today.



to her customers all day. Thanks to the rocket stoves in a smoke-free restaurant.

#### What has been achieved so far?



#### Health

Studies show that EnDev Kenya has improved the health situation of women and children. In comparison to an open fire, modern cooking devices reduce emissions up to 70 percent.

#### **Climate & environment**

Compared to a three-stone fire, the cooking technologies EnDev Kenya is promoting saves up to 70 percent of firewood.

Due to the high dissemination rate, EnDev Kenya causes very positive effects on the environment and the climate. Every stove saves around 0.72 tonnes of carbon dioxide annually which reduces the emission load to about 0.94 million tonnes every year. This is quite fundamental if you take into consideration that the average family of five in Kenya produces 1.5 tonnes of greenhouse gas emissions a year. All stoves together save 1.42 million tonnes of firewood which correlates with 78,000 hectares of mature forests.



**Restaurant owner Judith Akinyi** Judith Akinyi carefully puts half a dozen tilapias into the boiling oil. On her other stove, she is preparing Ugali, the traditional Kenyan side dish. She adds maize flour to a pan with boiling water and keeps stirring. From time to time, she takes a casual look at the two fires burning in her stoves. "Today I don't have to mind the fires anymore, since the rocket stove burns without problems, whereas an open fire constantly needs your attention," she says.

## "Today I don't have to mind the fires anymore"

What is more, she now saves up to 60 percent of firewood with her rocket stove. This has greatly reduced her fuel expenses. "Every day I save about 600 Kenyan Shillings (five Euros). This is money which goes directly into my pockets." Money that she also invests into new chairs and tables and glazed tiles for the restaurant floors.



#### What has been achieved so far?



#### Poverty reduction & income generation

The dissemination of cook stoves has many positive socio-economic impacts in rural areas. Firstly, it generates income for stove producers, builders and vendors. What is more, a majority of producers and installers hire additional labour. According to a study of 2011, the resulting generated income varies. Most of the stove builders earn between 75 and 150 Euro per month. This is quite a fair income since most of them install or produce only ten stoves a month, which leaves them plenty of time to pursue a second business.

Secondly, users of improved cooking technologies save time and/or money. There are two reasons for saving time. On the one hand, improved cook stoves cook much faster. On the other hand, women have to spend less time for collecting firewood, since they require much less fuel. This is a huge improvement especially for women in rural Kenya who are groaning under the burden of their many obligations.

As the majority of women does not only search for firewood but also has to buy it, they save money, too. With an improved cook stove, most households spend less than 500 Kenyan Shillings (KES) per month, while households using a three-stone fire pay up to 2,000 KES per month. A daily wage on the countryside is around 250 – 400 KES. Hence, the savings are quite substantial. Institutions like schools and restaurants can save even more. Big restaurants in Kisumu, for example, save 400 to 800 Kenyan Shillings every day.

Both developments enhance the lives of users and stove builders. Therefore, disseminating improved cook stoves reduces poverty and helps to reach the Millennium Development Goals. This becomes clearer when analyzing how the women use the extra time and money. Most families invest their additional money in food and domestic use, but also for covering the school fees and other educational costs for their children. Regarding the time saved, half of the women use it for productive use, whereas a third spends the extra time pursuing leisure instead.

Caroline Adhiambo cooks on an open fire Caroline Adhiambo is one of the few remaining restaurant owners still cooking on an open fire. "The smoke of the fire sometimes bothers my customers," she worries. I am afraid that they might choose the restaurant of my competitors next time." Her employee Roseline Oqweo also complains about the smoke, for other reasons though. She explains: "I am coughing so much that my rib cage hurts. We take turns in the kitchen so I can recuperate. Despite this, I still have to stay at home from time to time, drinking milk and eating honey to become healthy again." Both cook and restaurant owner want a modern stove as quickly as possible. As soon as she has saved enough, Caroline Adhiambo concludes: "I will order my own built-in rocket stove."

#### How Pamela Mahila persuaded the restaurant owners

"Today the restaurant owners know all about the benefits of my rocket stoves," tells Pamela Mahila who works for EnDev Kenya and leads the office for the Western Region. "To persuade them was not an easy task," she explains. "At the beginning, the women were very reluctant. Our mothers and grandmothers have cooked over open fires and so do we, they said," remembers Pamela Mahila. "So I persuaded one of the owners to test a stove for free.

## "Today the restaurant owners know all about the benefits of my rocket stoves"

Weeks later a serious thunderstorm came in. It rained so much that the water flooded the kitchens, extinguishing all the open fires in their holes. Only the fire in our rocket stove still burned. The owner made a good business that day and I got a dozen orders for new rocket stoves," Pamela Mahila recollects laughing.



Today, restaurant owner Joyce Apondi Okelo is grateful that Pamela Mahila from EnDev persuaded her to change

There are several contributing factors to the success of the project which will be examined in further detail here. One important reason for the success is the marketbased approach, another one is the careful selection of adapted and high-quality technologies. A final factor is the partnership with the Ministry of Agriculture and the timely foundation of the stove association.

## A Market-based approach

As a first step, EnDev Kenya identified the problems of the low stove dissemination, which up to that point had still depended on international development aid. During a first project between 1983 and 1994, German Gesellschaft für Internationale Zusammenarbeit (GIZ) had already invested in the development of a stove sector. Around 28 producer groups had produced and disseminated around 500,000 stoves, at an annual rate of approximately 50,000. After the project ended, the production rate dropped to 12,000 to 14,000 stoves a year. It was found that organizational, pricing and transport problems were reasons for the decline. Plus, there were hardly any market structures for modern stoves.

Therefore, EnDev Kenya focused on building a sustainable market for improved stoves. To initiate this market, two interventions were required at the same time. First, raising awareness by informing people about the advantages of modern stoves and so create a bigger demand. Second, training enough stove builders and installers who can then properly address this demand.





#### 1. Sensitization

To raise awareness is a very important issue. A lot of people in Kenya's rural areas are not aware of the dangers of cooking and of the positive effects of improved cook stoves. The sensitization and information is now provided in local public meetings called "barazas," which bring the whole community together, and by organizing field days or information desks on markets. EnDev Kenya also targets tea and coffee growers who usually employ several thousand workers who can then be addressed easily. Stove producers, installers and marketers play an even bigger role for sensitization work. All these activities have been very successful, as a study from 2011 shows. As much as 97 percent of people not using an improved stove is nevertheless aware of its advantages.

#### 2. Capacity building

Capacity building is the biggest challenge. EnDev Kenya therefore focuses not only on technical skills but also on marketing and organizational skills. The qualification of stove builders, installers and production groups is a key to success.

At the beginning of the project, many Kenyans thought that EnDev Kenya would not only train them but also provide them with jobs. The project initiators quickly changed this attitude by encouraging individual initiative. Only potential stove builders who have found customers that are willing to pay for a new stove are trained. This is a very important condition in the trainee selection.

The training methods have also changed within the last years. At the beginning, it was thought that one day of training would be enough. It was not. Since then, varying training units and courses have been developed, especially on technical skills. There are special courses regarding rocket stoves, Jiko Kisasa stoves, liner production, fireless cookers etc.

## **Comparison of school kitchens**

Jane Ambuka cooks in a smoky school hut The kitchen of the Mungoye primary school northwest of Kisumu stands hidden behind a large school building. The hut is built from wood and mud. The walls are partly broken with the wind blowing through the holes. Inside the kitchen, five three-stone-fires are burning under huge pots.

## "How she survives this smoke is a miracle; it is so dense"

Cook Jan Ambuka is hastening from one to the other, breaking kindling, feeding the fires and rushing out now and then to come back with more firewood. How she survives this smoke is a miracle; it is so dense. The eyes are burning, it is almost impossible to take in a breath without coughing. Anyone standing in this kind of smoke must know that it is hazardous to the health.

#### Vice-Director Rose Opete of Mungoye Primary School laments the waste of firewood

"One tree alone costs 8.000 Kenyan Shillings (65 Euro) and we need two per month," complains Rose Opete, Vice-Director of the Mungoye Primary School. Public schools do not have to pay for this; instead they allocate the burden to the parents who have to deliver sufficient firewood every day. Nonetheless,



Her school serves breakfast and lunch, which is why the school needs a lot of firewood.



Most of the stove builders hardly knew how to run a business or how to find prospective clients. Consequently, EnDev Kenya started offering entrepreneurship and business trainings on top.

To date, around 3,000 people have been trained. Not all of them proved to be good entrepreneurs. Some of them quit the job or work part time only. The majority, however, continues to build stoves.

These hundreds of stove builders and marketers are the driving force for the success of the project. They raise awareness in their enlightened self-interest. Their concentrated marketing power has and is still raising much more awareness than any development aid could have on its own, no matter how much money would be spent.

What is more, the stove builders compete with each other to win customers. The competition ensures that customers can purchase a stove at an affordable prize. A vibrant market also guarantees that users will be able to locate someone for maintaining and/or replacing their stoves, as needed.

High-quality stoves are a prerequisite to sustaining this market. To guarantee that all stove builders keep high standards is challenging though. This is the reason why the work of the stove builders is controlled very carefully. To simplify the monitoring process, EnDev Kenya organizes stove builders into groups. They meet at least every two months discussing prizes and challenges and supporting each other. The groups also count the stoves produced each month and forward their numbers to EnDev Kenya. All these tasks are currently still carried out by the project staff and to some extent by home officers of the Ministry of Agriculture. Increasingly though, EnDev Kenya will delegate tasks to the members of the Stove Association.

Rose Opete is quite unhappy with this: "As a school, we should set an example," she adds. The environment is part of the curriculum and saving firewood is an important objective in Kenya, where forests today only cover as little as 1.7 percent of the total land. This is one of the reasons why EnDev Kenya focuses on schools and offers them institutional stoves, which can save up to 70 percent of firewood. But up to now, Rose Opete has not been able to raise the budget necessary to buy a modern rocket stove, neither have the parents.

Cooking with an institutional Rocket Stove – Nyamninia Primary School "Since we started to cook with an institutional rocket stove, everything has become so much easier in my kitchen," says Roseline Gabiambo. She works as a cook in Nyamninia Primary School with 875 pupils. Despite these numbers, she now only requires four large wood logs (approx. 70cm long) per day, saving the school 70 percent of their firewood spending. An institutional rocket stove costs around 180,000 KES (1,640 Euro), which is a lot of money.

## "Since we started to cook with an institutional rocket stove, everything has become so much easier in my kitchen"

However, firewood is getting more and more expensive every day. At the current rates, an institutional rocket stove pays for itself within seven months. Nyamninia Primary School was lucky though. As part of the Millennium Development Programme of the Kenyan Government, they got the stoves for free.



Roseline Gabiambo is cleaning the huge pots of her modern stoves while

## school kitchens

## **B** Technologies

Convincing cooking products are a pre-condition for building a market for modern stoves. The cooking devices have to address the financial and cultural needs of the people. Kenyans in the countryside still rely on firewood even though it is becoming rare. After all, there are hardly any other sources to cook with. Therefore, EnDev Kenya decided to provide Kenyans with modern wood-burning stoves that would allow them to use their scarce firewood resources more efficiently. There are two types of wood-burning cookers - the Jiko Kisasa stove and the rocket stove.

#### **Jiko Kisasa**

Jiko Kisasa stoves are a well-adapted technology in Kenya. They were developed 30 years ago with the help of GIZ in its first engagement phase in Kenya from 1983 to 1994. Jiko Kisasa stoves come in various types and sizes and use firewood and charcoal. In comparison to an open fire, a Jiko Kisasa stove reduces emissions by roughly 30 percent.

To meet the required standards, the quality of the combustion chamber, also called liners, is crucial. EnDev Kenya therefore educated and trained special producer groups on the use of the right materials and equipped them with the proper tools. Today, the producers burn the required combustion chambers in kilns to make them very stable. Plus, they are able to mass-produce them.

Stove companies and individual stove builders buy the liners to produce different kinds of stoves, from portable to built-in ones and sell them on the markets. Mobile stoves are often made by little companies and artisans in small cities. In the countryside, however, the trained installers build Jiko Kisasa stoves directly in people's homes using mud and clay. A complete Jiko Kisasa costs as little as 400 Kenyan Shillings, which is less than four Euros. This makes the stove very affordable. Women can use different pot sizes on the stove, which is an advantage of the Jiko Kisasa.





#### **Rocket Stoves**

Rocket stoves are made by individual stove builders, too. In contrast to a Jiko Kisasa, only one pot size can be used. To their advantage, they save up to 60 percent of firewood and are therefore at least 20 percent more efficient than a Jiko Kisasa. Plus, they produce less smoke and reduce greenhouse gas emissions by up to 70 percent. Rocket stoves are available with and without chimney, for one and two pots. And they are available in different quality standards.

The rocket stove technology also addresses institutional needs, for example of school canteens. Big institutional rocket stoves are manufactured individually. They cost several thousand Kenyan Shillings depending on the required size. Despite the cost, the return on investment is usually achieved within only seven months. To date, EnDev Kenya has cooperated with 1,133 institutions, which altogether purchased nearly 2,300 stoves. In total, EnDev Kenya has thus reached more than 140,000 people.

EnDev Kenya introduced the rocket stove technology in Kenya in 2007. Five years later, three out of four stoves sold are of the rocket type. This means that the new technology has been well received by the consumers. In the meantime, many Kenyans are replacing their old Jiko Kisasa stoves with new rocket stoves and so cook even more economically.

Within the last years, a dynamic market for modern cooking devices has developed. New players and stove projects are appearing. Today, a lot of different stoves are available in Kenya. They use ethanol, plant oil and LPG instead of firewood, and many of them cater to urban customers.

## **Keyo Women Group**

#### **Experience of 30 years**

The Keyo Women Group has built and sold combustion chambers (also known as liners) for almost thirty years now. They were trained in the business as part of the stove project initiated by the GIZ in 1983. When they started out, modern stoves were simply not available. So an improved stove was developed in close cooperation with the Keyo women. The resulting Jiko Kisasa stove today is the most-known alternative to a three-stone-fire.

## "When they started out, modern stoves were simply not available"

To assure the quality of the stove, the former project focused on standardizing the combustion chamber production. The liners produced by the Keyo Women Group today are used for building portable metal stoves as well as built-in mud stoves.

How to make a Kisasa stove Lucia Alai kneads the mud-like dough locating any remaining pebbles and stones. These are removed immediately, if she finds any, since they are contaminants that could lead to cracks in the combustion chamber. One of her colleagues fills the mud into an iron form creating the walls of the combustion





Oftentimes, the technology of the new players is more sophisticated; some of them are even imported products. However, they often do not reflect the traditional Kenyan cooking tradition. For example: A typical Kenyan side dish is "Ugali", a porridge made from maize flower and water. It requires frequent stirring and a very stable and built-in cooking device. Most of the newly developed cookers are mobile though and very light. If pots are stirred and moved frequently, the mobile stoves might simply fall over.

These are reasons why EnDev Kenya favours the adapted cooking technologies of the Jiko Kisasa and the rocket stoves. They might be a little less efficient than some of the more sophisticated stoves. But their technologies are widely accepted and used. Thus their saving potentials are fully exploited.

Add to this the advantage that both technologies can be produced locally. This generates additional income in the rural areas. Locally produced modern technologies are cheaper than centrally produced ones. The low prize makes the stoves available for the majority of people and thanks to the reduced amount of firewood needed, they quickly pay for themselves.

# C Extension network within the Ministry of Agriculture

EnDev Kenya can rely on the Ministry of Agriculture as one of the project partners. The Ministry home economic officers play a crucial role in the promotion of the stoves. The Ministry disposes of a dense network of district offices. Their home economic officers take active part in promoting stove dissemination. Many of them have been trained and now assist in the trainings. And they help with monitoring the work of the stove builders and support them in pursuing their business plans. chamber. When the walls are ready, she cuts the opening for the wood fuel. To guarantee the quality for every step, the Keyo women use technical templates which have been developed with the help of EnDev Kenya. When satisfied with the shape of the combustion chamber to be, Lucia Alai carefully puts it into the shade where it needs to dry for several days. Then, it will be burnt in a kiln.

#### James Ochien´g buys combustion chambers twice a week

James Ochien'g has come all the way from Bondo, which is 50 kilometers away, by taxi. The 23-year-old young man works for a stove company which uses the combustion chambers of the Keyo Women Group. "The quality of the liners is excellent. I come here twice a week to buy their combustion chambers."

## "The quality of the liners is excellent"

He purchases hundreds of charcoal liners for his company every week. Back at the stove company, the workers are busy inserting the respective combustion chambers into metal-made stoves. These are then sold on the market. It is a good business – for both buyers and sellers. The cost of combustion chambers varies. The price for a wood stove liner is 150 KES. A small liner for a charcoal stove can be bought at about 25 KES (22 Eurocent) per piece. The company sells a complete stove for 200 KES or more (almost two Euro). James Ochien 'g is a good client for the Keyo women. Since he buys up to 1,000 liners every month, they achieve a turnover of 350 Euro with just one client.



*i*o women group.

## Keyo Women Group



Moreover, they raise awareness in the villages. For example, they invite stove builders to village meetings, which play a very important communication role within the rural areas. Without the dense network of the Ministry, EnDev Kenya with its staff of eleven people could not have achieved the success they have. The strong partnership between EnDev Kenya and the Ministry of Agriculture proved to be a prerequisite for building a sustainable project.

## D Stove association

EnDev Kenya also helped establish the foundation of the Improved Stoves Association of Kenya (ISAK). Formed in 2007, the association is to ensure the sustainability of the stoves activities, even after the project has been phased out.

Since forming, ISAK has started building up its own structures. The association wants to organize stove builders and producers and offer them services such as market information and workshops. In addition, the stove association has to ensure the production, distribution and marketing of high-quality, efficient and affordable modern cook stoves.

EnDev Kenya wants to make sure that the stove association runs by itself sustainably. Association members should therefore pay for all services themselves. Persuading the members to compensate the association for these services will not be easy. GIZ has however made very positive experiences with this approach in Kenya already. In sum, a functioning association is the best exit strategy for the long run.



make them tough and stable.

Outlook



## Outlook

EnDev operates successfully in 18 countries with the goal to promote modern energy to people in rural areas in developing countries. EnDev Kenya contributes to this development. With a budget of 5.9 million Euros (2005-2012) it has already helped to disseminate 1.3 million improved stoves and so delivered clean and efficient energy to 6.5 million people.

For each stove, EnDev Kenya invested less than four Euros. As one stove serves the average family of five, the invested sum per head is less than 90 Eurocent. This is very cost effective – even within the challenging framework of all EnDev-projects.

With its few means, EnDev Kenya has contributed to initiate a market for modern cooking devices. To date this market is predominantly active in the three project regions. It might therefore be a good idea to upscale this successful project to other Kenyan regions.



Roseline Ogweo works in the kitchen every day. Since she is cooking on a rocket stove she can concentrate on cooking because she hardly has to feed the fire anymore.

## Stove installer Margret Samonli

Margaret Samoli is 42 years old and has been a professional stove builder since 2006. She mainly builds fixed Jiko Kisasa stoves, one of Kenya's most popular stoves. Margaret Samoli cannot say how many stoves she has built so far. She needs a machete, soil and water for her job. And she has to bring an already baked combustion chamber along. "I buy the combustion chambers from a producer group" the 42-year-old woman explains. To build the stove, she mixes water with soil and forms a clayey mass. She uses the clay to fix the combustion chamber in the corner of the kitchen. Then she cuts exact borders into the mud and smoothes the surface with a little stick.

# "She uses the clay to fix the combustion chamber in the corner of the kitchen"

For a complete stove she charges 400 Kenyan Shillings, almost four Euros. This is not much but good money in the countryside. "I visit markets and villages and explain to potential customers how they can save food fuel and money with a new stove. It is a good business for me."



The project leaders would also like to further the technology of their stoves. A stove testing center is therefore crucial. For the future, new technologies will have to be developed that consider other types of fuel in order to take even more pressure off the Kenyan forests.

Thanks to the Clean Development Mechanism (CDM), numerous new stove projects and initiatives have come up. This development opens chances but also poses severe challenges. Many of these initiatives provide their stoves for free or subsidize prizes heavily to generate emission certificates. This threatens a market-based approach, since stove builders cannot compete with subsidized stoves. EnDev Kenya is trying to influence these developments by discussing and sharing their experiences with the respective CDM groups.

Extensive discussions between all concerned stakeholders are crucial anyway, since EnDev Kenya alone cannot address the complete cooking sector and is focused on rural regions. Many people in urban areas cook with charcoal. This is an entirely new target group which also should be taken into account. Whether EnDev Kenya should also target these customers has to be decided in the future.

The stove association ISAK shall eventually take over all involved activities. In offering the required technologies and services to its members, the stoves association can assure its own survival and sustain the development of the stove market in Kenya, which is very vibrant and still offers a lot of potentials – to save firewood, to offer job opportunities to many thousands of Kenyan women and men and to protect Kenya's forests.



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# Dynamic market for improved cooking devices in Kenya





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