AVSI People for development

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Cooking behaviour study

Main barriers and drivers towards the adoption of cleaner cooking solutions by households in 8 African countries

August 2024

Summary

Executive summary

Please refer only to Chapters 3 and 4 (Pages 7-16)

Acronyms

CCS	Clean Cooking Solution
FGD	Focus Groups Discussions
HTC	High Tier Solution
ICS	Improved Cook Stove
KAB	Knowledge Attitude Behaviour
LPG	Liquefied Petroleum Gas
PPP	Purchasing Power Parity
PPS	Probability-Proportional-to-Size sampling
TAM	Technology Acceptance Model
TC	Traditional Cooking
TPB	Theory of Planned Behaviour

1. Objectives

Cooking behaviour in a specific area or community is determined by several and interconnected variables that include social, economic, cultural, and legal drivers, barriers and obstacles – i.e., **behaviour determinants** - in addition to the availability, acceptability, affordability, and awareness of cleaner cooking solutions. Experience shows that it is crucial to identify these determinants before designing, planning and performing any activity/project related to cooking behavioural change or ICSs[1]/CCSs[2] sales promotion.

This study was conducted in 8 countries (**Côte d'Ivoire, Burundi, South Sudan, Kenya, Somalia, Congo Republic, DRC and Mozambique**) with the following main objectives:

1. Investigate the reasons why families use the current (traditional) cooking solutions, i.e. identify which are the perceived positive aspects (drivers, motivators) related to the traditional cooking methods.
2. Investigate the ultimate barriers toward the adoption of Improved Cook Stoves (**ICSs**) and/or Clean Cooking Solutions (**CCSs**) by households.
3. Identify possible drivers (enablers) toward the adoption of ICSs and/or CCSs by households.
4. Recommend strategies and priorities in order to address the barriers and to take advantage of drivers within a behavioural change campaign.

2. Methodology

2.1. The selected approach/Theoretical framework

This study is based on two theoretical frameworks: the **Theory of Planned Behaviour** (TPB) and the **Technology Acceptance Model** (TAM). TPB is a social psychology theory that views human behaviour as a result of an individual's attitudes, subjective norms, and perceived behavioural control. The theory was first proposed by Ajzen (1985, 1991) and has since been widely used in various research fields. In line with the TPB, an individual's attitude towards a specific behaviour is a primary indicator of whether they will perform that behaviour. Attitude refers to the extent to which a person has a positive or negative judgment toward a certain behaviour" (Ajzen, 1991, p. 188). Subjective norms describe the individual's perception of social pressure to engage in a behaviour. These social influences can derive, for example, from peers, family members and friends. Perceived behavioural control refers to the individual's perception of their ability to engage in a behaviour. This can include factors such as access to resources, knowledge and skills. TPB was deemed apt to understand individuals' intention towards the use of improved cooking solutions.

[1] Improved Cook Stoves
[2] Clean Cooking Solutions

The TAM explains how users adopt and use new technologies. It was first proposed by Davis (1989) in the context of information technology. According to TAM, a person's decision to adopt or reject a technology depends on two primary factors: its perceived usefulness and perceived ease of use (Marangunić & Granić, 2015). Perceived usefulness is the extent to which a user believes that a technology will improve their task performance. Perceived ease of use, on the other hand, is the degree to which a user believes that a technology will be easy to use. According to the TAM, if a person perceives a technology as useful and easy to use, they are more likely to adopt it. Given that changing from a traditional cooking stove to an improved cookstove implies a certain degree of change in technology and therefore requires a certain technology acceptance, this model was deemed useful for the purpose of this study.

2.2. Methodology and data analysis

This research uses a mixed-method approach with a quantitative survey and focus group discussions.

For the survey data, descriptive statistics (frequencies, means, and standard deviations) were used with the support of IBM SPSS Statistics 27 to gain insights about users and non-user's intentions, attitudes, perceptions and cooking behaviour.

2.3. Tools and data collection activities

The survey targeted two different groups: the **users** of Improved Cook Stoves (**ICSs**) or Clean Cooking Solutions (**CCSs**) and the **non-user households**. All the two groups have been involved through (i) door-to-door structured interviews and (ii) semi structured Focus Groups Discussions (FGD). Each focus group was composed by 10 participants on average and moderated by minimum 2 researchers. The interviewed users were almost invariably people who had used improved cooking solutions for at least 3 months. The study aimed to understand from users why they adopted and continue to use a clean technology as their primary (most frequently used) cooking solution and, from non-users, why they have never adopted/used clean cooking solutions. The data collection for the structured interviews with families was conducted using the Kobo toolbox, which was employed for developing the questionnaire as well as for collecting the families' answers.

Quantitative Survey

With regard to the survey, two different questionnaires were developed (one for users and one for non-users). For users, the questionnaire intended to explore the reasons for adopting and using an ICS/CCS, their satisfaction, and their attitudinal loyalty (i.e., their intention to continue using improved cooking solutions). For non-users, the aim was to understand their reasons for not adopting/not using improved cooking solutions and their intention to adopt an ICS/CCS in the future. Even though the two questionnaires included different questions based on the different target groups (users and non-users), the same questions were adopted in both instruments to measure individuals' attitudes towards the use of ICS/CCS, perceptions regarding the usefulness and ease of use of ICS/CCS, as well as to understand possible social influences (subjective norms) and perceived behavioural control. In addition, respondents' health consciousness was investigated. To ensure content

validity, an extensive literature review was conducted to select the constructs used in this study. Since literature on consumers' adoption of improved and clean cookstoves is still quite limited, the research scope was expanded to include studies on the adoption of clean energy, clean energy technologies and green products. Two academic experts and a team of AVSI experts validated the items and suggested rewording and adaptations to suit the study's context. For example, some scales originally referred to the adoption of renewable energy technologies or green products, and the items were adapted to fit the context of improved cookstoves. The following table summarizes the main sources used for each construct.

Table 1: Measurements

Constructs	Sources
Attitude towards purchasing improved cookstoves	Kim & Han. (2010); Yadav & Pathak (2016).
Subjective norm	Paul, Modi, & Patel (2016); Idoko, Oraedu, Ugwuanyi, & Ukenna (2021)
Perceived behavioural control (only non-users)	Paul, Modi, & Patel (2016); Idoko, Oraedu, Ugwuanyi, & Ukenna (2021)
Perceived usefulness	Kardooni, Yusoff, & Kari (2016)
Perceived ease of use	Kardooni, Yusoff, & Kari (2016)
Health consciousness	Nagaraj (2021
Purchase intention (only non-users)	Paul, Modi, & Patel (2016)
Satisfaction (only users)	Issock, Mpinganjira, & Roberts-Lombard (2019)
Loyalty (only users)	Issock, Mpinganjira, & Roberts-Lombard (2019)

Additional questions were included to gather information on the socio-demographic characteristics of the respondents and the head of the family, as well as on household composition, cooking habits, and energy use. The first draft of the questionnaire was further validated through several interactions between academics, AVSI experts and local experts. The questionnaire was originally written in English, then translated into French and back-checked to ensure the consistency and accuracy of the translation.

To reduce potential biases in the data collection process, academics and AVSI experts provided extensive guidance to local experts regarding the research aims, the correct procedures for data collection, and the interpretation of each item. Local experts then used this information to recruit and instruct local interviewers, who were specifically guided to place emphasis on minimizing potential response biases (e.g., by avoiding prompts that suggested desirable responses) and ensuring that the original meaning of each item remained consistent, even when questionnaires needed to be translated into local languages.

Data were collected from a stratified sample of users and non-users (see sampling strategy in Sect. 2.4). Each respondent was informed about the aim of the study, was ensured confidentiality and anonymity. Participation was on a voluntary basis and no compensation was given. The interviewers read each question and filed the responses onto Kobo. Each interview lasted about one hour.

Focus group discussions

The semi-structured questionnaire used for Focus Groups Discussions (FGD) was based on the structured questionnaire used for the interviews of families. Still, the dynamic of discussion allowed to explore some open-ended questions such as “What do you think are the characteristics of a very good cooking stove”, “If there is something you do not like about improved cooking stove can you describe what is it?” and deepen the discussion on topics such as: i) the circumstances under which people change for an Improved Cooking Stove; ii) the descriptions of potential underserved clients, disappointed/discontinuous users, loyal users and users championing the use of improved cooking stoves.

2.4. Sampling strategy

The identification of the survey respondents followed a stratified cluster random sampling method. The aim was to ensure the random selection of respondents as much as the stratification of the overall sample. The stratification was ensured by interviewing people in both urban and rural communities – plus in some humanitarian settings marked by instability when relevant. The random selection was ensured by selecting randomly the respondents within the communities, in particular by conducting so-called “modified random walks” (randomly selecting a direction to walk (e.g., by spinning a bottle), selecting a random starting point, and sampling contiguous households – a method developed by WHO). In practice, the communities covered were purposely selected as identified for incoming projects of clean cooking. However, by covering both urban/semi-urban, rural areas, and, when relevant, humanitarian settings, this study provides a fair representation of the different contexts of the country. Undoubtedly, to come up with a cost-efficient solution some approximations were made. In particular, the weight given to the three different settings did not mirror the proportion of their population size (no PPS sampling). Moreover, as a rule of thumb, it was decided to target at least 50 interviews for each relatively homogeneous subgroup.

Households from the 8 mentioned African countries were surveyed from May 2022 and December 2023 with structured interviews and FGDs.

Table 2: Number of households surveyed per user/non-user

	USERS		**NON-USERS**		**TOTAL**
	Interview	FGD	Interview	FGD	
URBAN CONTEXT	677	92	486	164	1,419
RURAL CONTEXT	304	47	550	55	956
HUMANITARIAN CONTEXT	75	16	106	22	219
					2,594

Table 3: Number of households surveyed per country

Country	No. of HHs surveyed	
Burundi	533	20.5%
Congo Republic	309	11.9%
DRC	512	19.7%
Côte d'Ivoire	293	11.3%
Kenya	356	13.7%
Mozambique	341	13.1%
Somalia	126	4.9%
South Sudan	124	4.8%
	2,594	**100%**

2.5. Glossary

Table 4: Type of cooking solution:

Clean cooking Solutions (CCSs)	Improved Cook Stoves (ICSs)	Traditional Cooking (TC)
• E-Cooking (from renewable energy source): electric plate, induction hob, Electric pressure cooker (EPC) • Biogas • Solar cooking • Gasifiers/Pyrolytic stoves • Gas/LPG	• ICS charcoal and firewood (Tier 3 and above) • ICS charcoal and firewood (Tier 1 and 2)	• Three stone fire (Firewood) • Traditional (inefficient) charcoal stoves

3. Main results

According to IEA, in sub-Saharan Africa, 29 countries have clean cooking fuels and technologies access rates below 20%. The region saw a continued increase in the number of people without access to clean cooking since tracking started, reaching around 990 million in 2022.

The reliance of the vast majority of sub-Saharan Africans on gathering or purchasing wood, charcoal and other biomass for cooking dramatically damages health and impairs productivity, with women and children being the worst affected (638.583 households air pollution attributable deaths in Africa in 2019[3]). The inefficient combustion of fuelwood and charcoal lead to high releases of methane and other GHGs and unsustainable harvesting also contributes to deforestation increasing further the climate impact. Achieving clean

[3] https://www.who.int/data/gho/data/indicators/indicator-details/GHO/household-air-pollution-attributable-deaths

cooking access can save up to 1.5 Gt CO2eq by 2030, 900 Mt CO2eq of which only in sub-Saharan Africa[4].

The table below show the current status of the access to clean fuels and technologies for cooking within the 8 African countries targeted by this study.

Table 5: Access to electricity and clean cooking by country

Country	Access to electricity	Access to clean fuels and technologies for cooking
Burundi	9%	Less than 1%
Congo Republic	54.5%	40%
DRC	19.1%	4%
Ivory Coast	70.4%	43%
Kenya	75%	31%
Mozambique	40%	6%
Somalia	49.3%	5%
South Sudan	7.7%	4%

3.1. Profile of the interviewed households

For the purpose of this study:

- Interviews were performed in the following locations:
  - In Burundi, in Bujumbura and Gitega (urban context), Cibitoke, Ngozi, Kayanza, Gitega and Rutana (rural context), Muyinga (humanitarian context).
  - In Congo Republic, in Pointe Noire in the districts of Mpaka, Ngoyo, Mongo Poukou, Vindoulou and in the Hinda sub-prefecture focusing on Quartier 1, Quartier 2, Quartier 3, Mboukou, Makola (urban context), in the Loango sub-prefecture focusing on Loubou (rural context).
  - In DRC in Goma, in Bunia (urban context), Kalemie (urban and humanitarian context), Idjwi (rural context).
  - In Ivory Coast, in Bouaké, Botro, Sakassou, Beoumi (urban contex), Bouaké, Brobo, Djebonoua, Diabo, Dibri-Asrikro, Languibonou, Lolobo (rural context).
  - In Kenya, in Garissa (Dadaab - humanitarian context), Meru, Nandi and Nairobi counties (rural and urban contexts).
  - In Mozambique, in Beira (urban context), Nhamatanda (urban and rural context), Dondo, Gondola, Manica (rural context) districts.
  - In Somalia, in Dhobley (rural and urban contexts) and Kismayo (urban context).
  - In South Sudan, in Luri (urban context) and Mangala (rural context).

[4] https://www.iea.org/reports/sdg7-data-and-projections/access-to-clean-cooking

- 52% of the **interviewed** households are **non-users,** i.e. households who do not yet have access to clean/improved cooking solutions; Approx. 48% are **users,** i.e. households that already have access to clean/improved cooking solutions.
- 55% of the interviewed households live in urban areas, 37% in rural areas, and 8% in humanitarian contexts.
- 52.2% (69.7% rural, 28.6% urban, 70.9% humanitarian setting) of the **interviewed non-users** use the **traditional three-stone fire (firewood)** while 43.9% (27.0% rural, 67.9% urban, 20.4% humanitarian setting) use the traditional charcoal stove; 1.9% (1.1% rural, 1.7% urban, 7.8% humanitarian setting) use built in clay stove for firewood and 1.9% other traditional cooking solutions.
- 25.5% (10.3% rural, 34.9% urban, 2.5% humanitarian) of the **interviewed users** cook with **locally made ICS for charcoal** (Tier 1 or 2); 24.4% use **LPG/gas cookers** (7.7% rural, 34.3% urban, 3.8% humanitarian); 24.0% (40.3% rural, 11.8% urban, 31.7% humanitarian) use locally made ICS for charcoal and firewood (bi-fuel – Tier 1 or 2); 10.3% (17.7% rural, 8.1% urban, 1.3%) industrialized (Tier 3 or 4) ICS charcoal; 9.5% (13.0% rural, 2.1% urban, 59.5% humanitarian) locally made ICS for firewood (Tier 1 or 2).
- Among **non-users 79.1% of the interviewed people are women** and 20.9% men; among **users, 80.0% are women** and 20.0% men.
- 36.1% of the interviewed non-user families and 37.7% of the user declared that their **head of household is a woman.**

3.2. Why do families still use traditional cooking solutions?

The first evidence of this study shows that the majority (**64.1%**) of the interviewed **non-user** families declare that they are **not satisfied with their own traditional cooking solution.** The main causes of their dissatisfactions are:

- **I spend too much on fuel** (37.7% in total; 29.8% in rural areas, 49.8% in urban areas, 28.4% in humanitarian settings)
- **It makes too much smoke** (34.5% total; 44.3% rural, 24.4% urban, 27.0% hum.)
- **It cooks too slowly** (10.6% total; 8.6% rural, 10.3% urban, 21.6% humanitarian)
- **I waste too much time getting fuel** (6.4% total; 7.5% rural, 6.5% urban, 0.0% hum.)

In particular, 67.1% of non-users who cook with charcoal deplore high fuel cost and 14.9% its cooking slowness. 51.7% of non-users who cook with firewood mainly complain about the smoke while 18.0% complain about the fuel's cost.

However, there are still many (**32.5%**; 40.3% of non-users who cook with charcoal, 25.5% of non-users who cook with firewood) respondents who are **satisfied** with their own **traditional cooking solution** due to its **ease of use** (**57.1%**); habits/traditions ("We have always used it": 9.9%) and due to the fact that fuel is available for free (9.1% in total; 14.6% in rural areas).

The non-users interviewed (without suggesting answers) seem relatively informed about clean cooking:

- **51.6%** (52.9% rural, 52.1% urban, 42.7% humanitarian) **say they know something about ICSs/CCSs** and their benefits; 65.1% (69.9% rural, 58.3% urban, 72.7% humanitarian) know that they save charcoal/firewood; 40.0% (38.1 % rural, 40.9% rural, 47.7.1% humanitarian) know that ICSs/CCSs save money; 32.7% (30.1% rural, 36.5% urban, 27.3% humanitarian) know that ICSs/CCSs save time spent in cooking; 21.0% (24.5% rural, 17.1% urban, 20.5% humanitarian) know that ICSs/CCSs reduce indoor air pollution/smokes.
- **53.2%** (50.8% rural, 68.2% urban, 17.7% humanitarian) know where to buy an ICS/CCS

In fact, 82.1% (77.4% rural, 83.7% urban, 99.0% humanitarian) of the non-users declare that they have never been targeted by a marketing or awareness raising campaign concerning clean cooking and/or improved cook stoves while the remaining 17.9% recall having been made aware and informed.

3.3. Which are the main barriers for the adoption of ICSs/CCSs?

In order to elaborate a more comprehensive analysis of the main barriers toward the adoption and sustained use of cleaner cooking solutions it is important to understand which would be the technology/fuel the surveyed non-users would possibly adopt/use.

Table 6: Which clean or improved cooking solution you would possibly adopt/use? Which is the most suitable for your family?

Preferred ICS/CCS technology	Total	Rural	Urban	Hum
Improved cook stove charcoal	33.6%	52.6%	38.1%	42.1%
Gas/LPG	15.0%	26.0%	0.0%	18.5%
Gas/LPG cooker four fires + bottle	*5.0%*	*8.2%*	*0.0%*	*5.9%*
Gas/LPG cooker one fire + bottle	*6.8%*	*10.9%*	*0.0%*	*8.0%*
Gas/LPG cooker two fires + bottle	*3.3%*	*6.8%*	*0.0%*	*4.5%*
Improved cook stove firewood	23.5%	5.2%	25.8%	15.8%
Improved cook stove bi-fuel (charcoal and firewood)	14.7%	8.7%	28.9%	13.3%
e-cooking	2.0%	3.9%	1.0%	2.8%
Electric cooker (one plate)	*0.2%*	*0.6%*	*0.0%*	*0.4%*
Electric cooker (two plates)	*0.7%*	*1.9%*	*1.0%*	*1.2%*
Electric cooker (four plates)	*1.1%*	*1.4%*	*0.0%*	*1.2%*
Clay stove built in for firewood	2.2%	0.6%	0.0%	1.3%
Other	1.1%	0.4%	4.1%	1.1%
NONE	7.9%	2.7%	2.1%	5.1%
	100%	**100%**	**100%**	**100%**

For **57.2%** of the interviewed non-user families, the most important barriers to access to improved cookstoves and clean cooking devices are linked to **economic accessibility (affordability)**: 33.4 % "I have no money" + 23.8% "They are too expensive". The second most relevant barrier concerns **lack of knowledge/awareness** (**30.4%**). The third barrier concern the lack of availability in the local market (6.3%). See details in the table below.

Table 7: Which is the main reason why you (non-user) did not buy and/or you don't use an ICS or CCS?

Reason why	Total	Rural	Urban	Hum
I don't have money	33.4%	36.9%	31.5%	23.5%
I do not know anything about clean cooking / ICSs	30.4%	30.5%	29.7%	33.3%
It is too expensive	23.8%	21.1%	25.9%	27.5%
I don't know where to buy	6.3%	5.0%	7.1%	9.8%
I'm happy with my traditional cook stove	1.0%	1.3%	0.8%	0.0%
Its lifespan is limited	0.9%	1.3%	0.6%	0.0%
The technology seems too complicated (I don't know how to use it)	0.7%	0.7%	0.8%	0.0%
I don't see why I should change	0.4%	0.6%	0.4%	0.0%
I don't know how to maintain	0.1%	0.2%	0.0%	0.0%
I don't trust it saves fuel/energy	0.1%	0.0%	0.0%	1.0%
Other	2.9%	2.4%	3.1%	4.9%
	100%	**100%**	**100%**	**100%**

79.7% of non-user that would possibly buy an LPG/gas cooking solution are concerned by its **affordability**; the same concern affects 67.7% of the non-users that would prefer an e-cooking solution, 57.5% of the ones that would buy an ICS charcoal and 42.9% of the ones that would buy an ICSs firewood.

Non-users that would buy an ICSs charcoal are also mentioning the **lack of awareness** (29.4%) which is the main critical barrier for 49.7% of the non-users that would prefer to buy an ICS firewood.

3.4. Which are the most effective drivers towards the adoption of ICSs/CCSs?

Non-users, among whom 75.2% consider it desirable or extremely desirable to buy/use an ICS/CCS, believe that the decisive aspect which would convince them would be, in order of importance:

- **Discount on the purchase price** (20.9% in total; 20.9% rural areas, 23.8% urban areas, 5.5% humanitarian context)
- **Payment in instalments** (18.5% total; 17.2% rural, 22.3% urban, 5.5% hum.)
- **Saving time for cooking** (12.4% total; 9.8% rural, 13.2% urban, 23.1% hum.)

- Understand better all benefits (10.4% total; 6.9% rural, 13.8% urban, 13.2% hum.)
- No indoor air pollution (7.1% total; 8.9% rural, 4.4% urban, 11.0% humanitarian)
- Availability on the closest market (4.8% tot.; 5.4% rural, 2.7% urban, 12.1% hum.)
- Saving time for firewood procurement (3.4%; 3.0% rural, 3.0% urban, 9.9% hum.)
- Possibility of testing their benefits (3.3%; 2.2% rural, 4.8% urban, 2.2% hum.)
- Forest protection (3.2%; 3.9% rural, 1.7% urban, 6.6% humanitarian)

In rural and urban areas, the main arguments (drivers/enablers) are linked to **financial/economic matters** (instalment payment + discount) 47.1.0% and 46.1% respectively.

Within **humanitarian settlements**, 33.0% of non-user families would be interested **in saving time** (23.1% for cooking and 9.9% for collecting firewood) and only 11.0% mentioned any affordability support. Moreover, they are the most sensitive to indoor air pollution (11.0%) and deforestation (6.6%).

It should be noted that while suggesting all the ICSs/CCSs benefits, non-users claimed to agree or absolutely agree with the following statements:

- ICSs/CCSs protect the environment (60.4%; 56.0% rural, 63.4% urb., 69.3% hum.)
- ICSs/CCSs reduce cooking costs (61.7%; 56.0% rural, 66.3% urban, 69.9% hum.)
- ICSs/CCSs protect families' health (64.8%; 61.2% rural, 67.8% urban, 69.9% hum.)
- ICSs/CCSs facilitate/improve cooking (63.8%; 58.8% rural, 68.4% urb., 68.3% hum.)
- Learning to use an ICS/CCS is easy for me (60.2% tot.; 53.5%, 66.5%, 65.7%)
- I will consider switching (buying) to an ICS/CCS (68.8% tot.; 65.1%, 72.6%, 70.3%)

Moreover, 48.1% of the interviewed non-user households declared that they are likely to be influenced by their "friends' positive opinion" for purchasing an ICS/CCS and only 41.2% think they would be influenced by their children (33.6% rural, 48.6% urban, 46.1% humanitarian).

Asked to mention the main aspects (multiple choice) which make them select their own most suitable cleaner cooking solution (Ref. Table 6 above), non-users declared the following:

- **I can save money** (54.9% in total; 48.3% rural, 64.5% urban, 43.6% humanitarian)
- **It makes less or no smoke** (42.2% in total; 47.0% rural, 36.6% urban, 43.6% humanitarian)
- I can save time because it cooks faster (32.5% in total; 37.1% rural, 30.8% urban, 14.9% humanitarian)
- It lasts longer (20.7% in total; 23.2% rural, 13.9% urban, 41.5% humanitarian)
- It saves forests/environment (11.0% tot.; 13.3% rural, 8.3% urban, 11.7% hum.)
- I save time in fuel procurement (9.7% tot.; 12.2% rural, 7.1% urban, 8.5% hum.)

- My neighbour uses it and/or recommend (9.3% total; 7.5% rural, 10.8% urban, 11.7% humanitarian)

In order to better understand what could be the most effective arguments/drivers for selling or promoting behavioural change towards the adoption and sustained use of ICSs/CCSs, it is also important to refer to the results of the questionnaires administered to families who are **already users of an ICS/CCS** (25.5% using Tier 1 or 2 ICS for charcoal; 24.4% LPG/gas cookers; 24.0% Tier 1 or 2 ICS for charcoal and firewood - bi-fuel; 10.3% industrialized Tier 3 or 4 ICS charcoal; 9.5% locally made Tier 1 or 2 ICS firewood)

It should first be noted that **92.6% of users' families say they are satisfied** with their clean cooking solution for the following reasons:

- 40.0% I can save money (47.7% rural, 38.8% urban, 19.2% humanitarian)
- 22.0% It is easy to use (14.6% rural, 24.6% urban, 28.8% humanitarian)
- 17.5% I can save time / it cooks faster (17.8% rural, 17.5% urban, 16.4% hum.)
- 7.0 It makes less/no smoke (7.0% rural, 7.4% urban, 4.1% hum.)
- 4.9 It last longer (6.6% rural, 4.2% urban, 4.1% hum.)
- 2.1% It saves forests/environment (1.4% rural, 0.6% urban, **17.8% humanitarian**)

On the other hand, the **main reasons why these households purchased and/or use** their ICS/CCS are:

Table 8: Which is the main reason why you (user) did buy and/or use your ICS or CCS?

Reason why	Total	Rural	Urban	Hum
I can save money	41.6%	43.0%	42.0%	33.3%
I can save time (it cooks faster)	20.4%	21.7%	20.7%	12.8%
It makes less/no smoke	12.4%	12.7%	12.9%	6.4%
It lasts longer	8.5%	8.7%	8.9%	3.8%
It saves forests/environment	3.6%	3.0%	2.8%	12.8%
I save time (less time wasted in firewood and charcoal procurement)	3.2%	3.7%	3.0%	3.8%
My neighbour used it and/or recommended	2.2%	2.3%	2.1%	2.6%
I'm not happy with my traditional cook stove	1.6%	0.7%	1.8%	3.8%
I like it (aesthetic), it looks good/modern	1.5%	1.3%	1.8%	0.0%
I don't see why I should not change	0.8%	0.3%	0.1%	7.7%
My relative/friend used it and/or recommended	0.8%	0.3%	1.0%	0.0%
The school/my children recommended	0.2%	0.0%	0.3%	0.0%
I care about my wife and children	0.1%	0.0%	0.1%	0.0%
Richer people use it	0.1%	0.0%	0.1%	0.0%
Other	3.0%	2.3%	2.2%	12.8%
	100%	**100%**	**100%**	**100%**

So, it is confirmed that the most effective arguments concern the **economic** and the **time savings** matters for all the contexts. Additionally, **indoor air pollution** is important for households living in urban and rural areas while forests protection for the ones living in humanitarian context.

Regarding communication and promotion of the purchase or use of their ICS/CCS, the result of the questionnaire confirms that only 39.4% have been targeted by a marketing or awareness raising campaign concerning clean cooking/Improved cook stove (63.2% rural, 31.5% urban; 15.6% hum.) through:

- Community meetings (25.6% in total; 43.0% rural, 10.6 urban; 25.0% hum.)
- Radio (14.6% in total; 15.1% rural, 15.1% urban, 0.0% hum.)
- Neighbour (13.4% in total; 9.5% rural, 16.0% urban; 25.0% hum.)
- Road show (9.9% in total; 11.7% rural; 9.0% urban, 0.0% hum.)
- Relatives (7.7% in total; 3.9% rural; 11.3% urban, 0.0% hum.)
- Sales promoter (5.0% in total; 0.0% rural; 9.4% urban, 0.0% hum.)
- Friends (4.5% in total; 0.6% rural; 6.6% urban, 25.0% hum.)

Regarding the **most effective message of the marketing campaigns**, the one that convinced them to buy/adopt their ICS/CCS, **users** report (open question) the following:

- 30.9% Fuel savings (22.5% rural, 40.2% urban, 0.0% humanitarian)
- 16.0 % It cooks faster (14.8% rural, 17.3% urban, 12.5% humanitarian)
- 14.6% Advantages of using ICS/CCS (19.5% rural, 10.6% urban, 0.0% humanitarian)
- 10.4% Sustainability (13.6% rural, 7.8% urban, 10.4% humanitarian)
- 6.7% Easy to use (6.5% rural, 6.2% urban, 25.0% humanitarian)

Regarding the persuading power of influencers, 48.6% (70.5% rural, 42.4% urban; 19.0% hum.) of respondents affirmed that someone suggested them to adopt their current ICS/CCS: 26.8% friends, 24.4% neighbours, 18.9 community leaders, 14.3% relatives. According to users' statements, the most effective message conveyed by these influencers, are the following (open question):

- 22.3% Fuel savings (20.3% rural, 23.2% urban, 30.8% humanitarian)
- 17.1% It cooks faster (16.6% rural, 17.9% urban, 7.7% humanitarian)
- 9.5% The advantages of using ICS/CCS (11.2% rural, 7.2% urban, 30.8% humanitarian)
- 9.5% ICS/CCS quality (6.4% rural, 11.4% urban, 15.4% humanitarian)
- 9.3% Sustainability (12.3% rural, 7.2% urban, 7.7% humanitarian)

It should also be noted that 95.7% of users say they are convinced and available to recommend the adoption of an ICS/CCS to relatives and friends.

Focus groups confirmed all of this information. In particular, they reported the importance of fuel savings, smoke reduction and faster cooking.

4. Recommendations

Acknowledging that there is no secret formula for promoting behavioural change, as it heavily depends on the specific context and target groups, the following recommendations have been developed based on the assumption that the results and data presented above pertain to a specific context - i.e., an imaginary typical African community - rather than to more than 20 different contexts across 8 countries.

In order to conceive, plan and implement the most appropriate strategy to promote the adoption and sustained use of ICSs/CCSs within a targeted area it would first be necessary to start from the consideration about the most suitable and desired technology. E.g. most non-user households within this imaginary community would choice a **charcoal ICS**.

As confirmed by the focus groups, this preference that also concerns rural areas is influenced by the fact that charcoal cooking is perceived as “modern” by many poor rural households but also by the fact that deforestation has obliged women and children to walk very far and spend too much time in firewood collection. Of course, this solution (moving from firewood to charcoal) is not always suitable in term of cumulated emissions and deforestation reduction but also in term of family’s expenditures.

Findings from the interviews for both ICS/CCS users and non-users (and therefore for users of traditional solutions) demonstrate that **an effective campaign** to promote behavioural change towards cleaner cooking solutions should be based on these three main messages:

1. **Fuel and money savings**
2. **Reduction of smoke / Health benefits** (Second most important aspect for non-users and third for users)
3. **Saving time for cooking and collecting wood** (Second most important aspect for users and third for non-users)

Messages to promote cooking behavioural change should also highlight the **easy-of-use** of the proposed cleaner solution. In fact, users and non-users mentioned this aspect as one of the main reasons of satisfaction of their current cooking solution.

Based on users’ experience, the **most effective instruments/channels** for disseminating these messages appear to be:

1. Neighbours, families, friends (Influencers)
2. Community meetings
3. Tv / Radio

Concerning marketing and sales levers, the **economic and financial proposition** represents by far the most important key to any initiative to promote the purchase of an ICSs/CCSs. The largely preferred promotional tool is a **discount on the purchase price** followed by a **payment in instalments’** offer.

In general, any ICSs/CCSs promotion campaign should carefully consider the **gender issue**: on the one hand to enhance the role of women as promoters of behavioural change while reinforcing their dignity, independence and decision-making power; on the other hand, to involve men in kitchen tasks. In fact, the main family's cooker remains a woman (mother, daughter, grandmother, employee) in 86.6% of the **non-user households interviewed** and the main fuel buyer/collector is a woman.

Clean cooking behavioural change activities should be comprehensively conceived as gender transformative and not only gender sensitive or gender responsive, i.e. initiatives designed around the fundamental aim of addressing root causes of gender inequality within society (e.g. Women and girls spend much more hours per week doing house work activities strictly linked to the use of cooking stoves - collecting fuel, water, preparing meals – than men) or parental training built to overcome context specific gender stereotypes (e.g. girls/women as the "natural" family's cooker).

The gender issue becomes even more important because in the areas targeted by this study, 58.0% of users and 65.0% of non-users assure that it is the woman who makes the decisions regarding the type of stove and fuel to be used while 23.2% of users and 14.4% of non-users say that the decision is taken jointly. As we can see, **women decision making power concerning cooking fuels and solutions is largely wider within families that already use an ICS/CCS** than within non-user families. Of course, these results may be influenced by the fact that 79.1% of the non-user and 80.0% of the user people interviewed was a woman.

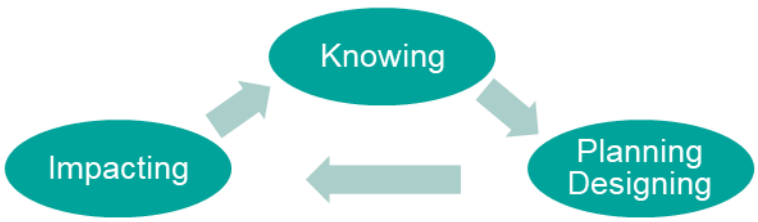
According to the focus groups that involved users and non-users together, **a good ICS** owns the following **features**:

1. Quality production material (iron, steel)
2. Weight and steadiness
3. Long lifespan, resistance

We should also remark that some people use their stove for heating purpose in winter.

Finally, focus groups revealed that ICSs/CCSs are perceived as products for "rich families" and "clever/intelligent" people and therefore a campaign or promotion could also focus on the democratization of this product, i.e., on the **achievement of a higher social status**. In addition, the persuasive power and authority of influencers should be used.

A realistic and comprehensive knowledge of consumer behaviour in a specific context should inform not only the design of any marketing and behavioural change initiative, but also its implementation phase. It is therefore recommended to establish procedures to constantly improve these initiatives through lessons learned and consumers' insights gained during their implementation.



5. Lessons learnt on behavioural change

Before introducing some general considerations concerning behavioural change promotion, it is essential to remark that "behaviour change campaigns are often important for driving adoption and disuse (of traditional cooking methods - Ed.), but cannot drive sustained use if products (cleaner technologies – Ed.) do not start with a **solid value proposition**"[5].

Sector's practitioners are generally convinced that they are promoting a solution for daily cooking that is much healthier, endorses savings and holds many other indisputable benefits for the end-user. Nevertheless, they all experience difficulties and challenges to convince non-users to adopt a manifestly and holistically more beneficial cooking behaviour. One of the grassroots causes of this apparently "irrational" behaviour by non-users is that too often the above-mentioned benefits are not perceived as "crucial" or they are really not as "indisputable" as practitioners may think when considering non-users' perspective.

In fact, in the previous chapters we examined sector-specific barriers and drivers towards the promotion of cleaner cooking behaviours but there are other crucial and tough **"external" barriers** to overcome that could not be commonly addressed by a short-term clean cooking intervention, namely, i) traditions, habits and local culture, (ii) consumers' self-perception and (iii) lack of basic education[6].

On the other hand, AVSI's experience shows that awareness raising and behavioural change campaigns towards ICS/CCS adoption can contribute to improve consumers' self-esteem and consciousness about their dignity and value by turning them more informed, autonomous and protagonists of their life. A more conscious, valued and informed consumer may consequently change her/his cooking behaviour even in the short-term with less or no efforts and investments by clean cooking sectors players. This is exactly what happened with Ivette, a woman that lives in a very remote rural village in Côte d'Ivoire. She has changed from the three-stone-fire to LPG cooking "simply" because she cares about herself: "*No one promoted LPG adoption in this area. No behavioural change campaigns. The fact is that once the forest was very close meanwhile now I should walk hours to collect wood. Moreover, with LPG I cook faster. My time is precious and my eyes are not burning anymore*".

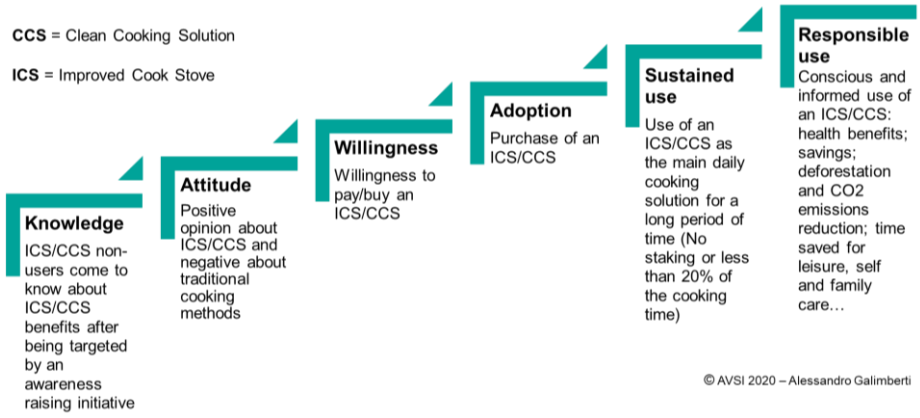
Similarly, it is impossible to foresee all outcomes produced by a raised awareness about the importance of women and children's health and time. The same could happen through the provision of a basic financial literature course that would allow women to calculate and valuate savings from ICS/CCS adoption… AVSI experienced that the promotion, adoption and sustained use of cleaner cooking solutions could lead to unpredictable positive and holistic impacts in term of **integral human development**.

[5] Clean Cooking Alliance / Dalberg. Clean Cooking Sector Strategy, Presentation of key findings: Systemic challenge #1, October 2020
[6] A. Galimberti et al. (2021), Behavioural change promotion toward cleaner cooking solutions. EnDev Learning & Innovation.

All behavioural change initiatives are led by and addressed to human beings inserted into specific cultural, geographical, social, historical, and economic contexts. Although behaviour dynamics can be similar (social thinking and aspirations, mental models, automatic thinking), the same mix of behavioural changes activities (inputs) may result in very different outputs and outcomes, dramatically above or below expectations compared to previous experiences.

Consistently, we insisted and we insist on the importance of a prior assessment of the local cooking behaviour determinants as we did in this study. Apart from the approach applied for this study, there is abundant literature that can provide useful guidelines for human behaviour analysis, psychological and social patterns and that can inspire and inform approaches for clean cooking project implementation. Another classical behavioural change approach is the KAB[7] originally applied to education and health sectors.

However, since the target group of our sector is composed of "beneficiaries" that technically should be considered as "consumers", we should also take in consideration marketing aspects and more comprehensive consumer behaviour theories[8]. Here below, we designed a simple clean cooking behaviour ladder as an example of a behavioural change process for a consumer-beneficiary.

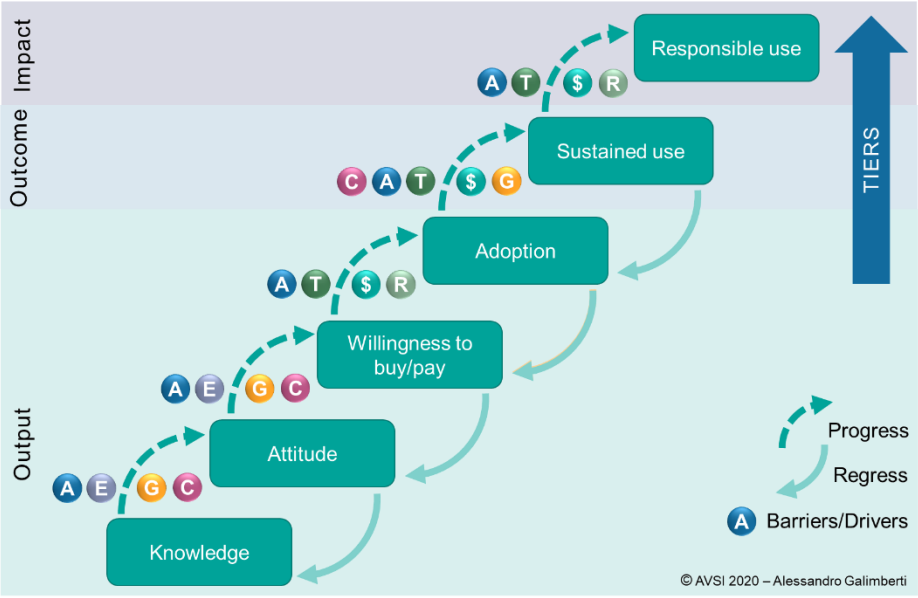


The desired impact from any behavioural change initiative is reached when a consumer is persuaded that traditional cooking methods are not sustainable and/or healthy and/or convenient for her/him, for her/his family and community. Once this happens, the consumer will likely reach at least the "sustained use" level, where the clean cooking solution becomes the most commonly used cooking method, e.g., used over 80% of the time.

[7] Bruvold, 1990; Byrd-Bredbenner, O'Connell, & Shannon, 1982; Coyle,Basen-Engquist, Kirby, Parcel, Banspach, & Harrist, 1999; Donovan, & Singh, 1999Heppner, Humphrey, Hillenbrand-Gunn, & DeBord, 1995;Kapoor, 1989; Kirby, 1985; Lawless, Brown, & Cartter, 1997;Looker, & Shannon, 1984; Miller, Booraem, Flowers, &Iversen, 1990.

[8] See, as a matter of example, "Progression through the stages of change" based on a diagram from Atkins (2009) in Using the transtheoretical model of behavioural change to understand the processes through which climate change films might encourage mitigation action - Rachel A. Howell, Institute of Geography and the Lived Environment, School of GeoSciences, The University of Edinburgh

Nevertheless, the above representation is incomplete because in reality consumers, especially the ones living in vulnerable contexts, can either progress up or regress down the ladder due to, for example, unforeseen events (natural disaster, economic crisis – objective causes) or to personal problems (lack of money to replace the clean cooking solution or to periodically pay for its use – subjective causes). The figure below tries to illustrate consumer's behavioural change by introducing this more realistic dynamism and the determinants (barriers and/or drivers[9]) that can ease or prevent consumers progress or even leapfrogging.



Only the last stage, "Responsible use" can be considered a permanent or acquired status. Where responsible means also informed, conscious and aware. Once a consumer reaches this point, we could consider that he will see any possible non-clean cooking behaviour he adopts in the future as temporary and caused by a specific reason that he will try to remove as soon as possible. In this case, the other barriers may still be present and possible support to the consumer will not target awareness or behaviour, but availability and affordably promotion.

Once the dynamic of consumer behaviour towards clean cooking solutions is represented, practitioners' main question is: "How can I support non-users to progressively climb these steps?" Or simply: "How to promote cleaner cooking behaviours in households, social institutions, communities, countries?" The present study provided some inspirational information and recommendations for a specific context. Generally speaking, the more we know the targeted households/communities (consumers) and the more holistic the approach the most effective the behavioural change campaign towards the adoption and sustained use of cleaner cooking solutions.

[9] Barriers/Drivers: A = Awareness; $ = (Economic) Affordability; T = Technology (Acceptability and Availability); E = Education (Socio-demographic); G = Gender (Socio-demographic); C = Culture, habits and shared values (Socio-demographic); R = Regulation, legislation and policies

Annex 1: References - Main sources used for each construct and study methodology

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Published by: AVSI FOUNDATION – August 2024

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In collaboration with ENI for data collection in Côte d'Ivoire, Congo Rep. and Mozambique and EnDev for data collection in DRC and Burundi

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