Cooking behaviour study

Main barriers and drivers towards the adoption of cleaner cooking solutions by households in Sofala and Manica provinces (Mozambique)

January 2025

Summary

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

Executive summary

Please refer only to Chapters 3 and 4 (Pages 7-12)

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

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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 and sustainable 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

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

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.

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.

In Mozambique, the number of people surveyed with structured interviews and FGDs are indicated below. The interviews and FGDs occurred from November 2023 to February 2024.

Table 2: Number of people surveyed

	USERS		NON USERS		TOTAL
	Interview	*FGD*	*Interview*	*FGD*	
URBAN CONTEXT	100	7	62	11	180
RURAL CONTEXT	0	9	141	11	161
					341

2.5. Glossary

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

In Mozambique, approximatively 40.0% of the population has access to electricity through grid or mini/off-grid systems[3]. 68.4% of the population relies on biomass for daily cooking – 90.1% in rural areas and 31.7% in urban areas[4]. In Sofala Province, 73.2% of the rural population cooks with firewood, while 26.8% uses charcoal. In urban areas, 70.0% rely on charcoal and 5.0% on firewood. In Manica Province, 76.2% of the rural population depends on firewood, and 23.8% on charcoal. Among urban residents, 70.0% use charcoal, while 10.0% rely on firewood[56].

According to the World Bank[7], 74.4% of the Mozambican population lives below the extreme poverty line, meaning they survive with less than 2.15 USD per person per day in PPP terms.

For the purpose of this study:

- 53.7% (70.2% rural, 16.1%) of the interviewed **non-users** (households who do not yet have access to clean/improved cooking solutions) use the traditional three-stone fire (firewood) while 44.3% (29.8% rural; 77.4%) use the traditional charcoal stove; and 2.0% other cooking solutions.

- The interviewed **users** (households that already have access to clean/improved cooking solutions) are all located in urban areas. 42.0% of them use LPG/gas cookers; 27.0% industrialized improved cook stoves (charcoal); 25.0% electric cookers; 5.0% artisanal improved cook stoves charcoal.

- Among users, 74.0% of the interviewees are women and 26.0% men; among non-users 71.9% are women and 28.1% men.

- 52.9% of the interviewed families declared that their **head of household is a woman** (59.7% among users, 48.1% non-users).

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[3] https://www.iea.org/countries/mozambique
[4] WHO (2021)
[5] INE National Institute of Statistics
[6] AVSI Internal elaboration on primary data (2022)
[7] World Bank (2022)

3.1. Why do families still use traditional cooking solutions?

The first evidence of this study concerns the fact that the majority **(82.8%) of non-user** families living in Sofala and Manica provinces declare that they are **not satisfied with their own traditional cooking solution.** The main causes of their dissatisfactions are:

- **it produces too much smoke** (58.9% in total, 71.7% in rural areas and 27.1% in urban areas);

- **the cost of buying fuel is considerable** (29.2% in total, 16.7% in rural areas and 60.4% in urban areas).

In particular, 75.0% of non-users who cook with charcoal complain about its cost while 86.0% of non-users who cook with firewood (mostly collected for free in the forest or woods) mainly criticize the smoke it produces. Surprisingly, only a small percentage of firewood users (1.9%) complain about the time spent collecting it.

However, some **respondents (17.2%) remain satisfied** with their own traditional cooking methods, (primarily) due to its **ease of use (68.6%)** and, in the case of charcoal, the affordability of stoves (20.0%).

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

- **62.1%** (similar percentage in both urban and rural areas) **say they know something about ICSs/CCSs** and their benefits: 65.1% know that they allow to save charcoal/firewood, but only 23.0% realize that this also means saving money; 38.1% know that they prevent intoxications/cough, 27.0% that they allow to save time on cooking, 24.6% that they reduce indoor air pollution/smoke; 8.7% that they reduce deforestation; 1.6% that they last longer.

- **Only 38.9%** (34.0% within rural areas, 50.0% in urban areas) know where to buy an ICS/CCS.

In fact, 48.0% 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 52.0% recall having been made aware and informed, especially by promoters in their houses (35.6%), by relatives (27.1%), and by neighbours (11.9%).

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

According to **60.9%** of non-user families living in these provinces of Mozambique, the most important barriers to access to improved cookstoves and clean cooking devices are linked to **economic accessibility (affordability)**: 53.0 % "I have no money" + 7.9% "They are too expensive". The second most relevant barrier concerns **lack of knowledge/awareness**: "I don't know anything about ICSs/CCSs" **(28.7%)**. The third barrier concerns the availability of ICSs/CCSs in the local market: "I don't know where to buy it" (6.9%).

In rural areas, concern for the cost of ICSs/CCSs is even greater. 63.1 % of people think they do not have sufficient money or that they are too expensive, while in the urban area

this percentage is reduced to 55.8 %. On the other hand, the lack of knowledge is cited by 33.0% of urban non-users.

Focus groups highlighted that people are worried about ICSs/CCs problematic and costly maintenance and reparation.

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

Non-users, among whom 92.2% 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** (**27.2%;** 28.6% rural, 24.2% urban)

- **No indoor air pollution** (23.3%; **27.1% rural**, 14.5% urban)

- **Saving time on cooking** (13.0%; 9.3% rural, **21.0 urban**)

- **Payment in instalments** (11.0%; 7.1% rural, **19.4% urban**)

- Opportunity to test benefits (9.4%; 8.6% rural, 11.3% urban)

The main (38.2% cumulatively) arguments (drivers/enablers) seem to be linked to economic reasons (especially in the urban area with 43.6%), but 21% of people living in urban areas are also interested in saving time. On the other hand, 23% of people living in rural areas are attracted by the chance to reduce indoor air pollution (health benefits).

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

- ICSs/CCSs protect the environment (71.4%)

- ICSs/CCSs reduce cooking costs (72.0%)

- ICSs/CCSs protect families' health (68.3%)

- ICSs/CCSs facilitate/improve cooking (77.3%)

- Learning to use an ICS/CCS is easy for me (60.0%)

- I will consider switching to (buy) an improved stove (66.1%)

Moreover, 53.7% say they are likely to be influenced by "people who are important to me" in purchasing an ICS/CCS and 54.2% think they would be influenced by their children.

Finally, 63.6% (63.1% rural[8]; 64.5% urban) of the non-users consider the **charcoal ICS as the most appropriate and suitable cleaner cooking solution for their family**; 13.8% (18.4% rural; 3.2% urban) would opt for firewood ICSs; and 11.3% for an **electric cooker** with 4 or 2 plates (7.1% rural; **21.0% urban**). As an additional remark, it may be useful to note that in urban areas, 8.1% non-user families would adopt gas cookers with 1, 2 or 4 plates.

Asked to mention the main aspects which make them select their own most suitable cleaner cooking solution, the interviewees declared the following:

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[8] This result is most probably influenced by the fact that charcoal is considered a socioeconomic status symbol by many rural families using the traditional three stone fire (firewood).

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- **It does not produce smoke** (61.6%; 67.4% rural, 48.4% urban)
- **I can save money** (51.2%; 49.6% rural, 54.8% urban)
- I can save time because it cooks faster (45.8%; 48.2% rural, 40.3% urban)
- My relatives/friends use it and/or recommend it (13.3%; 12.1% rural, 16.1% urban)
- I can save time in charcoal/firewood procurement (11.8%; 13.5% rural, 8.1% urban)
- It contributes to the conservation of forests and the environment (11.8%; 14.2% rural, 6.5% urban)
- I am not satisfied with my traditional cook stove (8.9%; 9.9% rural, 6.5% urban)

Remarkably, 16.4% of urban non-users mentioned neighbours as potential influencers vs 2.1% of rural non-users. **Almost none (3.4% in total) expressed concerns about the health of their wife/children**.

In order to better understand what could be the most effective arguments/drivers for selling or promoting behavioural change towards the adoption of ICSs/CCSs, it is also important to consider the results of the questionnaires administered to families who are **already users** of an ICS/CCS (42.0% LPG/gas; 27.0% industrialized ICSs charcoal; 25.0% electric cookers; 5.0% artisanal ICSs charcoal) and **live in urban areas**. It should first be noted that 90.0% of families say **they are satisfied** with their clean cooking solution for the following reasons:

- 37.4% It is easy to use
- 26.4% I can save time because it cooks faster
- 24.2% I can save money
- 4.4% It produces less/no smoke

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

- 39.0% I can save money
- 39.0% I can save time/it cooks faster
- 10% It produces less/no smoke

So, it is confirmed that, for urban families, the most effective arguments are economic and time-related.

Regarding communication and promotion of the purchase or use of their ICS/CCS, the result of the questionnaire confirms that 52.0% of users were targeted by marketing campaigns and 57.7% claimed to have followed the advice from someone: promoter in my house (38.5%); relatives (30.8%); friends (9.6%); neighbours (7.7%).

It should also be noted that 96.0% of users say they are convinced and available to recommend the adoption of an ICS/CCS to relatives and friends.

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:

- 34.6% Money savings

- 25.0% Fuel savings
- 21.2% Faster cooking
- 11.5% Easy to use

Regarding the most effective message conveyed by influencers (people who convinced 53% of them to buy/adopt their ICS/CCS) users report (open question) the following:

- 28.3% Money savings
- 24.5% Fuel savings
- 22.6% Faster cooking
- 11.5% Easy to use

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

4. Recommandations

Being aware that there is not a secret formula for behavioural change promotion as it strongly depends on specific context and targets, in order to design and implement the most appropriate strategy to promote the adoption and use of ICSs/CCSs within the areas targeted by this study it would first be necessary to start from a consideration: most non-users (63.1% in rural areas and 64.5% in urban areas) would choose the **charcoal ICS** as cooking solution for their families. As confirmed by the focus groups, this "bizarre" data concerning rural areas is influenced by the fact that charcoal cooking is perceived as modern by many poor rural households currently cooking on the traditional three stone fire. Of course, this solution (moving from firewood to charcoal) is not suitable in term of cumulated emissions and deforestation reduction but also in term of family's expenditure. It is interesting to highlight that the second most desired cleaner technology within **urban areas** is the **electric cooking** (21.0%) and, specifically, the two or four hotplates electric cookers.

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. **Reduction of smoke / Health benefits** (perceived as crucial mainly by non-users)
2. **Saving fuel and money** (perceived as crucial by users and non-users)
3. **Saving time for cooking and collecting wood** (perceived as crucial by users and non-users).

Messages to promote cooking behavioural change should also highlight the **ease of use** of the proposed cleaner solution. In fact, both – users and non-users – widely 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. Door-to-door promoters

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

In addition, generally speaking, any ICSs/CCSs promotion campaign should also 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 and fuel buyer/collector in many cases is still a woman (mother, daughter, grandmother, employee) in 99% of the households interviewed.

The gender issue becomes even more important because in the areas targeted by this study, 57.0% of users and 40.9% of non-users assure that women are the ones who make decisions regarding the type of stove and fuel to be used. 22.0% of users and 15.3% of non-users say that the decision is taken jointly. As we can see, **women's decision-making power concerning cooking fuels and solutions is largely wider within families that already use an ICS/CCS** than within non-user families.

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

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

We should also remember that people use their stove for heating purpose during winter.

To conclude, focus groups told us that ICSs/CCSs are perceived as products for "rich families" and "clever/intelligent" people. Therefore, campaigns or promotions 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 leveraged.

In all cases, a realistic and comprehensive knowledge of consumer behaviour in a specific context should guide not only the design of marketing and behavioural change initiatives, but also their implementation. It is therefore recommended to establish procedures for continuously improving these initiatives based on lessons learned and consumers' insights gathered during implementation.
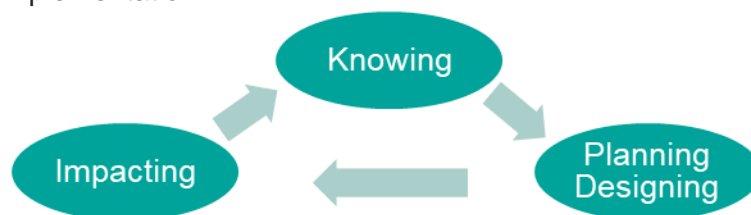
5. Lessons learnt on behavioural change

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**"[9].

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[10].

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**.

All behavioural change initiatives are led by and addressed to human beings inserted into specific cultural, geographical, social, historical, and economic contexts. Although

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

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[11] 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[12]. Here below, we designed a simple clean cooking behaviour ladder as an example of a behavioural change process for a consumer-beneficiary.
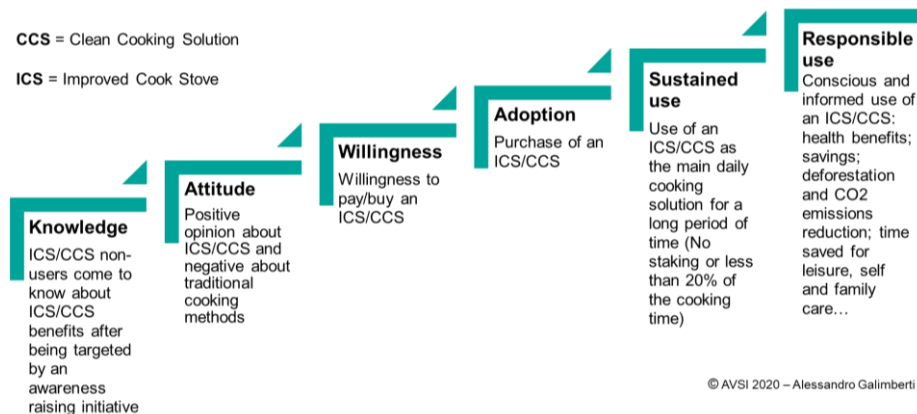

The desired impact from any behavioural change initiative is reached when a consumer is persuaded that traditional cooking methods are not sustainable and/or healthy and/or convenient for her/him, for her/his family and community. Once this happens, the consumer will likely reach at least the "sustained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

Nevertheless, the above representation is incomplete because in reality consumers, especially the ones living in vulnerable contexts, can either progress up or regress down

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[11] 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.

[12] 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

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[13]) that can ease or prevent consumers progress or even leapfrogging.
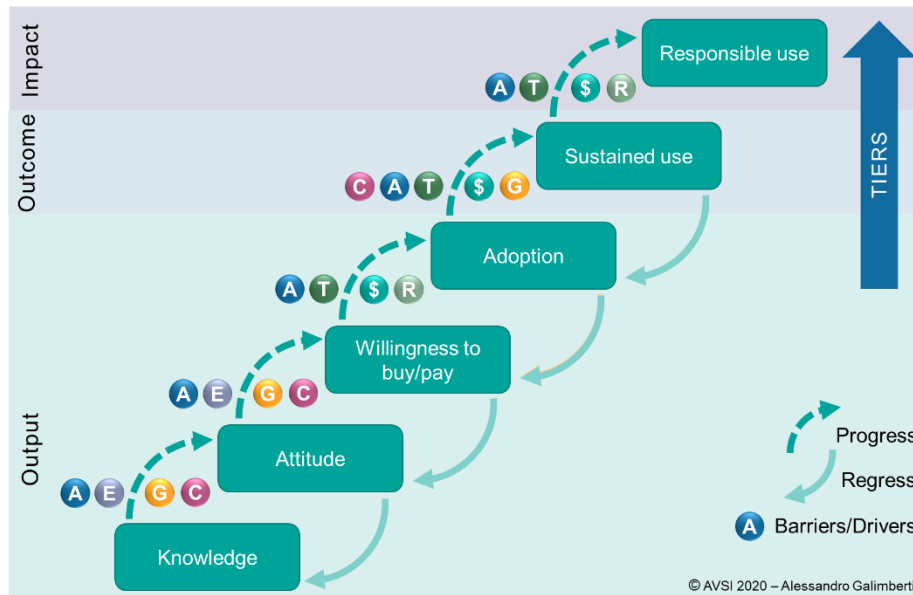
Only the last stage, "Responsible use" can be considered a permanent or acquired status. Where responsible means also informed, conscious and aware. Once a consumer reaches this point, we could consider that he will see any possible non-clean cooking behaviour he adopts in the future as temporary and 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.

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[13] 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

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