



ProcarBOOH

Improved
Cookstoves in
Côte d'Ivoire

Introduction

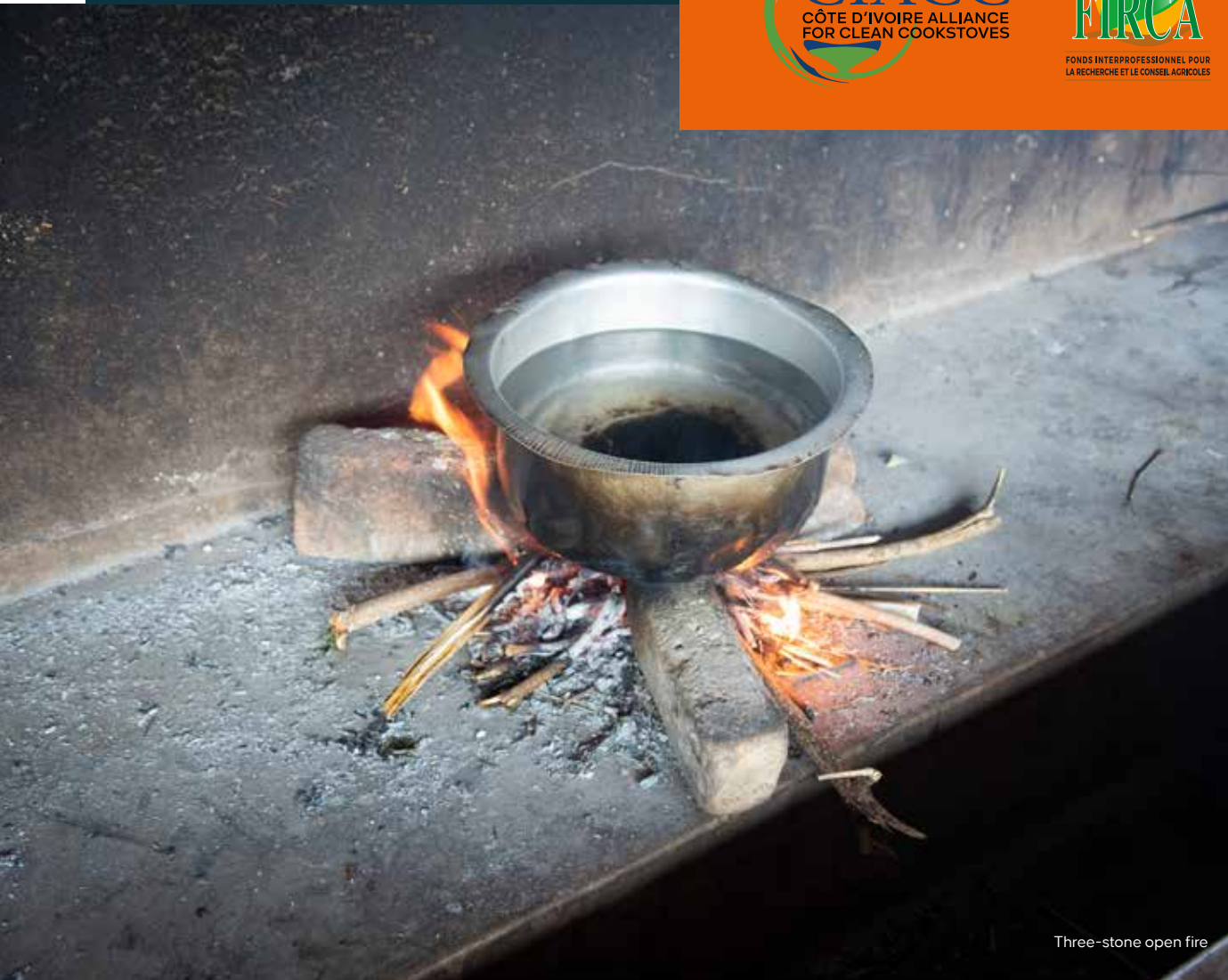
Our ProcarBOOH project in Côte d'Ivoire aims to stimulate the commercial distribution of improved cookstoves to support forest conservation and the livelihoods of farming communities.

These stoves significantly decrease household air pollution, help households save on fuel expenditure, and reduce the time spent collecting firewood.

Since we kicked off distribution in 2018, the project has produced and sold more than 10,000 stoves, while establishing self-sustaining machine production lines and effective community sensitization strategies.

In this document we discuss the environmental and social context that gives this intervention its potential, share our findings on the stoves' efficiency in terms of forest conservation, household economics, and carbon capture, and highlight the success factors in creating and distributing these improved cookstoves.

Finally, we explain how we aim to upscale this project to sell 2,000 stoves per month.



Three-stone open fire



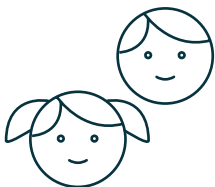
The Environmental Context: Biofuels and Deforestation

Since the 1960s, Côte d'Ivoire has lost more than 85 per cent of its forest cover, in large part due to expanding cocoa production. The National Forest Regulation Body SODEFOR estimates that up to 60 per cent of the country's protected forests are occupied by cocoa settlements. Even Tai National Park – a UNESCO World Heritage Site and the largest remnant of Upper Guinean Rainforest in West Africa – is under increasing pressure, with more than 80% of the surrounding forests being cleared and cocoa farms now occupying 53 per cent of its periphery.

Growing urbanisation in rural areas is a major reason for this, as forests are cut down to make room for expanding villages and their agricultural livelihoods. Overall, Côte d'Ivoire's population of over 25 million still relies on firewood for 73 per cent of its energy needs, contributing to high rates of deforestation across the country. In rural areas these numbers

are even higher: 95 per cent of rural households fully depend on firewood for energy. Meanwhile, a shift to alternative resources such as gas and electricity is still a long way off, hampered by a lack of infrastructure and significant price gaps.

Our improved cookstoves reduce the risk of deforestation, as they require 45 per cent less biofuel. This statistic also gave the project its name, as 'Booh' means forest in Baoulé, the language of the largest ethnic group in Côte d'Ivoire. When adopted at scale, this intervention has the potential to lead to a significant reduction in deforestation in and around cocoa-growing communities. Though certainly not a silver bullet, in combination with improved agroforestry practices, conservation projects and reforestation work, the stoves present an opportunity for holistic problem-solving at the farmer level.



The Social Context: Gender, Child Labour and Household Health

Anti-deforestation initiatives such as the [Cocoa and Forests Initiative \(CFI\)](#) are increasingly recognizing the need for gender and youth-sensitive strategies towards protecting forest areas, especially as women and youth are often the most heavily impacted by interlinking social and environmental issues. In Côte d'Ivoire, both firewood collection and cooking are activities conducted largely by women and children. Firewood collection is time intensive and most commonly done by children, predominantly girls, who have been found to carry weights of up to 15 kg on their heads for several kilometres at ages as young as seven. This can have harmful effects on their health and physical development, as well as increased risk of time spent outside of school.

Cooking also disproportionately falls to girls and women, and traditional cooking methods over open fires are linked to significant health issues. Most cocoa households cook on three-stone open fires

that are in small huts to provide shelter from the rain. The burning of wood or charcoal in these enclosed spaces releases harmful substances such as carbon monoxide, particulate matter, and black carbon, and as cooking in this way also takes several hours, the huts fill with thick smoke. This Household Air Pollution (HAP) poses a significant health risk, as it causes respiratory problems and even infections. In Africa, an estimated 352 million children are exposed to HAP, and more than 50 per cent of premature deaths due to pneumonia among children under 5 are caused by the particulate matter inhaled from HAP. HAP contributes to the premature death of around 16,000 Ivorians per year (WHO, 2019).

Clean cookstoves are an example of a gender-sensitive intervention, as the reduced need for firewood collection and more efficient cooking that the stoves provide lead to positive impacts for women and girls in particular.



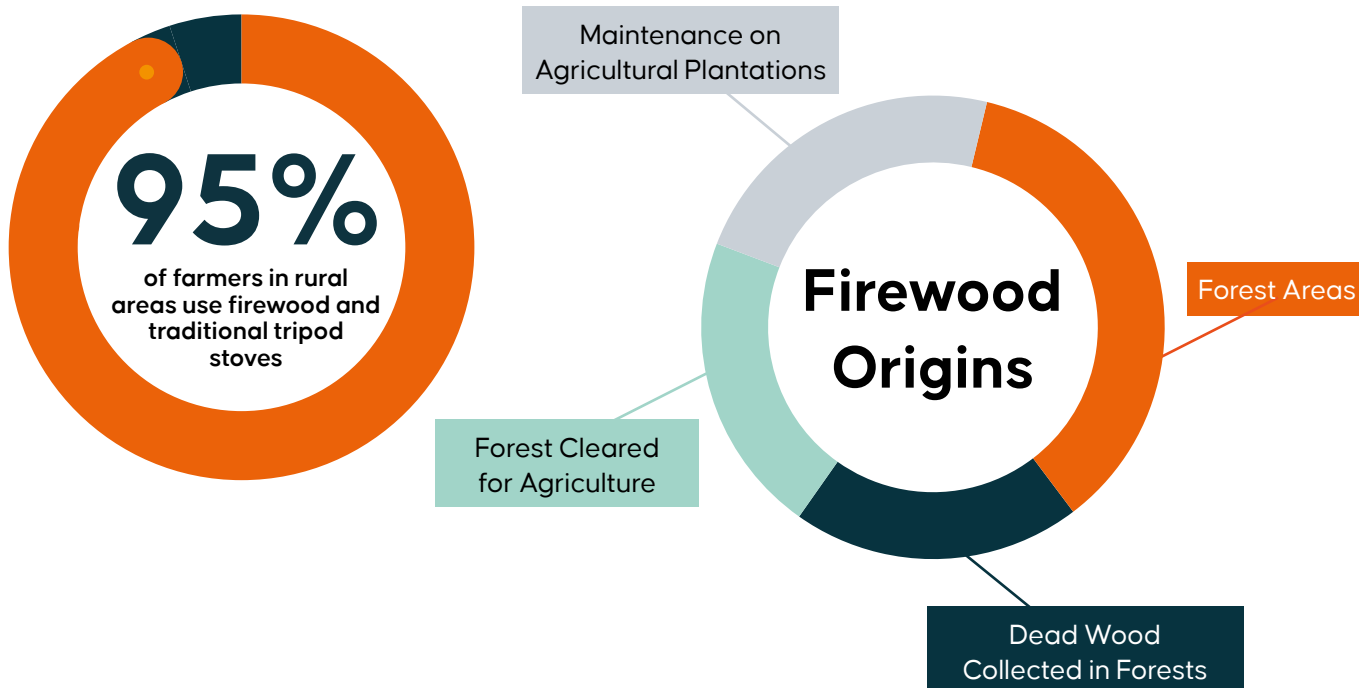
The Story of Our Improved Cookstoves

Conducting a baseline study

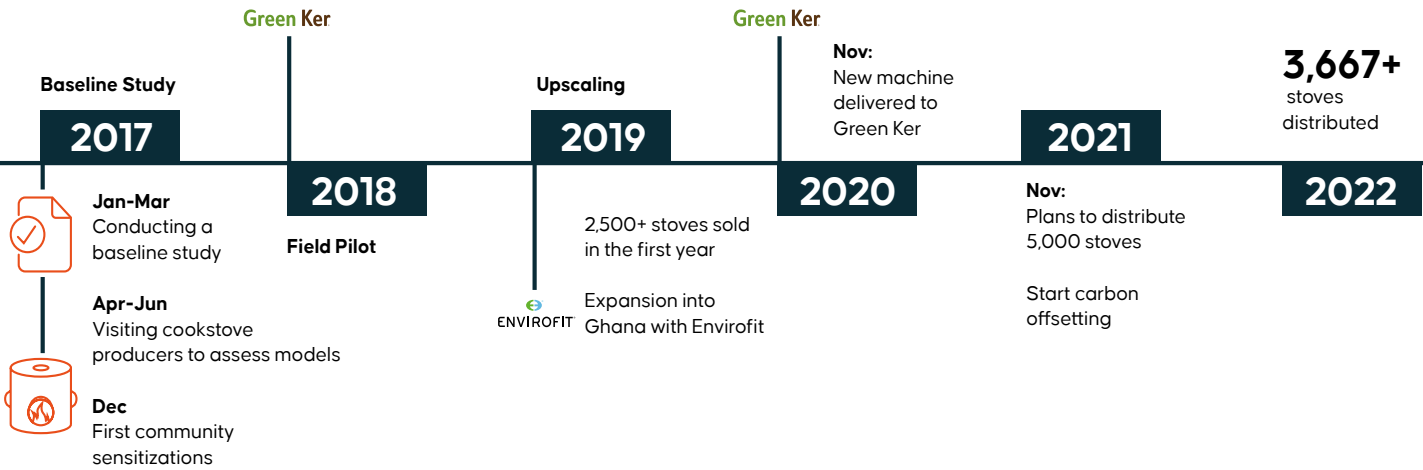
In 2016, we formed a partnership between the Ivorian Alliance for Improved Stoves and Cooking Energy (CIACC), the Interprofessional Fund for Agricultural Research and Council (FIRCA) and the Executive Secretariat REDD+ in Côte d'Ivoire to start up the ProcarBOOH initiative. The following two years were dedicated to a diagnostic study where we collected data from communities and tested different stove models.

In 2017, 1,740 surveys were conducted with rural and urban households, food stall owners, and producers of firewood and charcoal in both the North and West of the country (Duékoué, Soubré and Guiglo). The surveys provided insight into the challenges and opportunities for a cookstoves project:

- We found that 95% of farmers in rural areas use firewood and traditional (tripod) stoves, and only a small group (4%) used charcoal. Firewood was either collected by the farmers themselves in nearby forests (51%) or bought (49%), costing an average of 8,500 CFA (€13) per month.
- In the Western region, 36% of the wood came directly from forest areas and another 20% came from forests that had been torn down for new agricultural plantations. The other half was dead wood collected in the forest (23%) or came from maintenance on agricultural plantations (21%).
- 86% of households were aware of the negative impacts of household air pollution. The most reported complaints were respiratory diseases, eye pains, burns and headaches. In the Western cocoa region, families attributed 55% of their costs for hospitals and pharmacies to cooking smoke-related diseases.
- In a pollution test of two households in the Western area, the particular matter measured by far exceeded the norm of the World Health Organisation.
- None of the rural households were aware of the existence of clean cooking stoves. After an explanation, 85% of households said they would be interested in using an improved cooking stove, with the main incentives being having less smoke and reducing spending on fuel.



ProcarBOOH: The Journey So Far...



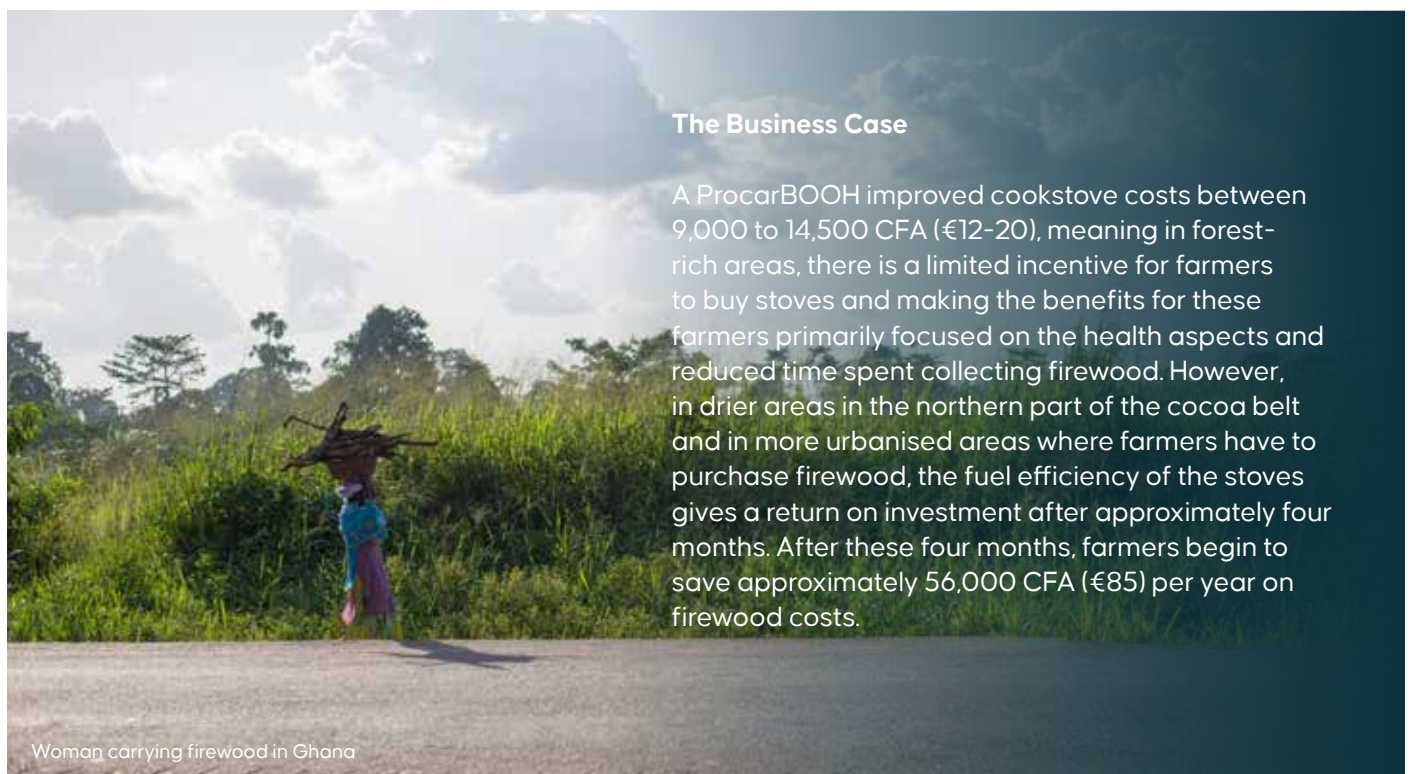
Field Pilot

To find cookstove models best aligned with the needs and desires of local cocoa farmers, we imported 12 different firewood and carbon-fuelled models in different sizes and organised community sensitisations at two cocoa cooperatives around Duekoué. After the sensitisation, 488 members were given one of the 12 models to test at home for four weeks. The same number of stoves were also distributed to members of a cotton cooperative in the north of Côte d'Ivoire to compare the impact.

After the four-week trial, an evaluation was conducted. This provided us and our partners with information on how the different cookstoves matched

farmer households' needs and expectations. Some of the most significant benefits farmers expressed included quick heating, reduced use of fuel and reduced smoke. Based on the farmers' feedback, two improved cookstove models – one burning charcoal and one burning wood – were selected for production by local manufacturer Green Ker.

Tests carried out by the CERNER laboratory indicated that the energy efficiency of the charcoal model was 60% higher compared to traditional stoves, while the wood-burning model resulted in a 43% efficiency gain over traditional counterparts.



The Business Case

A ProcarBOOH improved cookstove costs between 9,000 to 14,500 CFA (€12-20), meaning in forest-rich areas, there is a limited incentive for farmers to buy stoves and making the benefits for these farmers primarily focused on the health aspects and reduced time spent collecting firewood. However, in drier areas in the northern part of the cocoa belt and in more urbanised areas where farmers have to purchase firewood, the fuel efficiency of the stoves gives a return on investment after approximately four months. After these four months, farmers begin to save approximately 56,000 CFA (€85) per year on firewood costs.

Woman carrying firewood in Ghana



Upscaling: Community Sensitisations and Discount Rates

In August 2018, sales began through our local production partner Green Ker in Akouedo. We aim to reach similar adoption rates of cookstoves as found in Eastern Africa, where comparable projects have been taking place since the 1980s with high adoption rates. Today, studies suggest that between 50-60 per cent of charcoal users in Kenya use some kind of improved cookstove, with uptake in Nairobi and Mombasa as high as 80%. In Côte d'Ivoire, where improved cookstoves are still a relatively new concept, we are facilitating distribution through three core strategies:



Sensitisation Sessions:

To increase awareness around the benefits of these improved cookstoves, we focus on community-level sensitizations where farmers have the opportunity to see the cookstoves in action, ask questions, and engage directly with our field supervisors.

Discount Rates:

We also combine community sensitizations with significant discounts on the stoves themselves. Improved cookstoves are still a new concept for farmers in West Africa, and given their higher price compared to the traditional three-stone open fires, financial incentives are still needed to convince farmers to give these new products a try.

The retail prices of our improved cookstoves vary from 9,000 to 14,500 CFA, compared to 3,000 CFA for a traditional iron stove. To increase the uptake of the stoves in the short term, we have seen that a discount of 60% is necessary. With a 20% discount very few stoves were being sold, but when a 60% discount was introduced, making prices comparable to those of traditional stoves, 1,000 were sold at one cooperative alone.

Loan Facilities:

We also offer farmers options for loans, which they can repay over the course of six months through their cocoa deliveries.

Through these strategies, we hope to significantly increase uptake in the short- and medium-term. In the long-term, once the concept has been introduced, this should lead to a point where farmers are willing to pay the full price, as the business case is there.



2021: A New Machine and Growth Strategy

In November 2020, our local production partner Green Ker received a new manufacturing machine, taking their production capacity up to 4,000 cookstoves per month.

Increasingly, we are bundling the clean cookstove initiative with other community development activities such as village savings and loan associations (VSLAs) and child protection schemes. This will not only increase our outreach but will make the most of the cookstoves' holistic potential as a support mechanism for women and youth. For instance, the distribution of stoves will be adopted as a remediation intervention for children

who are found to be frequently carrying heavy loads of firewood, identified by our Child Labour Monitoring programme. In many cases, these heavy loads consist of firewood, so reducing the amount of firewood needed also reduces the risk of child labour. For VSLAs that participate in Income Generating Activities (IGAs) and women empowerment training, we will also begin offering stoves at a reduced price to support the offtake of their small businesses, many of which have a focus on preparing and selling food. For others, the stoves can reduce household expenditure and thereby allow more investments in their IGAs.



Looking ahead: the potential of carbon off-setting

As the project gains traction, we have also begun a new carbon off-setting project through these cookstoves. In 2021, Green Ker started a pilot project together with ESSP and ALLCOT. The offset is calculated at 2.7 tonnes of carbon per year for 5

years (the lifecycle of a stove), and to include stoves in the project they are registered with a number and the name of the owner when they are purchased. An audit will be undertaken once a year to verify the information.



Sensitization Session



Yeboue Akissi Viviane is a cocoa farmer and mother of four from the village of DeniseKro, just outside of Côte d'Ivoire's capital of Abidjan. As part of a cocoa cooperative, she attended a community sensitization in early 2020 on ETG | Beyond Beans' improved cookstoves project. Inspired by the benefits of these improved stoves, she decided to buy her own.

"I just bought my stove today," she said, "I hope it will reduce the amount of wood I have to carry from the farm as I am getting older and have less strength for this kind of physical work."



**BEYOND
BEANS.**

Beyond Beans Foundation

Van Heuven Goedhartlaan 7C

1181LE, Amstelveen,

The Netherlands

info@beyondbeans.org

www.beyondbeans.org