



FINDINGS REPORT: THE SOCIAL AND CULTURAL CONTEXT OF CLEAN COOKSTOVE PROJECTS IN ANDHRA PRADESH

January 2018

Gregory Simon
Emily Anderson, Brendan Berve
Marcelle Caturia, Cody Peterson, Isaac Rivera
University of Colorado Denver

ACKNOWLEDGEMENTS

University of Colorado Denver

Department of Geography and Environmental Sciences

National Science Foundation

Nafisa & Siddharth and the entire Laya staff

Pradeep & NS and the entire Samuha staff



University of Colorado
Denver



TABLE OF CONTENTS

Introduction	4
Study Background	5
Overview of Significant Findings	6
Fuel Collections	7
Time Savings, Daily Routine, & Social Networks	18
Cookstove Costs & Benefits	34
Climate Change	42
Water Filter	49



INTRODUCTION

This research examines important social and cultural aspects of domestic stove use and clean cookstove adoption in the State of Andhra Pradesh. Throughout India and other parts of the developing world, rural villages are participating in programs that distribute cleaner cookstoves to households in order to promote rural development and improved health, living and environmental conditions for local residents. Insights from this study were generated in order to better understand the practices, needs and priorities of households in Andhra Pradesh as they encounter these stove-based development projects and as they transition from traditional to improved stoves.

Much of the existing research on clean cookstoves focuses on emissions testing, public health benefits, or local economic effects. There has been considerably less attention given to the nuances of individual cooking behavior, fuel collection activities and village/domestic social dynamics that may influence household compatibility of new cookstoves and, ultimately, the success of these projects. More detailed knowledge of cooking and fuel collection practices can help NGOs and financiers better measure actual fuel/emissions savings, as well as understand subtle cultural barriers to stove uptake, thus improving the use and efficacy of improved stoves.

While the findings presented here by no means cover all social and cultural factors, study results are illustrative of important household nuances and reflect the need for greater fine-grained analysis of specific project sites – locations that each present their own unique ecological, spiritual, demographic, cultural, labor and socio-economic characteristics. We hope this study will (a) provide useful findings that demonstrate both successes and challenges with stove distribution in Andhra Pradesh and (b) spur similar place-based and household-focused studies in other locations to improve the outcomes of future improved cookstoves projects for household members and participating organizations.



STUDY BACKGROUND

This research was conducted through a partnership between the Laya organization (Andhra Pradesh, India) and American researchers from the University of Colorado Denver (Denver, Colorado, USA). The project was funded through the National Science Foundation, a US government institution which funds independent academic research in the United States and abroad (Geography and Spatial Sciences Program, Award Number: 1539746). The head of the American research team is Dr. Gregory L. Simon, who has considerable experience in India conducting social science research on the promises and challenges of clean cookstove projects. He has served as an advisor to the United Nations Foundation Global Alliance for Clean Cookstoves Finance and Investment Working Group (2010-2012). Dr. Simon is an Associate Professor in the Department of Geography and Environmental Sciences at the University of Colorado Denver. This research was also carried out by five graduate students in the Masters of Geography and Applied Geospatial Sciences Program at the University of Colorado Denver.

The majority of the data was collected through a detailed, 170 question survey about the cooking habits, daily routines, and fuel collection practices of household receiving clean cookstove, as well as a control group not receiving an improved stove. These surveys were designed by the American researchers, but conducted in village households by Laya field staff. Most participants live in the villages surrounding Paderu in Andhra Pradesh where Laya works directly with thousands of households on a variety of local development projects. Altogether, 680 surveys and 109 control surveys were collected between June 2016 and September 2017. In addition, the American research team coordinated 5 open-ended focus groups with female stove users in order to enhance insights from the surveys. Interviews were also conducted with Laya employees who install stoves and manage projects in order to better understand the challenges of stove implementation.



OVERVIEW OF SIGNIFICANT FINDINGS

According to stove users, clean cookstoves do save noticeable amounts of time and fuel.

Although total time savings are often small, they can still change and improve women's daily routines by allowing multitasking while cooking and making time to socialize.

Because the stove can burn smaller pieces, improved stoves reduce the distance women must walk to collect fuel.

The time saved collecting fuel allows women to collect other forest items, improving their livelihoods and perhaps their income.

Cookstove projects may help households become exposed to other types of projects that increase their resiliency to climate change, such as sustainable agriculture.

Stove users can and do adapt their ritual practices to the new, improved stoves. Hence, in this area cultural practice around stoves is not a major barrier to stove uptake.

Many stove users note that the stoves are not large enough for certain occasions like festivals when women must cook for dozens of people. So more or larger burners which can accommodate larger families may be important for better stove compatibility.





FUEL COLLECTIONS

INTRODUCTION

Because of their greater heat efficiency, improved or clean cookstoves significantly reduce the amount of fuel required to boil water or cook a meal. These fuel savings can have many benefits for individual households as well as for the local environment. These results demonstrate that improved cookstoves do indeed save time and energy for women by reducing the frequency of fuel collection, the amount of time it takes to collect on each outing, as well as the distances they must walk to locate fuel. While these actual time savings may only amount to a few hours a week for many women, the stove does add meaningful conveniences to women's daily routines and improve their quality of life by giving some extra time to work in their fields, rear their children, socialize with friends, and watch television.

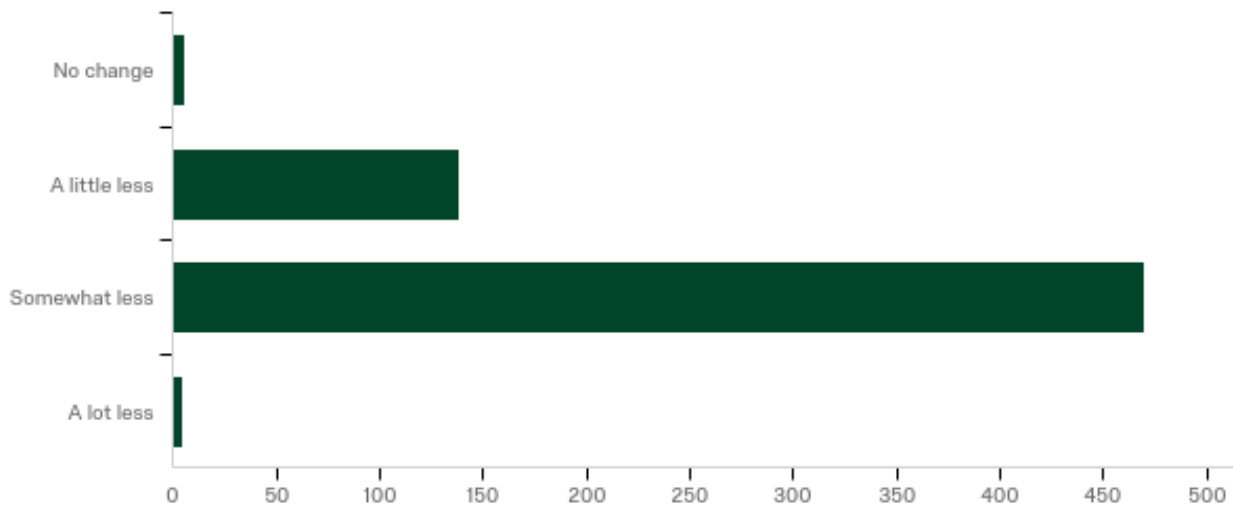
The improved stove makes it significantly easier to locate fuel because smaller pieces like branches can be used instead of logs which are more scarce and take more effort to procure. This means women spend less time and effort collecting fuel, and are able to locate viable pieces much closer to their homes. The use of smaller pieces almost certainly means that women have to cut down less live trees, instead using small twigs from the ground and branches, putting less stress on local vegetation.

Moreover, our results provide strong evidence that fuel savings allow women to spend more time collecting other items from the forest, which can enhance their quality of life as well as their income, as many women do sell these products at market. We also discovered that fuel collection is very much a social activity among women, as they not only help one another cut and lift wood pieces but also have the opportunity to gossip, joke, and relax with one another. This indicates that although fuel savings may only save a moderate amount of literal time, it can improve women's quality of life in nuanced ways.

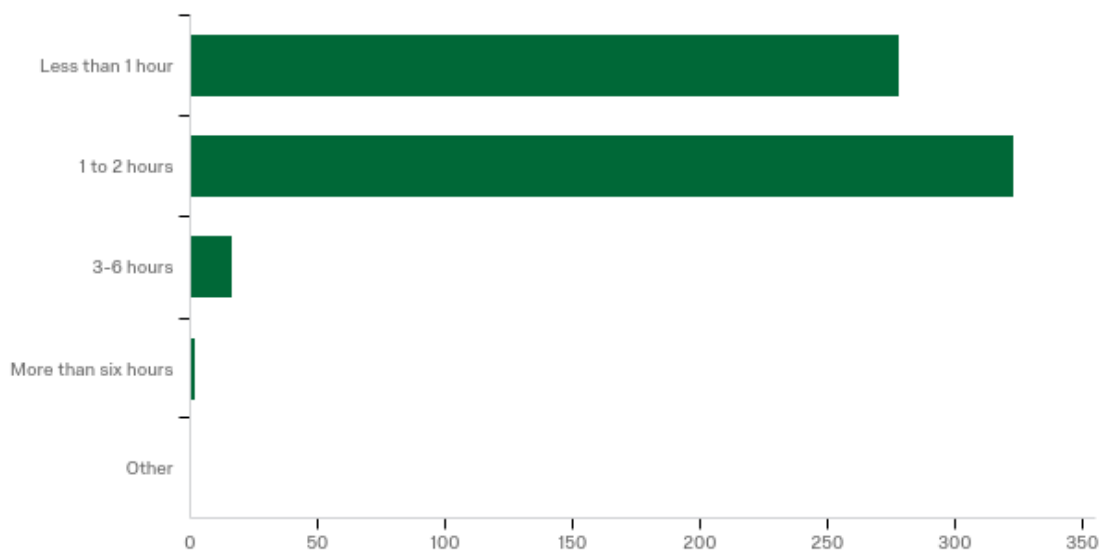
In addition, an inventory of fuel types used by households in these villages illustrates that every household has a diverse and unique set of fuel types and fuel sources. In trying to understand the effects of fuel collection on the local vegetation, as well as the emissions produced by stoves, attention to variability in fuel choice is very important. This further reiterates the idea that most women very much value having customizable choices in fuel---NGO's will likely have to account for this desire for choice in their project management. Overall, stove users report that the improved stove has in fact saved them a significant amount of time and fuel compared to the old stove, and they are very much pleased with their improved stove.



Q22a. How much less time do you spend collecting firewood since receiving the new stove?



Q22b: On each outing, how much less time do you spend collecting firewood since getting the new stove?

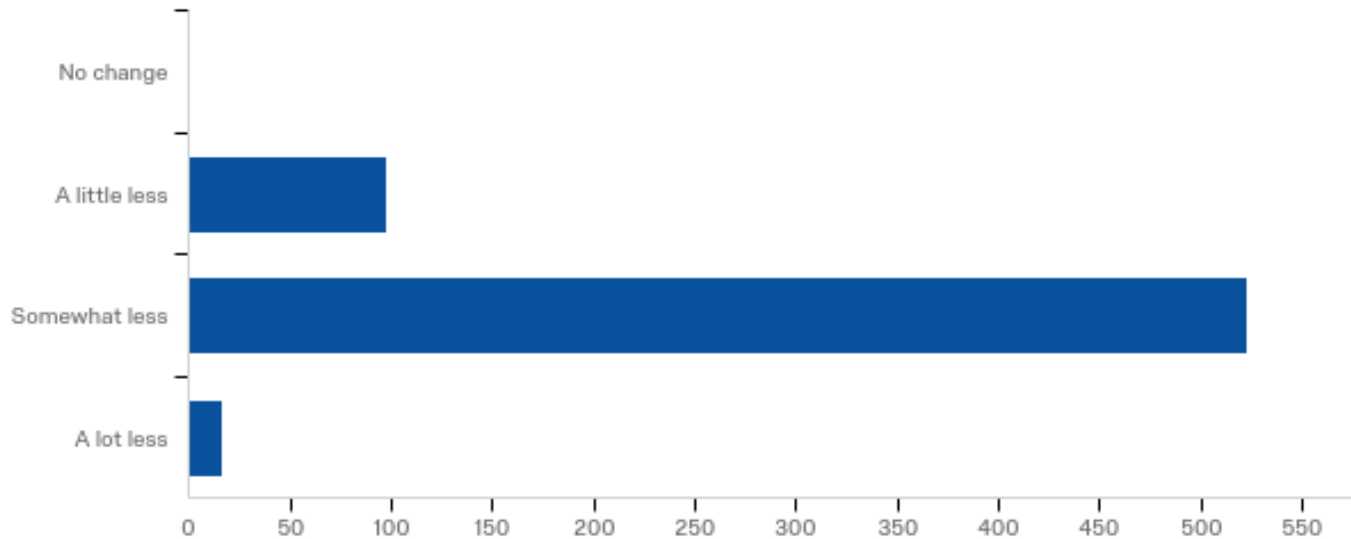


While respondents confirm that they do indeed spend less time collecting fuel since receiving the improved stove, many people note that the time savings are only moderate, not immense or life changing (this is corroborated by our focus groups). Most say that they save 1-2 hours at most, which is significant but won't necessarily alter one's livelihood in a substantial way.

When asked what they do with their new free time, women tended to describe finishing other chores, working in the fields or neighbor's fields, gossiping with friends, or taking care of their children, rather than more entrepreneurial or income generating activities. Therefore, we should reconsider what time savings actually mean for women and the different ways that free time might be utilized by women.

Now we have much extra time to use as we choose, whether NRGs, for agriculture, or whatever, it's our time (Female Stove User).

Q23b. How much less firewood do you use since receiving the new stove?

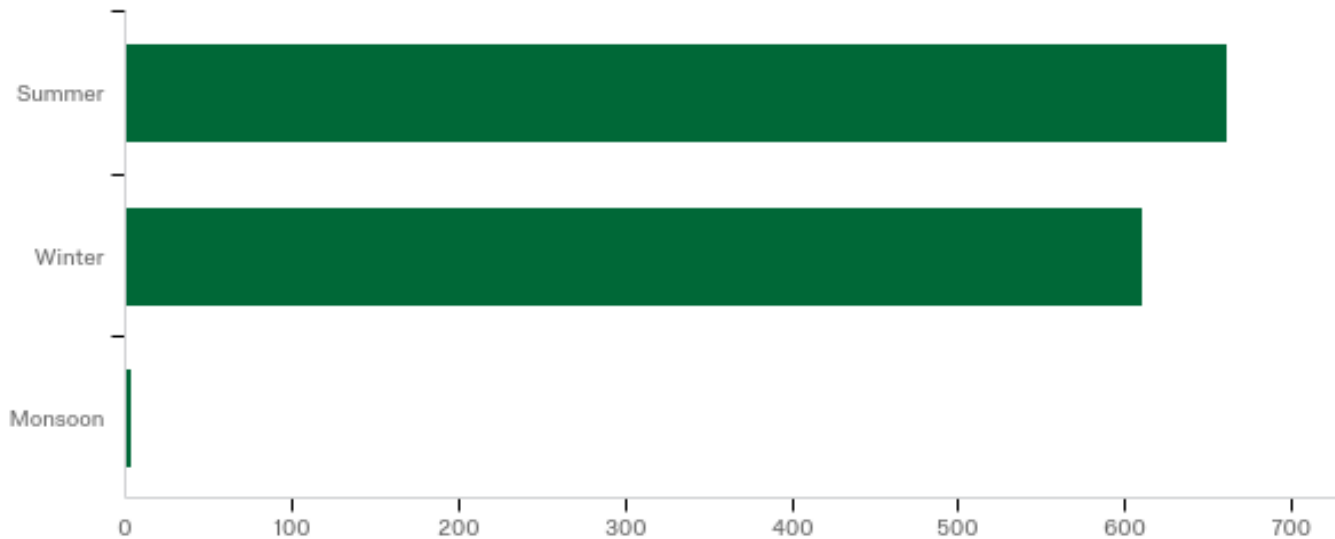


Nearly everyone confirms that they indeed save fuel with the new improved stove, which indicates that stoves likely do reduce the amount of fuel extracted from the local environment and may make households less vulnerable to fuelwood scarcity.

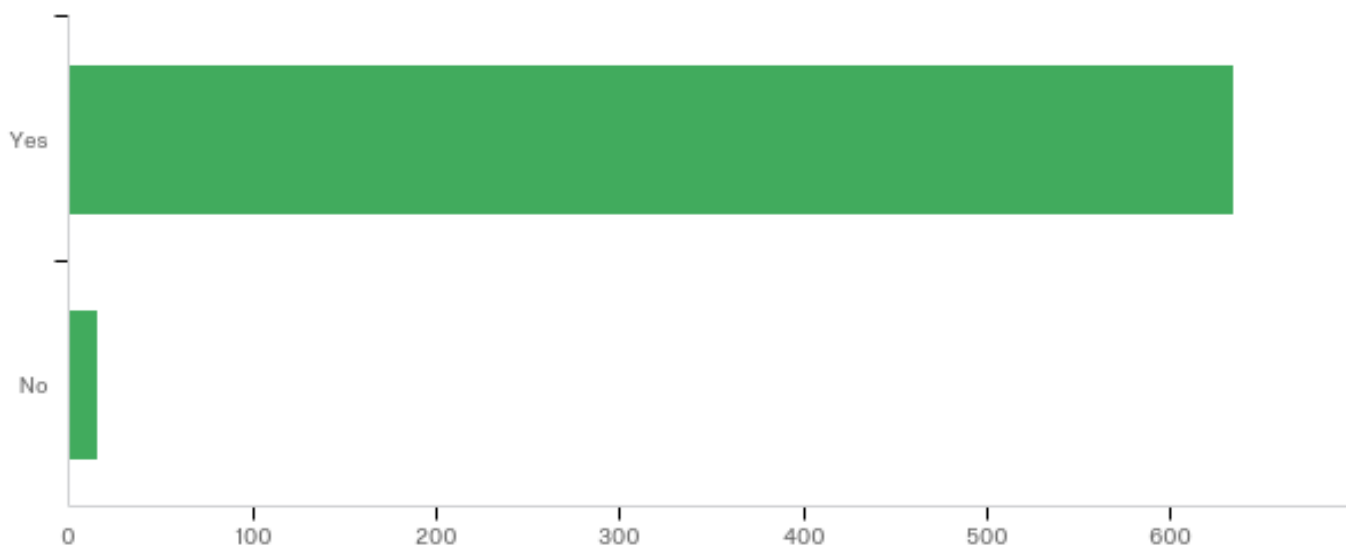
One change is that the wood size has decreased, so we travel less distance to collect wood because the type of fuel that we collect can be smaller more like twigs and things, so it is much easier to find near my village. Now then I have more time for myself and with my family (Female Stove User).



Q19: In what seasons do you collect firewood?

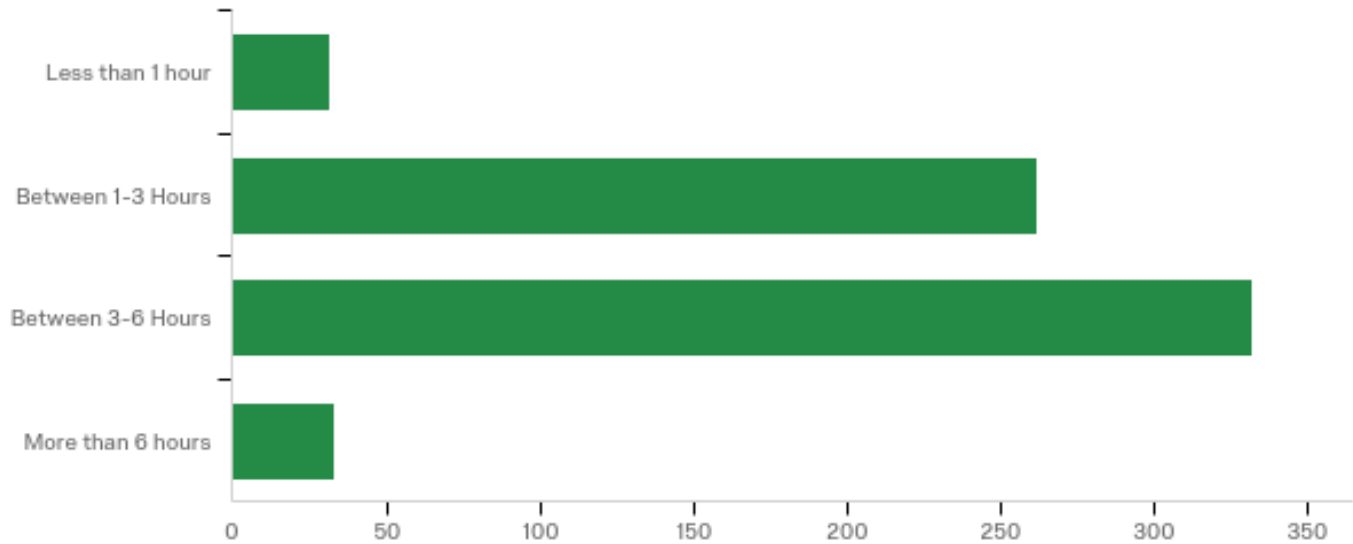


Q24: Do you stockpile wood during the dry season?



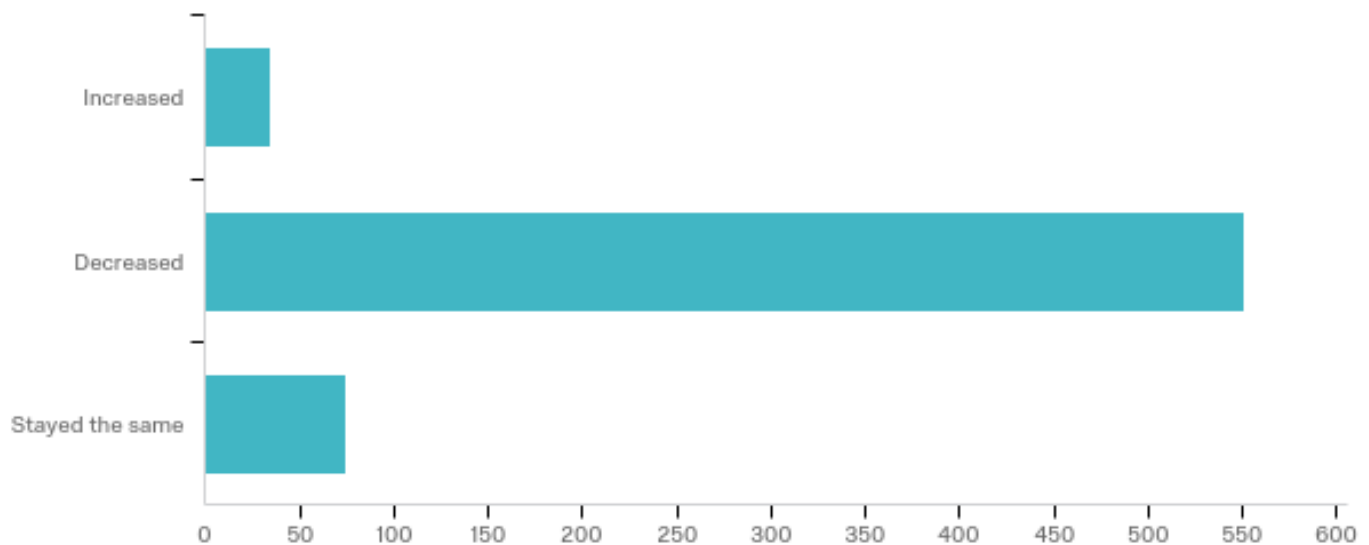
These questions indicate that seasonality is important for fuel collection habits—no one collects wood during the monsoon, much preferring to collect when it is dry and stockpile for the wet season. While this may seem obvious, it gives a few interesting insights: 1) time and labor spent on fuel collection is not uniform across the year the way labor for cooking is, it changes and thus the daily routines of women have a dynamic, shifting component through the year, and 2) fuelwood scarcity may be influenced by these seasonal dynamics; the monsoon might be a time when people begin to run out of fuel or have to ration it because they were not able to stockpile enough due to scarcity. Therefore, fuel savings also allow stockpiles to last longer and can reduce vulnerability to fuel scarcity during the wet season. This is an example of how stoves might help people adapt to changes in climate and vegetation.

Q25a: How much time do you walk to collect firewood?



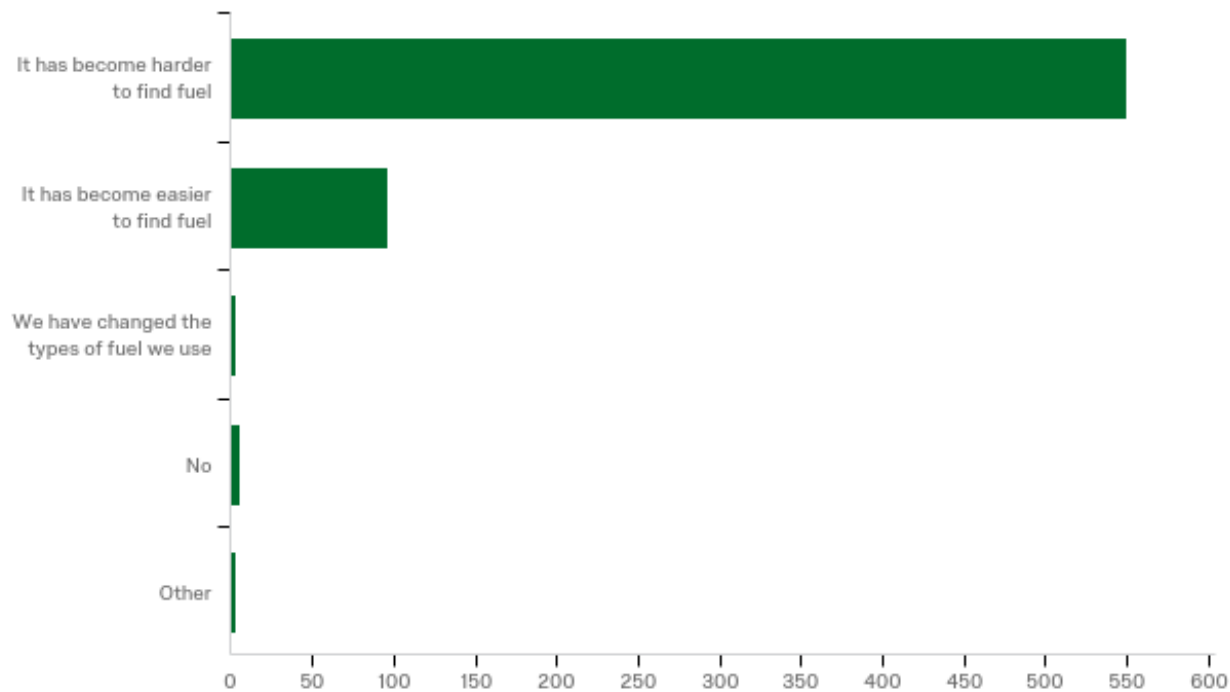
This graph indicates that people are forced to walk very long distances and spend a large chunk of the day just walking to get to good fuel collection sites. 40% of respondents perceive themselves as walking very far to collect fuelwood, whereas 55 report walking 'somewhat far'.

Q26: Since getting the new stove, has the distance you walk to collect firewood...



This graph describes how people do in fact have to walk less distance to find fuel upon receiving the improved stove. From further inquiry during focus groups, it emerged that the improved stoves make fuel collection easier not only because they require less fuel, but because they can effectively burn smaller pieces of wood which are significantly easier to find and carry. This information confirms that fuel savings can indeed reduce the time and tedium around fuel collection, requiring less long distance walking and thus opening up time for other things, perhaps representing a major quality of life improvement).

Q27: In the past few years in this area, has there been any change in the availability of fuel for cooking?

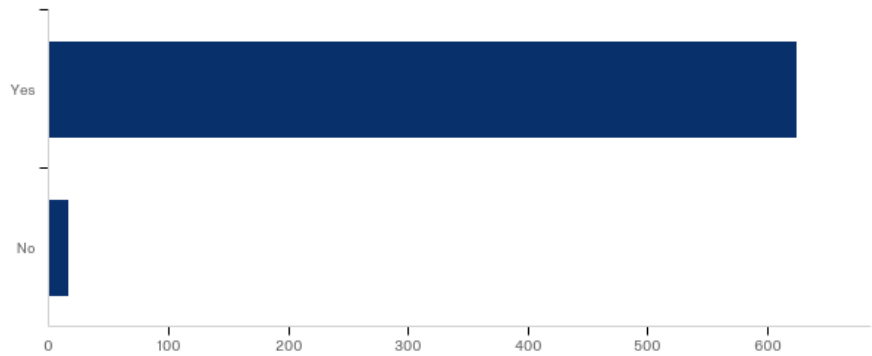


Many people say they have experienced greater difficulty in finding fuelwood in recent years, which confirms that scarcity is an issue and thus improved stoves make life easier. However, many others actually say that it has become easier to find fuel due to the introduction of coffee plantations, from which they can use trimmings. This suggests that fuel scarcity is not straightforward or uniform--people in the same village but with different circumstances (owning a plantation or not) may experience fuel availability in

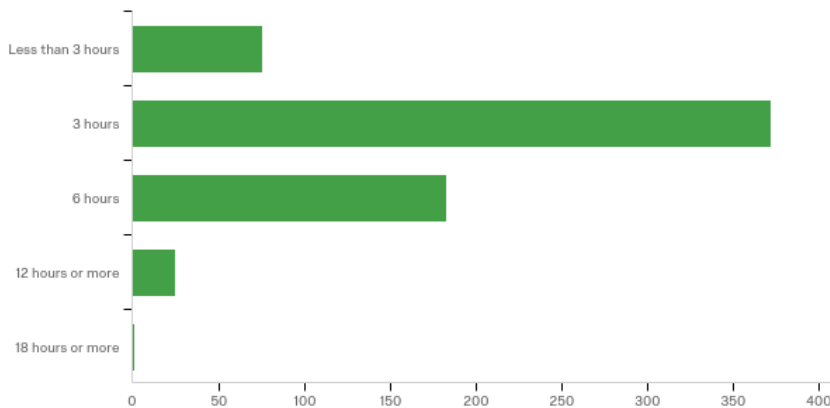
At that time we used to spend up to 12 hours to collect wood, we had to walk a very great distances, now this has changed, we spend only one hour because we are collecting fuel from our own fields (Female Stove User).

Non-Timber Forest Product (NTFP) collection:
 These questions indicate a few interesting things:

Q29: Do you collect non-wood forest items?



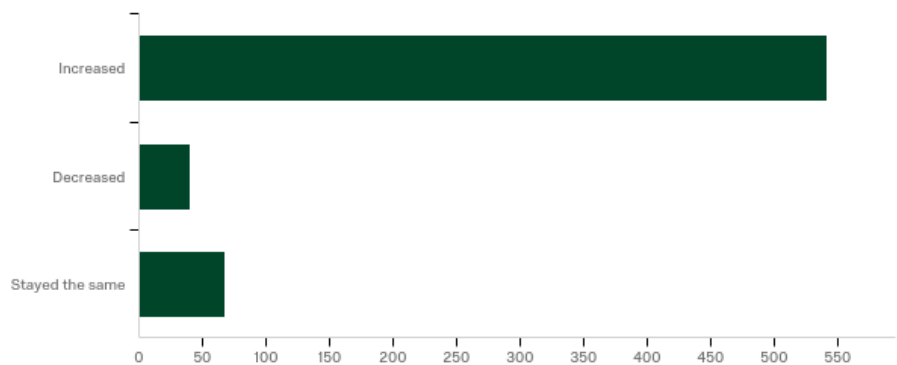
Q31: How much time per week do you spend collecting non-wood forest items?



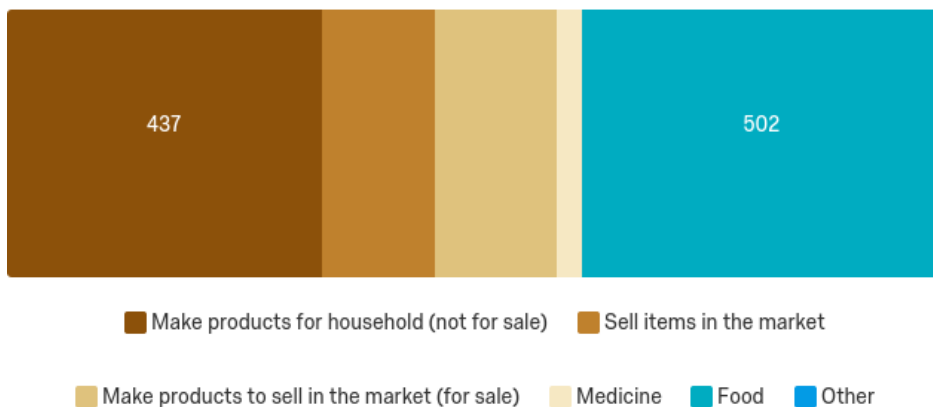
1) The majority of people spend a fair amount of time (3-6 hours) collecting items from the forest other than firewood, suggesting that it is important to their livelihood

2) Many women report spending increasing amounts of time collecting other forest items due to the fuel savings of the improved stove. So, while women may spend the same amount of time out collecting, now they can collect less fuel and more of these

Q32: Since getting the new stove, has the time you spent collecting non-wood forest items...

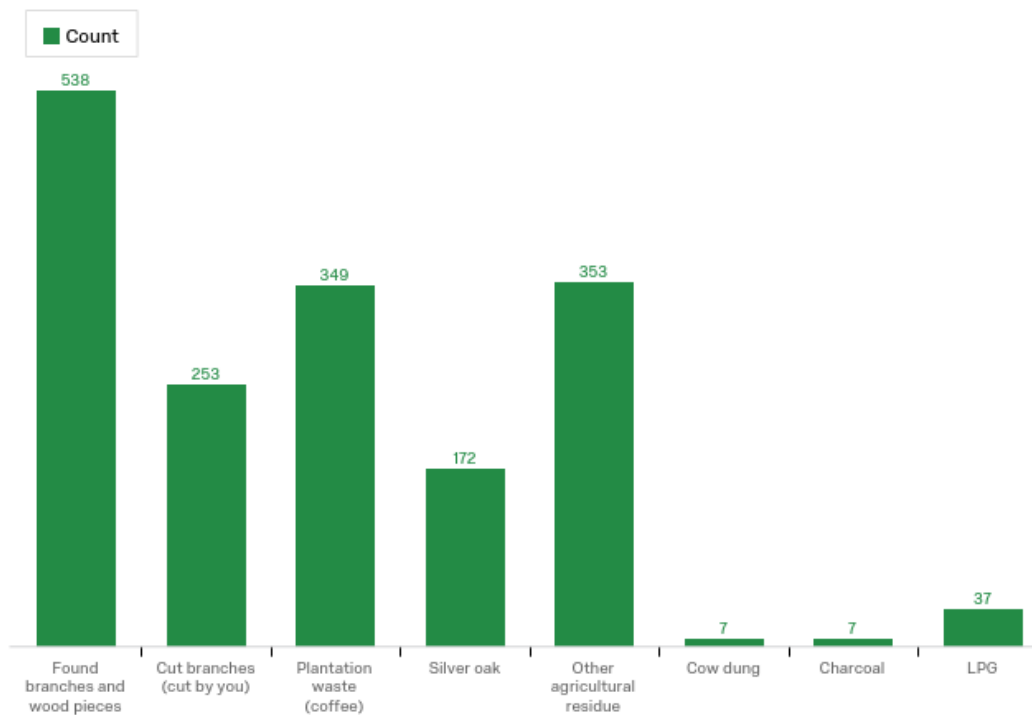


Q34: What do you do with those items?



3) It is possible that the cooking and fuel collection time saved by the improved stoves may allow people to spend more time collecting NTFPs, enhancing and diversifying their livelihoods. Some women during focus groups suggested that they collect more items and sell

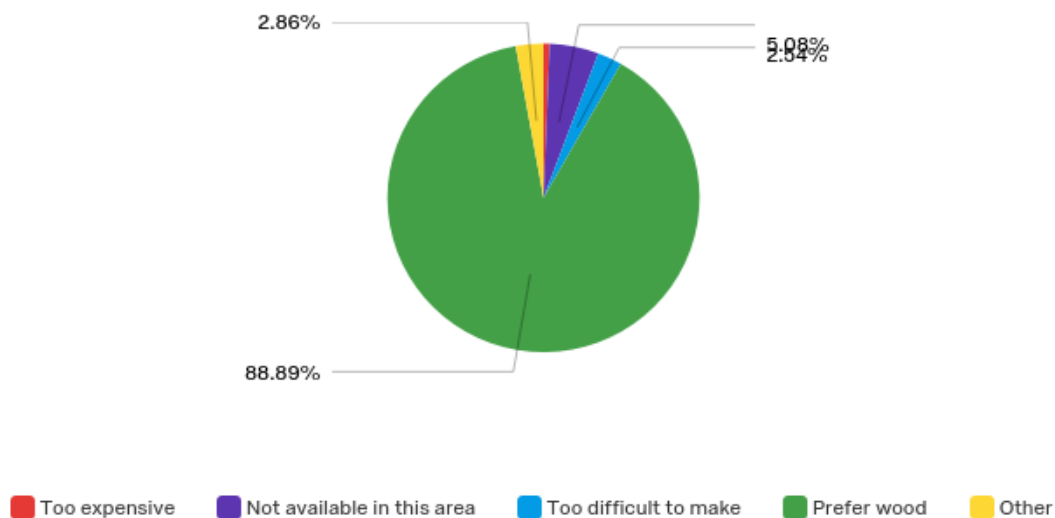
Which of these fuels do you use or have you used in the past month?



- People Collect
- Adda leaves
 - Adda Seeds
 - Tubers
 - Creepers
 - Leafy Vegetables
 - Goose Berries
 - Broom Stick
 - Bamboo sticks
 - Ethapallu(Fruits)
 - Nalla Zedi
 - Paremipallu
 - Koval Gammu

These are the most common types of fuel that people use, which is important for understanding the relationship between cooking and local land cover as well as cooking and emissions.

Why don't you use charcoal regularly? (92% indicated that they do not):



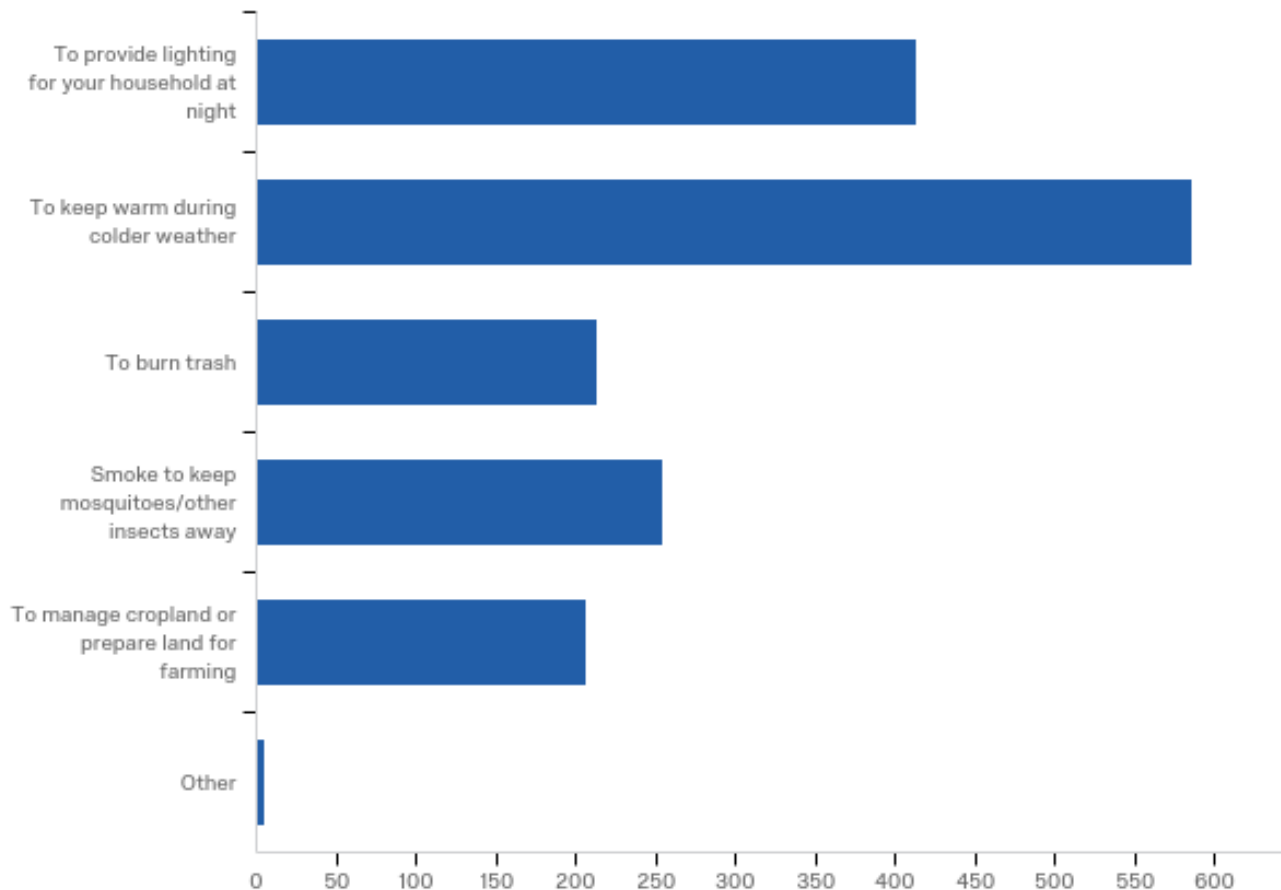
Not only do very few people in this area use charcoal on a regular basis, the reason they do not use it is because they simply prefer burning wood--while one might expect a lack of availability or too great an expense, personal preference in cooking and taste tends to be an important factor in fuel selection.

The results indicate that most people indeed walk long distances and spend a considerable amount of their time collecting firewood. Hence the results confirm the idea that this is a major part of women's labor routine and that fuel savings will in fact save time.

90% of stove users report that the amount of time they spend collecting firewood has decreased with the improved stove because they require less fuel.

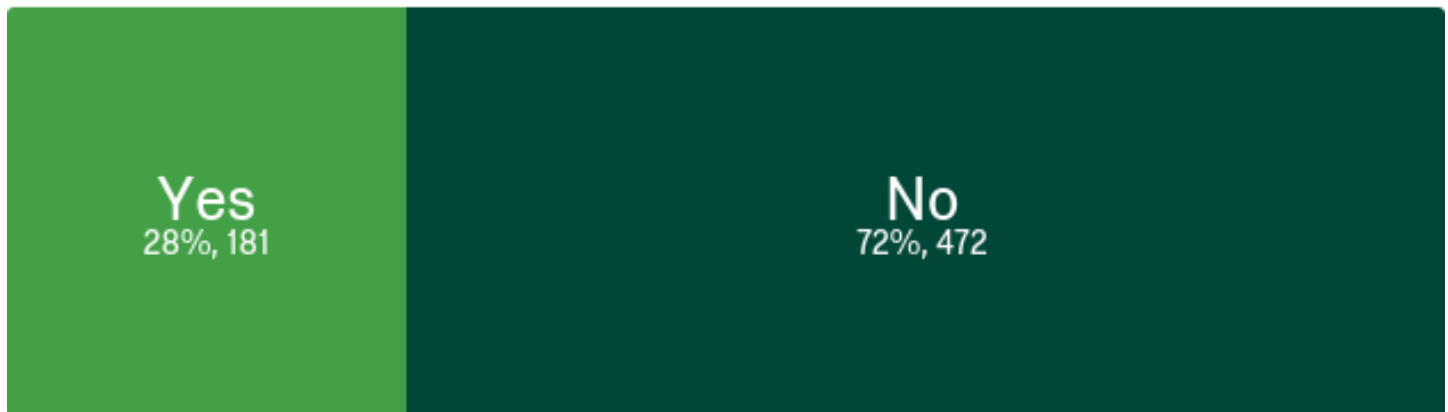


Q42. Does your household use fire for other purposes?

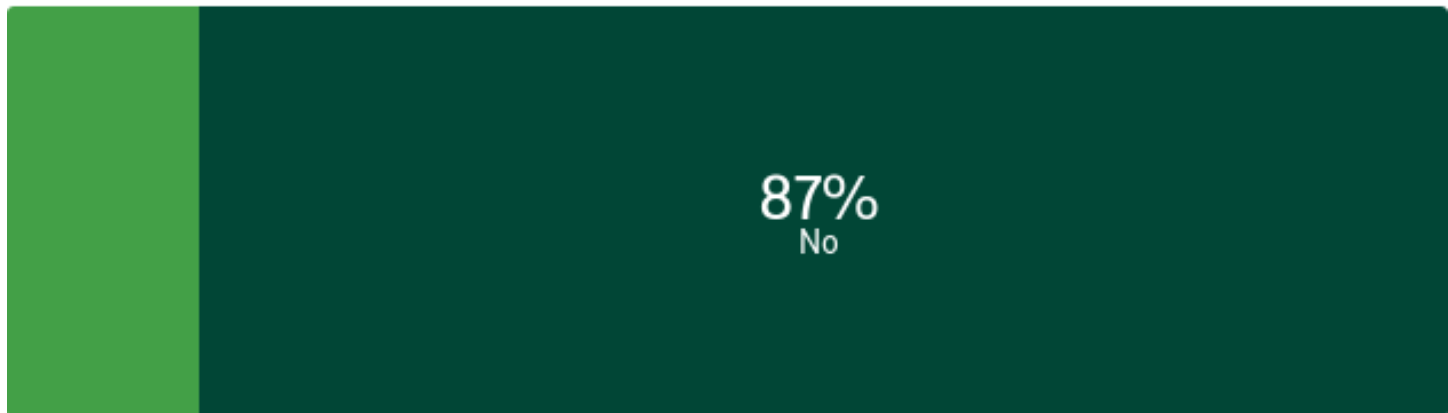


This results indicates that many people do use fire for diverse purposes, including lighting and heating their home, drying seeds, and warding off insects. Therefore, improved stove designed need to take into account those important uses other than cooking. Does the improved stove still meet these needs? Is it possible to account for these needs in stove design?

Q43: Does your family cultivate/plant trees to use for firewood?



Q44: Does your household cultivate trees (such as Eucalyptus) for sale?



■ Yes ■ No

These results indicate that many households also actively plant and cultivate trees, not only cutting from the forest. This shows that tree planting is an important source of fuel and income for some households.

TIME SAVINGS DAILY ROUTINE SOCIAL NETWORKS



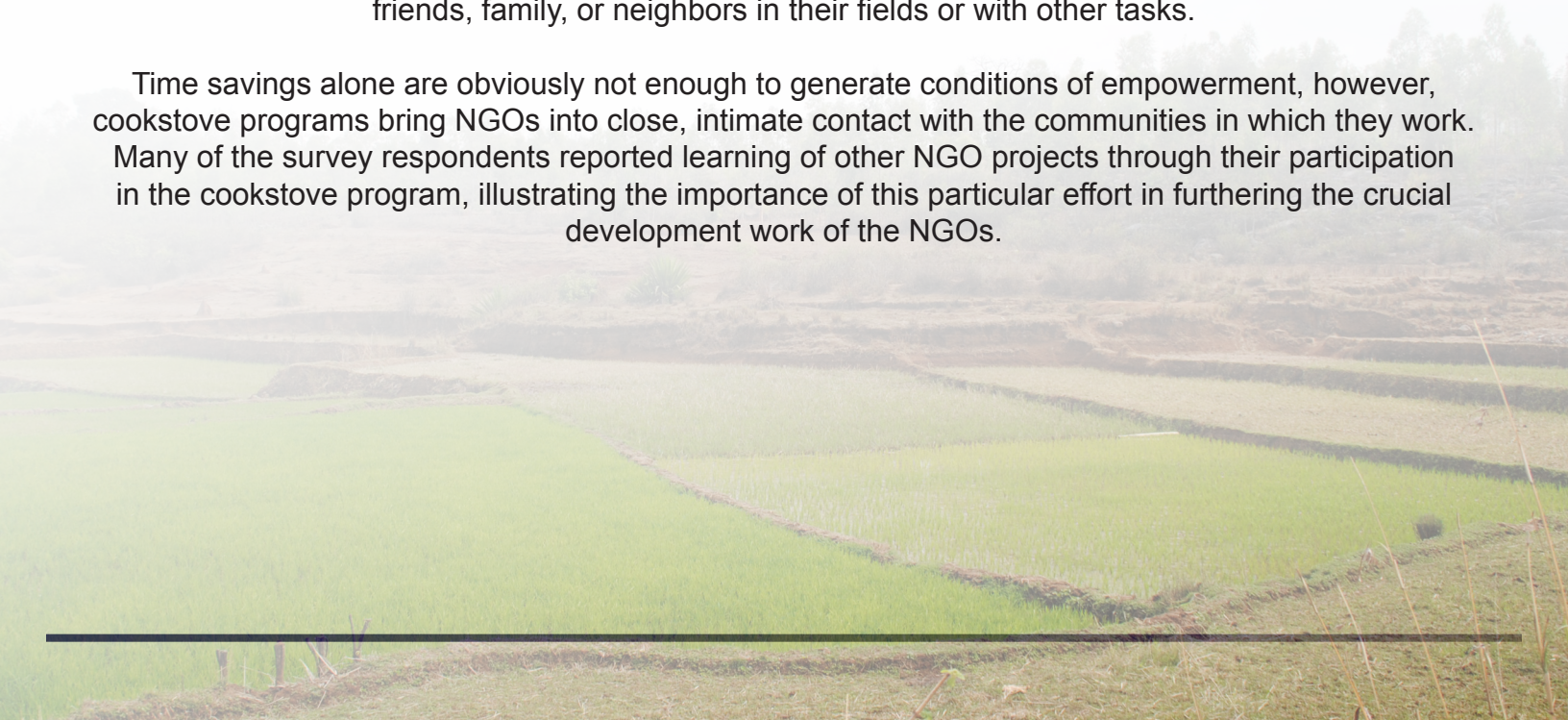
INTRODUCTION

Due to their ability to burn fuel more efficiently and at higher temperatures, clean cookstoves reduce the amount of time women spend on cooking. Since time savings is commonly thought to facilitate women's economic empowerment by allowing them to pursue entrepreneurial or educational opportunities, it's important to understand how a reduction in cooking time might impact their daily routines. While our results indicate that the amount of time saved by the clean cookstoves is minimal, and the way women use their extra time is highly variable and rarely entrepreneurial, that small amount of extra time still has a generally positive impact on women's lives. It allows them to spend more time socializing with friends, tending to other household chores, or working longer hours in the fields.

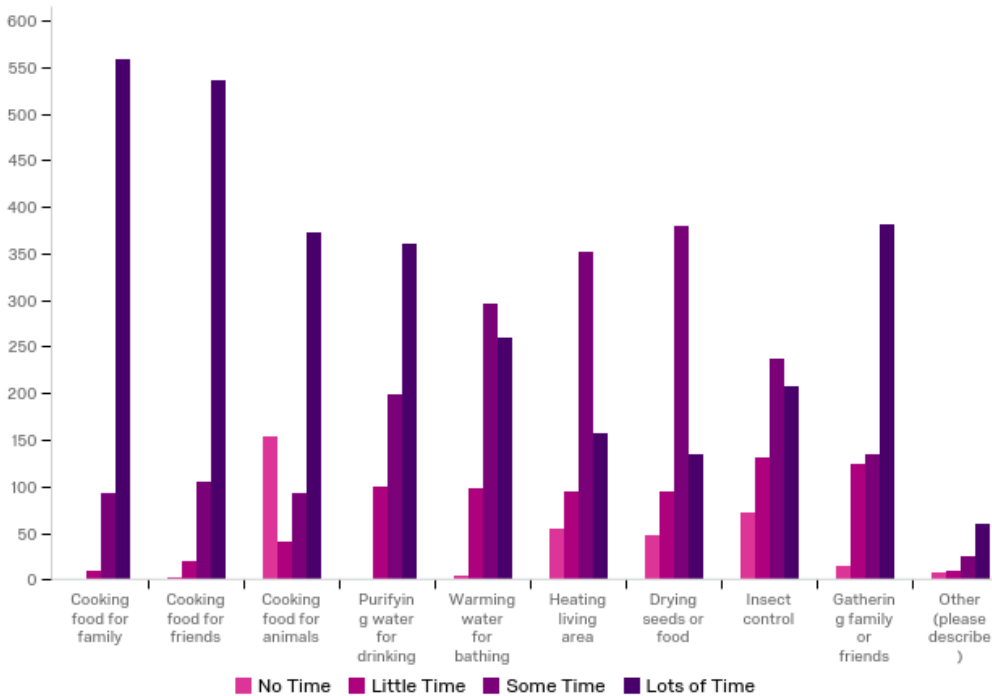
Socializing with friends may not seem like a very important aspect of daily life, and certainly something not easily quantified, however its importance is reflected in our survey results and in the focus group discussions. Having a little extra time to spend with friends in the community to gossip or chat or even watch television serials was clearly something the women valued, and something they were able to enjoy because they spent a little less time cooking during the day. The women also reported that since getting a clean cookstove, they were able to spend more time attending to other household chores. Rather than opening up extended periods of free time to do other chores, however, the time saved by using the new stove often took the form of increased multi-tasking abilities while cooking. The improved heat efficiency of clean stoves means that the fire will stay lit without being tended to—this allows women to complete other tasks while food is cooking. With their old stoves, the women would have to keep a very close eye on the flame and keep feeding in fuel and blowing on it to make sure it didn't burn out. Their new stoves burn fuel more efficiently and stay lit for longer, therefore allowing them time to do other activities while the food is cooking.

One exception to the multitasking scenario was roti. With the new stoves, the flame is more concentrated, so unless the roti is constantly flipped, it will burn. The attentiveness required of the roti making process prevents the women from multitasking, but the hotter pan ultimately makes it faster, which saves time. Less cooking time also frequently allows the women to leave earlier for work in the fields, or, rather than using extra time for personal endeavors, free time might be collectivized (i.e. people may not perceive time as an individual resource, but more as a collective village resource which can be shared). This means that people will distribute time savings to neighboring households by helping friends, family, or neighbors in their fields or with other tasks.

Time savings alone are obviously not enough to generate conditions of empowerment, however, cookstove programs bring NGOs into close, intimate contact with the communities in which they work. Many of the survey respondents reported learning of other NGO projects through their participation in the cookstove program, illustrating the importance of this particular effort in furthering the crucial development work of the NGOs.

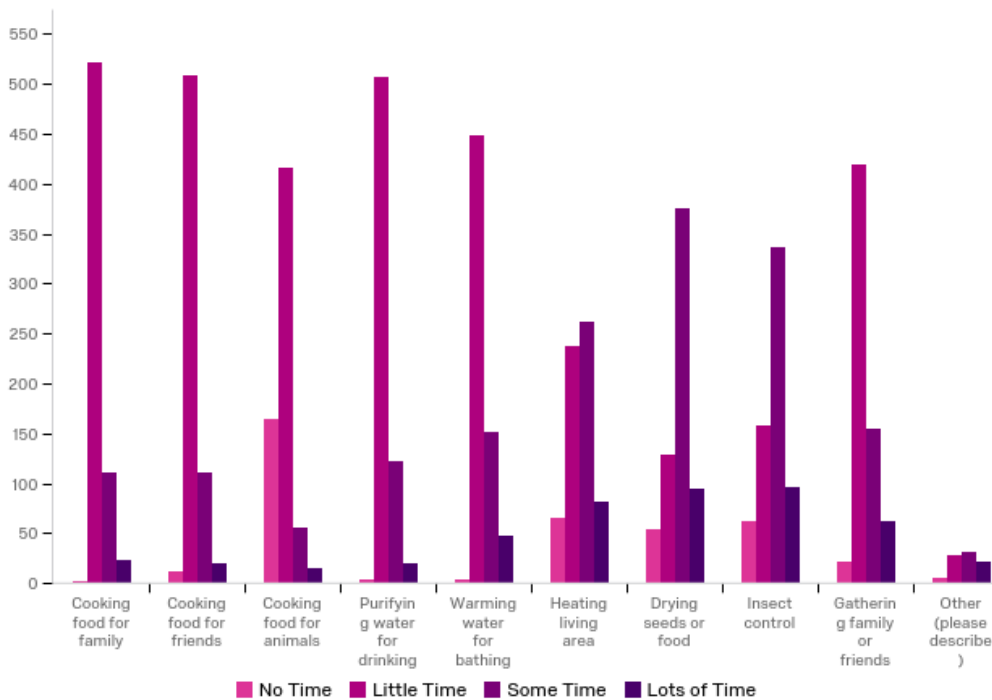


Q50: How much time did you spend each day using your OLD cookstove(s) for the following activities?

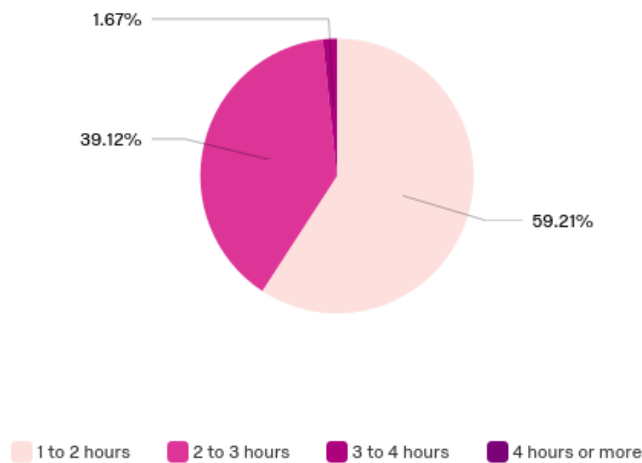


The results indicate that a majority of respondents spent a lot of time using their stove for various activities prior to getting the new cookstove, but spent much less time doing those same activities after getting the new stove. This suggests that are time saving benefits to the new stoves.

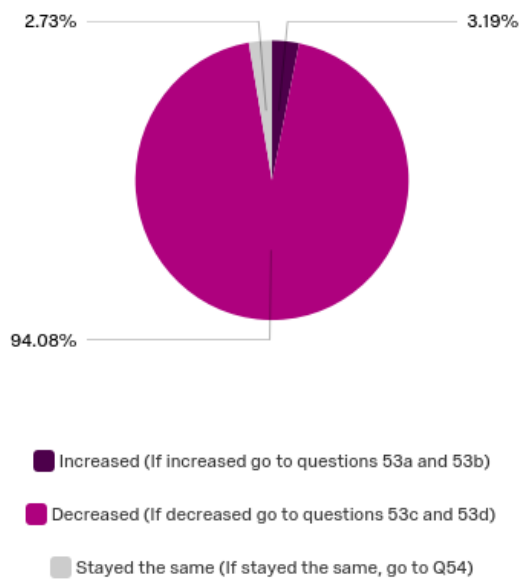
Q51: How much time did you spend each day using your NEW cookstove(s) for the following activities?



Q52: How much time do you spend cooking and using your stove daily?



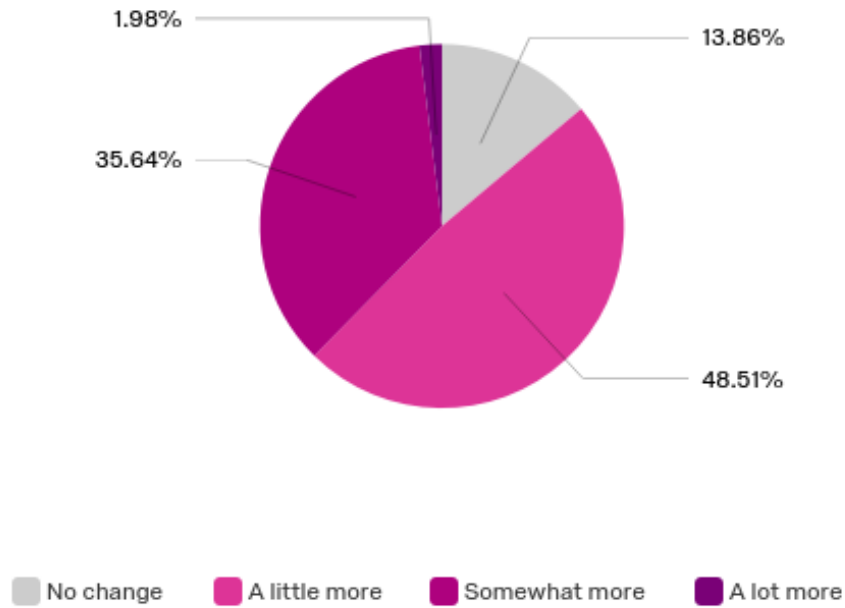
Q53: Since getting the new stove, has the time you spend on cooking:



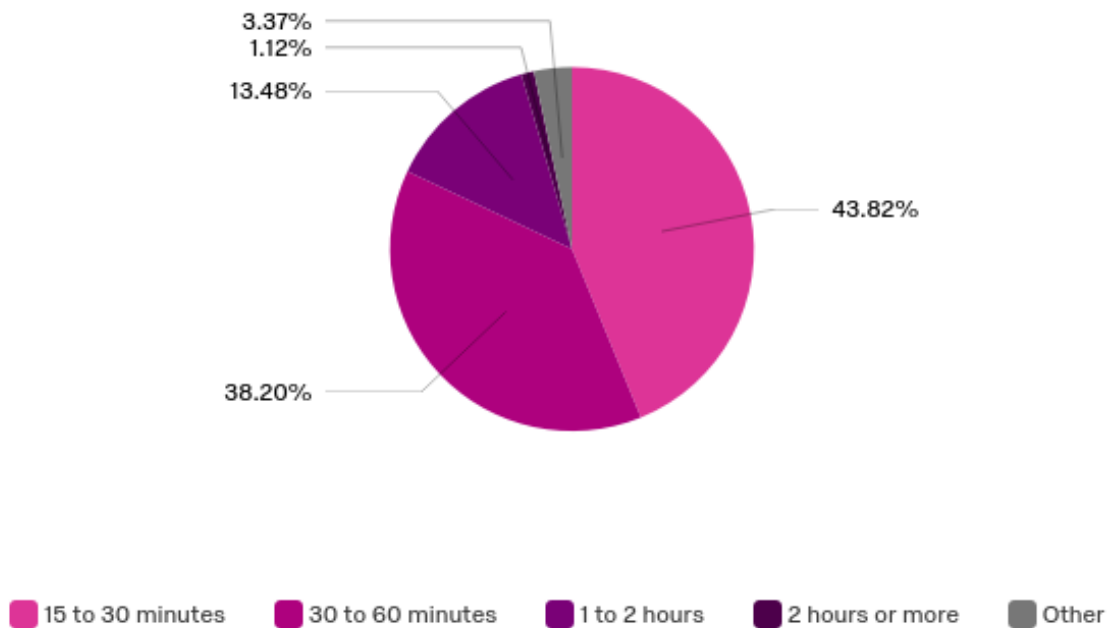
Most respondents indicated that the amount of time they spend cooking since getting their new stoves has decreased, suggesting that time savings is a real benefit of the new stoves.



Q53a: How much more time do you spend cooking since receiving the new stove?

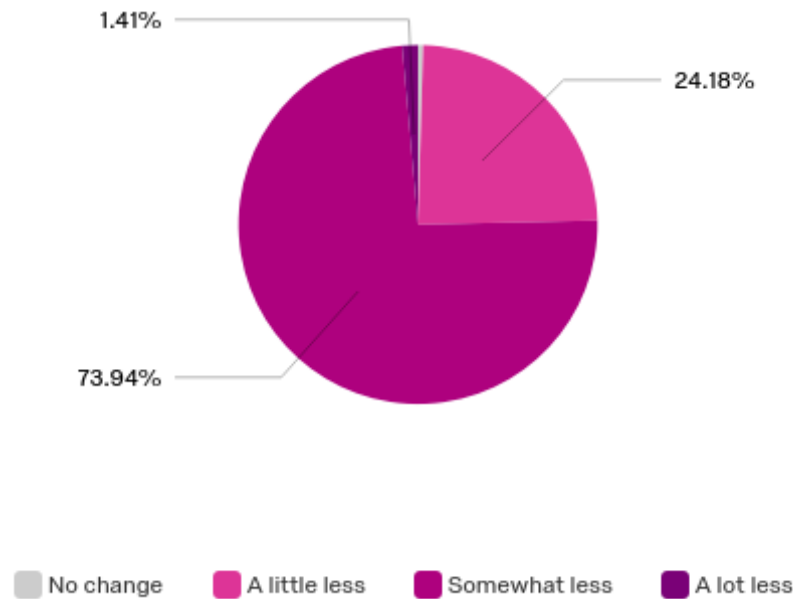


Q53b: How much more time do you spend on cooking daily since getting the new stove?

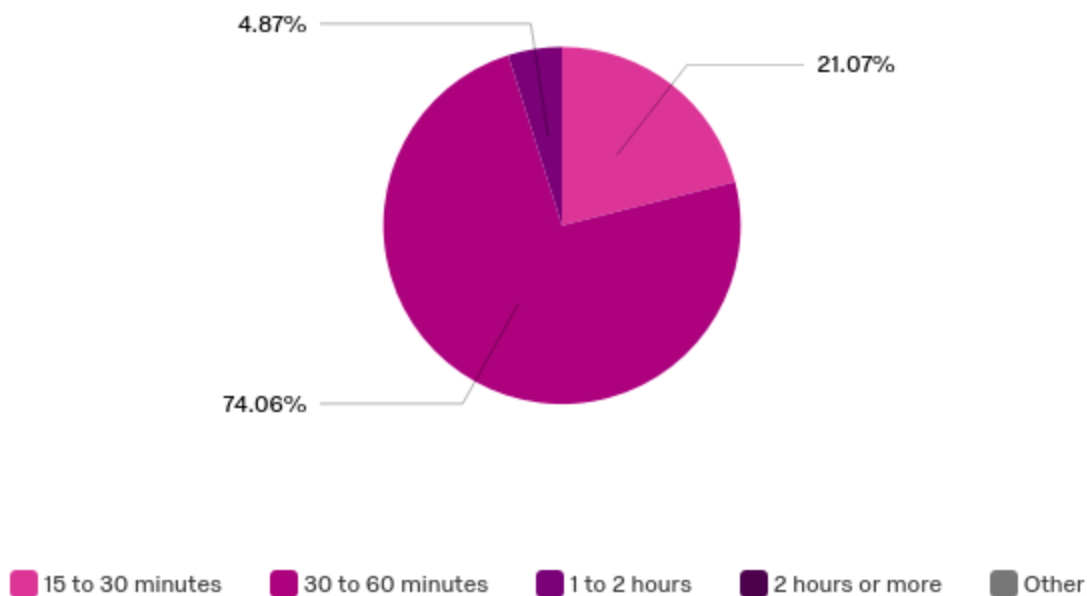


A majority of the 3% of respondents who said they spend more time on cooking since getting the new stove said they only spend a little more time, or 15-60 minutes cooking a day.

Q53c: How much less time do you spend cooking since receiving the new stove?



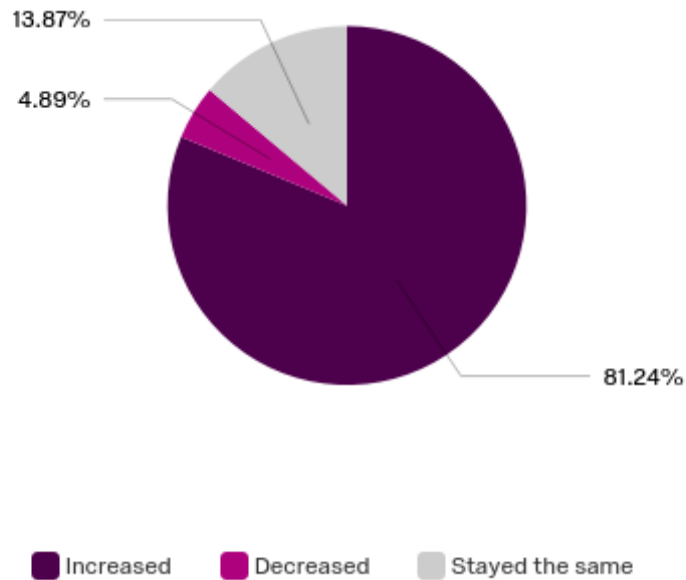
Q53d: How much less time do you spend on cooking daily since getting the new stove?



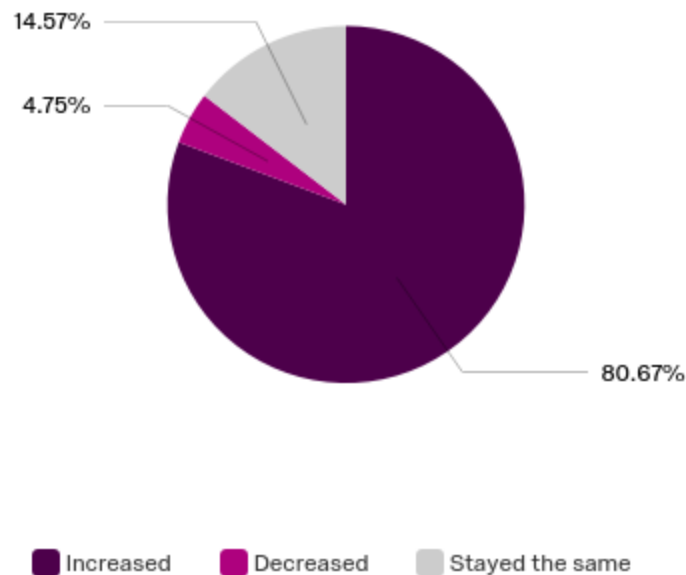
These questions were used to gauge the amount of time savings generated from the new stove. The ordinal response options were used in case the respondents weren't used to talking about time in minutes or hours. Most people reported spending only a little to somewhat less time cooking, or 15-30 minutes. This time savings is not extraordinary, but it is beneficial as it allows the women to multitask, leave for work earlier, do extra chores, or spend more time socializing.

In the following charts respondents indicated that their time spent on these activities had increased since getting the new stove. The time savings may not be all that significant, but the women are reporting some benefits, and perhaps a slight change in routine.

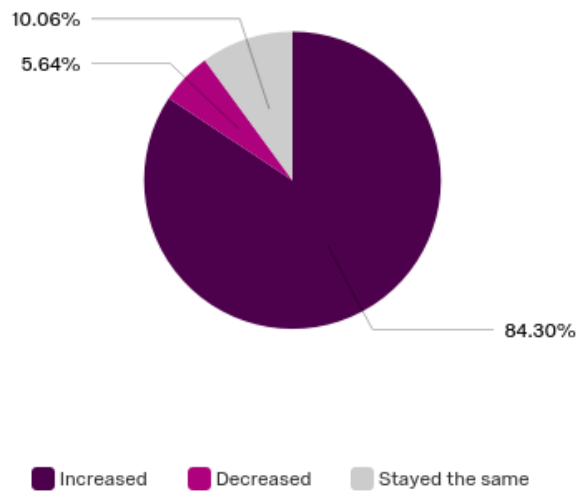
Q55: Since getting the new stove, has the time you spend caring for your children:



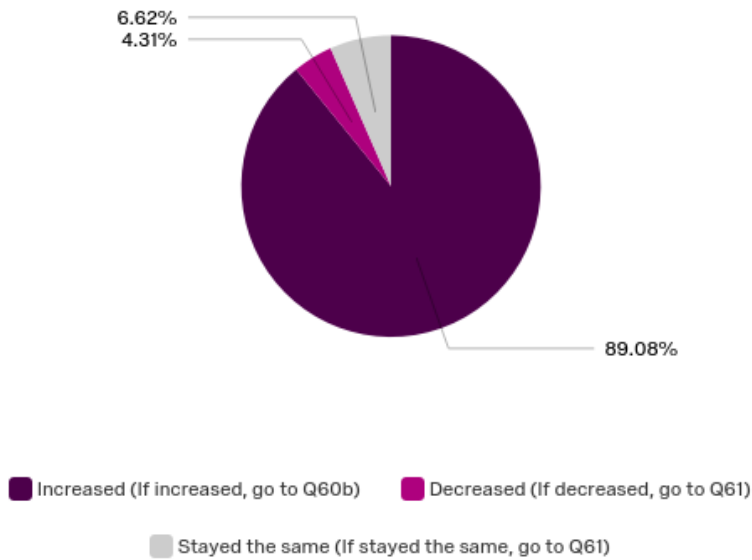
Q57: Since getting the new stove, has the time you spend caring for family:



Q59: Since getting the new stove, has the time you spend socializing with friends:



Q60a: Since getting the new stove, has the time you spend participating in community activities:

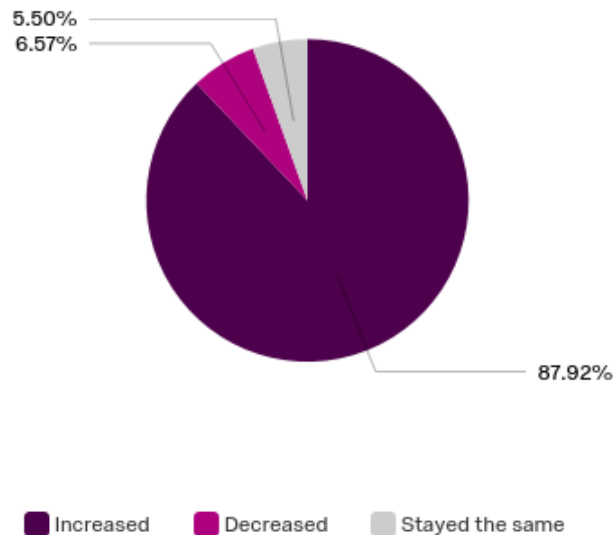


In our life, cooking food is the main thing. Because this is much faster we are spending more time with our families and in the village, but cooking is our primary work so we only go out to do other things when this is finished (Female Stove User).

Q60b: What community activities do you participate in with this extra time?

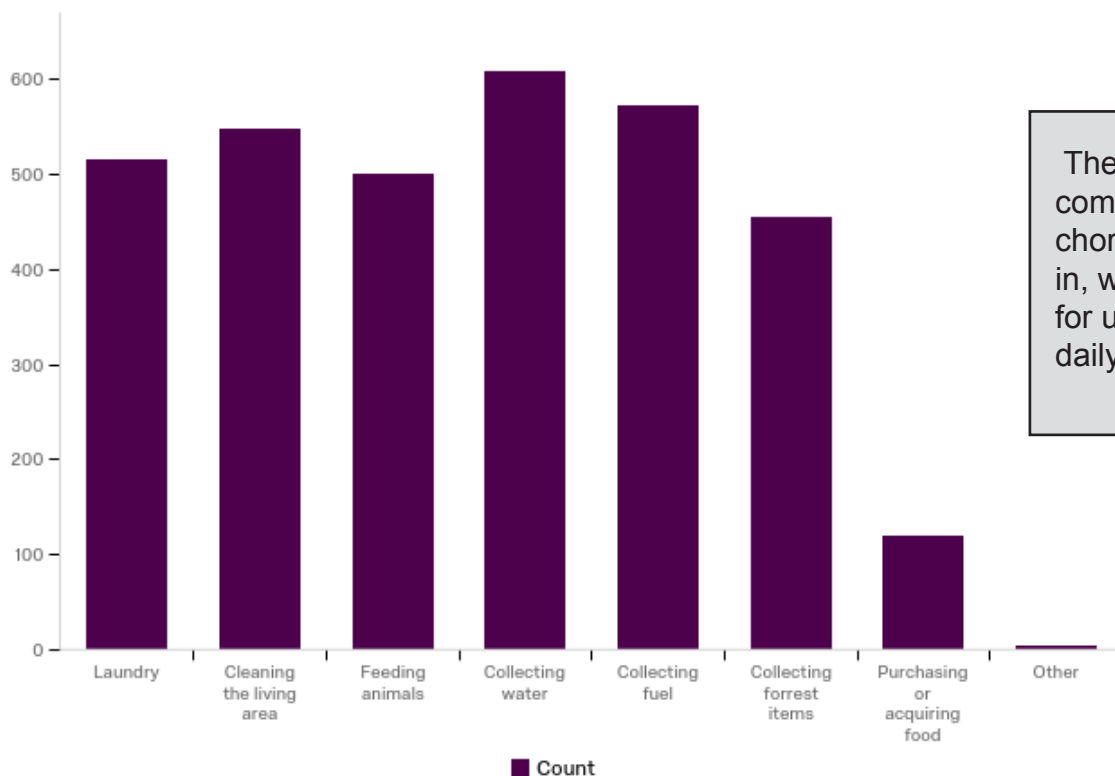


Q62: Since getting the new stove, has the time you spend doing household chores (unpaid labor):



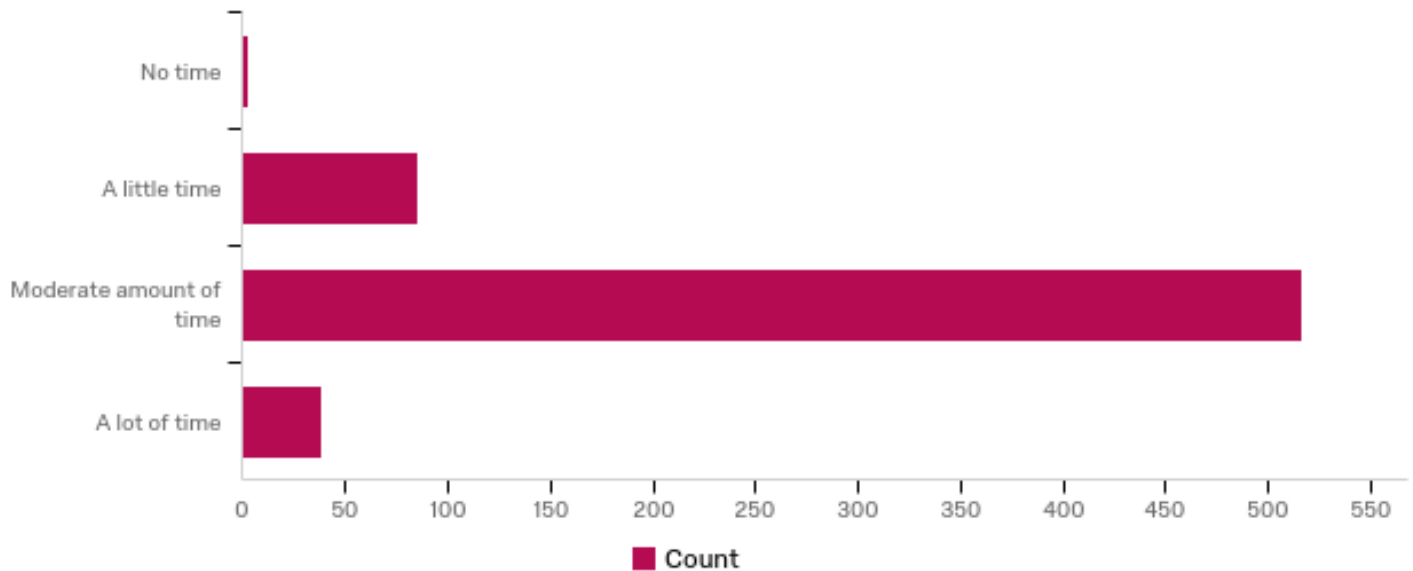
A majority of respondents reported an increase in the amount of time they spend doing chores since getting the new stove, which suggests a “chore displacement”: Less time engaged in one chore just means more time to engage in other chores. This could also be related to increased multitasking, possibly due to the faster cooking speed and efficiency of the new stoves.

Q63: Which household chores do you do?* (other than cooking) (select all that apply):



These are the most common types of chores people engage in, which is important for understanding their daily routines.

Q64: How much time do you spend working outside the home?



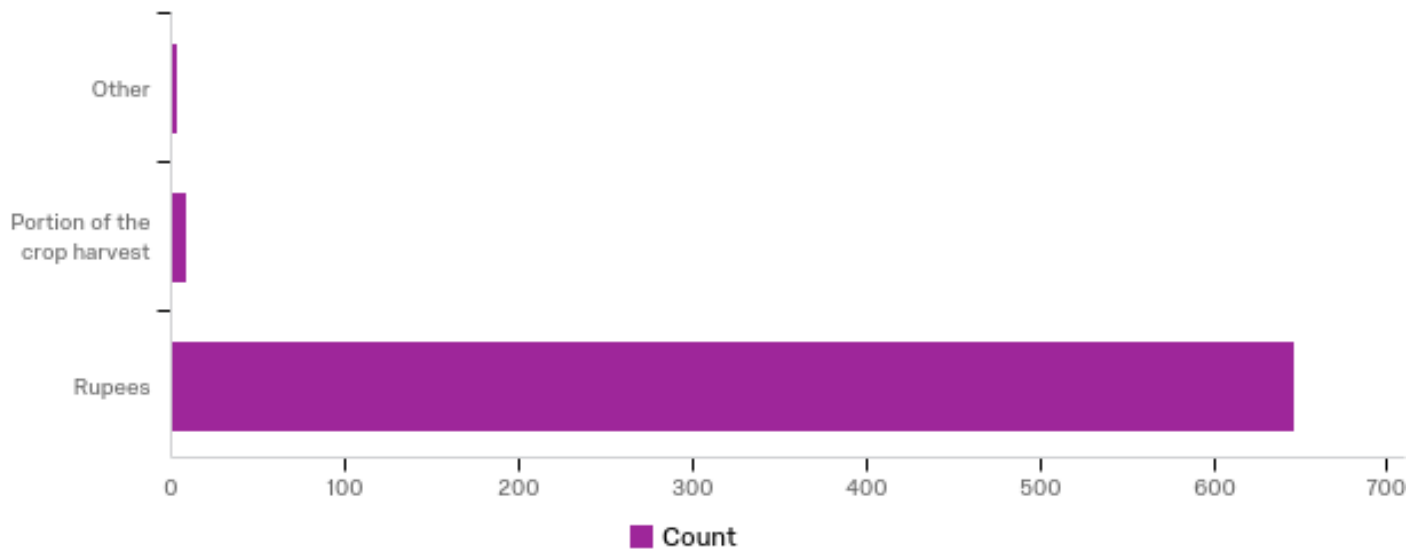
Gauging how much time people spend working outside the home is also important for understanding their daily routines and how those routines might be impacted by the introduction of a new cookstove.

Other:

forest
group
collecting
ntfp
cbo
vikasini
collection
workwoman



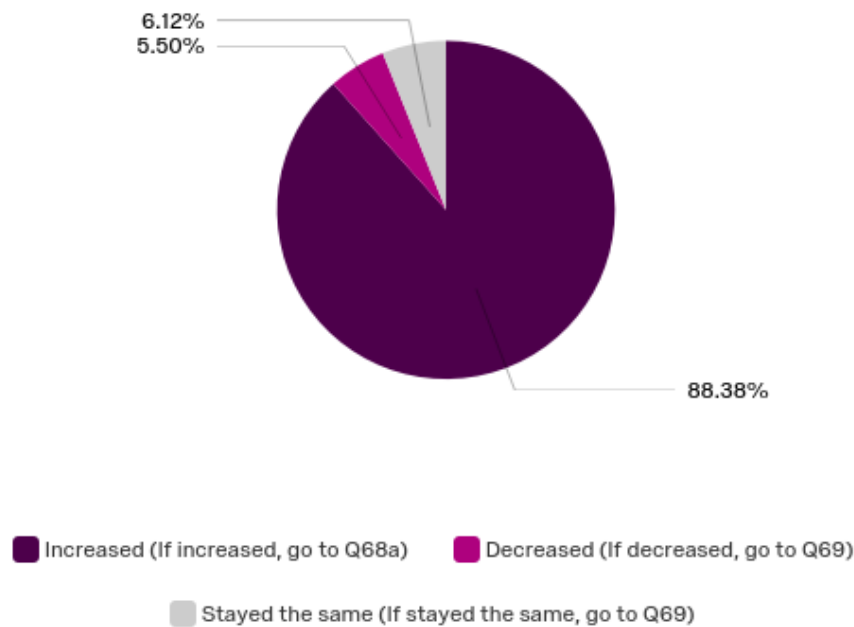
Q66: How are you paid for your work?



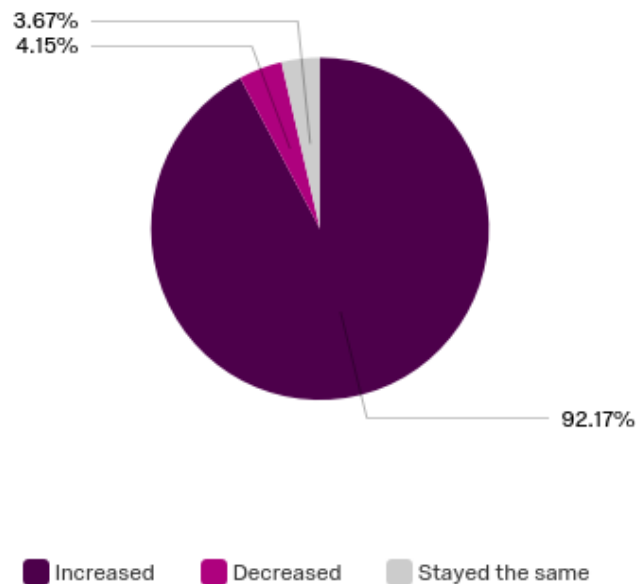
While a majority of people are paid in rupees for their work outside of the home, they are also occasionally paid in a portion of the crop harvest.



Q68: Since getting the new stove, has the time you spend working outside the home (paid Labor):

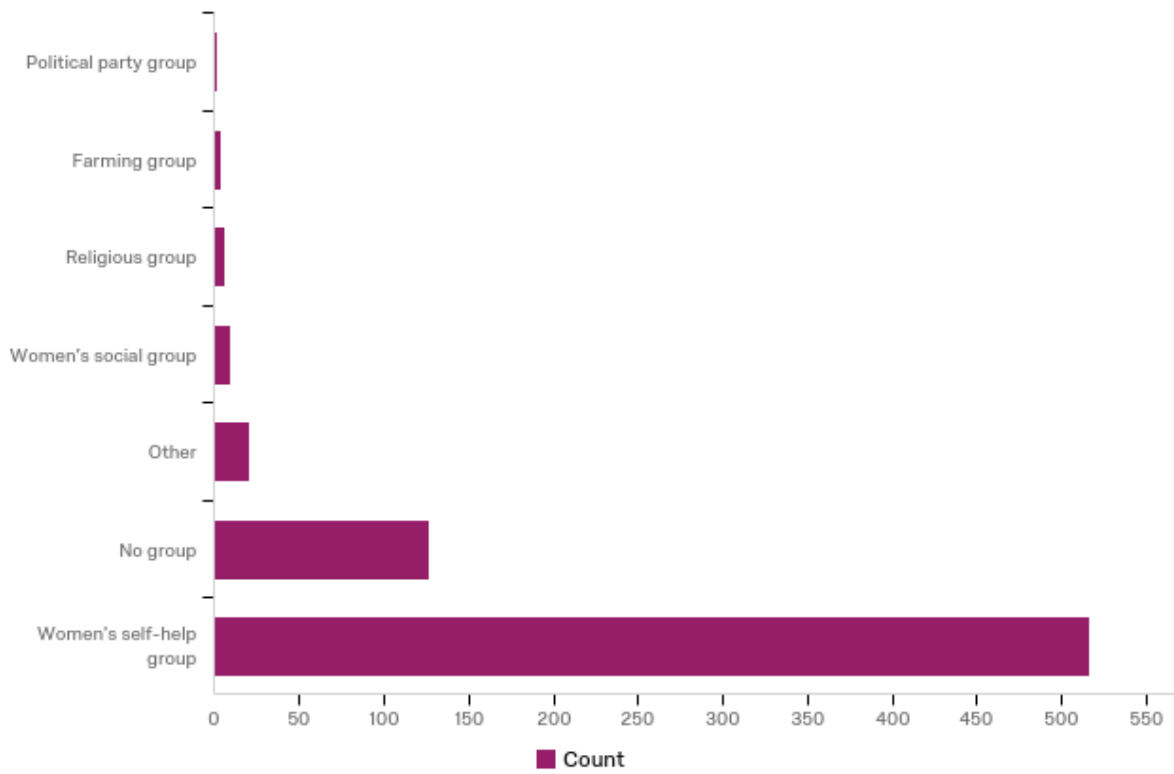


Q68a: Since getting the new cookstove, has your income:



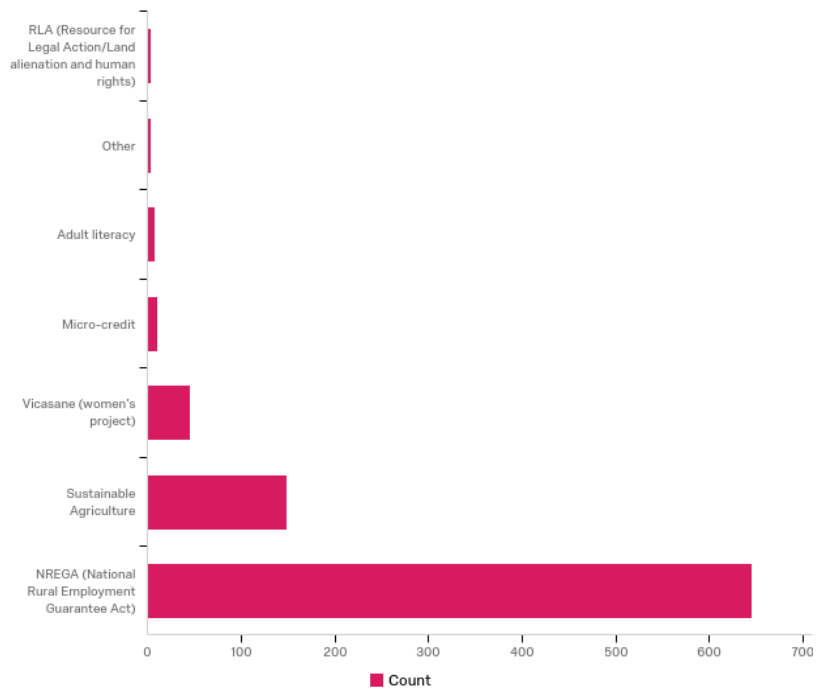
A majority of respondents reported an increase in time spent working outside the home, and subsequently also reported an increase in income. While the increase wasn't exceptional, it is beneficial. Though impossible to discern from the survey alone, the focus group discussions support our speculations that time saved from cooking rarely (if at all, in some villages) results in entrepreneurial activities. Rather it often means doing additional chores or leaving earlier to work in the fields.

Q71: Do you participate in any of these social groups? (select all that apply):

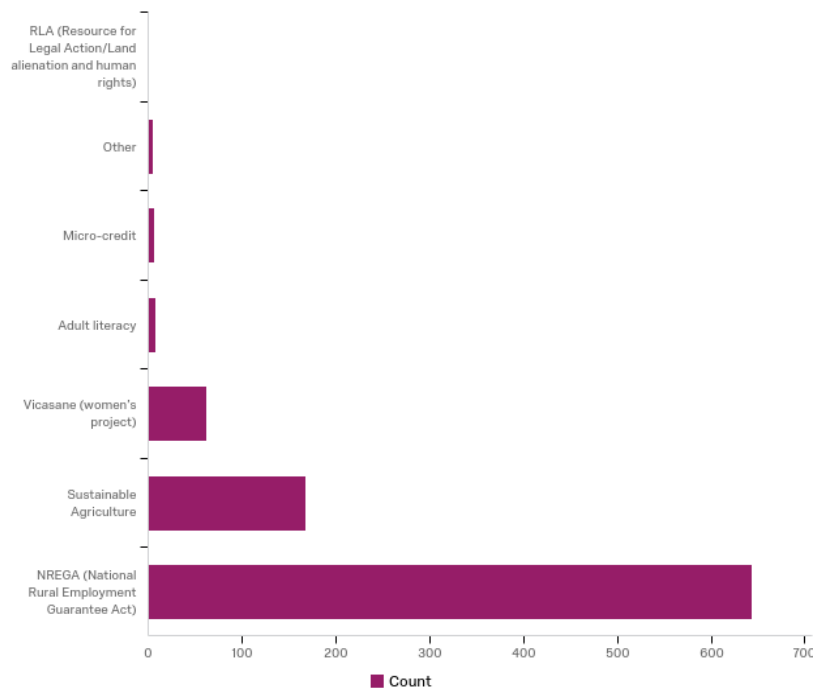


These questions indicate that there was a shift in project/program participation after cookstove implementation. They show which NGO specific programs the women participated in before and after getting a new stove. The results indicate that while the cookstove itself may not be life changing, the cookstove program is likely a conduit to participation in other beneficial programs. This is supported by the fact that a majority of respondents said that they had learned of other NGO projects through the cookstove program.

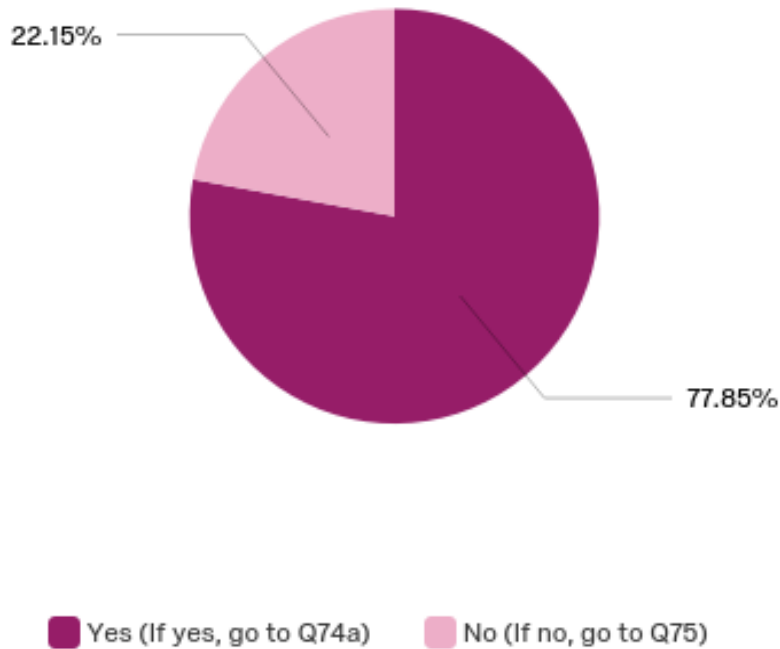
Q72: Which of these programs/projects did you participate in before receiving a new cookstove?



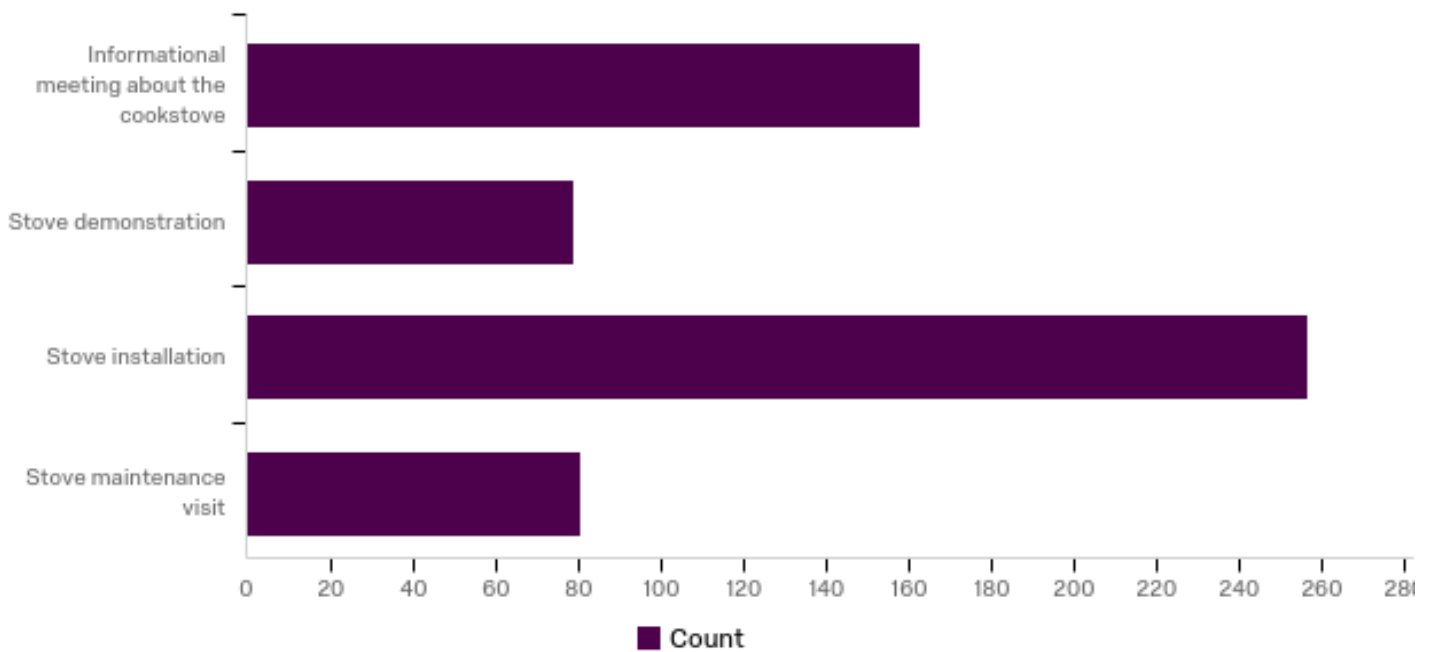
Q73: Which of these programs/projects did you participate in after receiving a new cookstove?



Q74: For programs/projects selected above, did you learn about these through the improved cookstove project?



Q74a: Where else did you learn about these programs?





COOKSTOVE COSTS & BENEFITS


INTRODUCTION

Because they often have primary responsibility for domestic tasks that depend on cookstove use, such as cooking or boiling water, women are necessary participants in clean cookstove projects. They are also directly impacted by household dynamics such as cultural practices, religious beliefs, and interactions between daily domestic routines and the conceptualization of time. Introducing new cookstoves into households thus provide women with various costs and benefits, some of which are intangible and not easily assessed via standard quantitative metrics. Such costs and benefits together play a significant role in whether or not clean cookstove projects are successfully implemented.

When and how a new stove is introduced into a household can be culturally significant. Most families had personally installed or constructed their old stoves - and may not only be wary of a new stove installed by someone else, but also want to keep their old stove. Stove projects funded by carbon offset programs often require that old stoves be destroyed before a family receives a new stove.

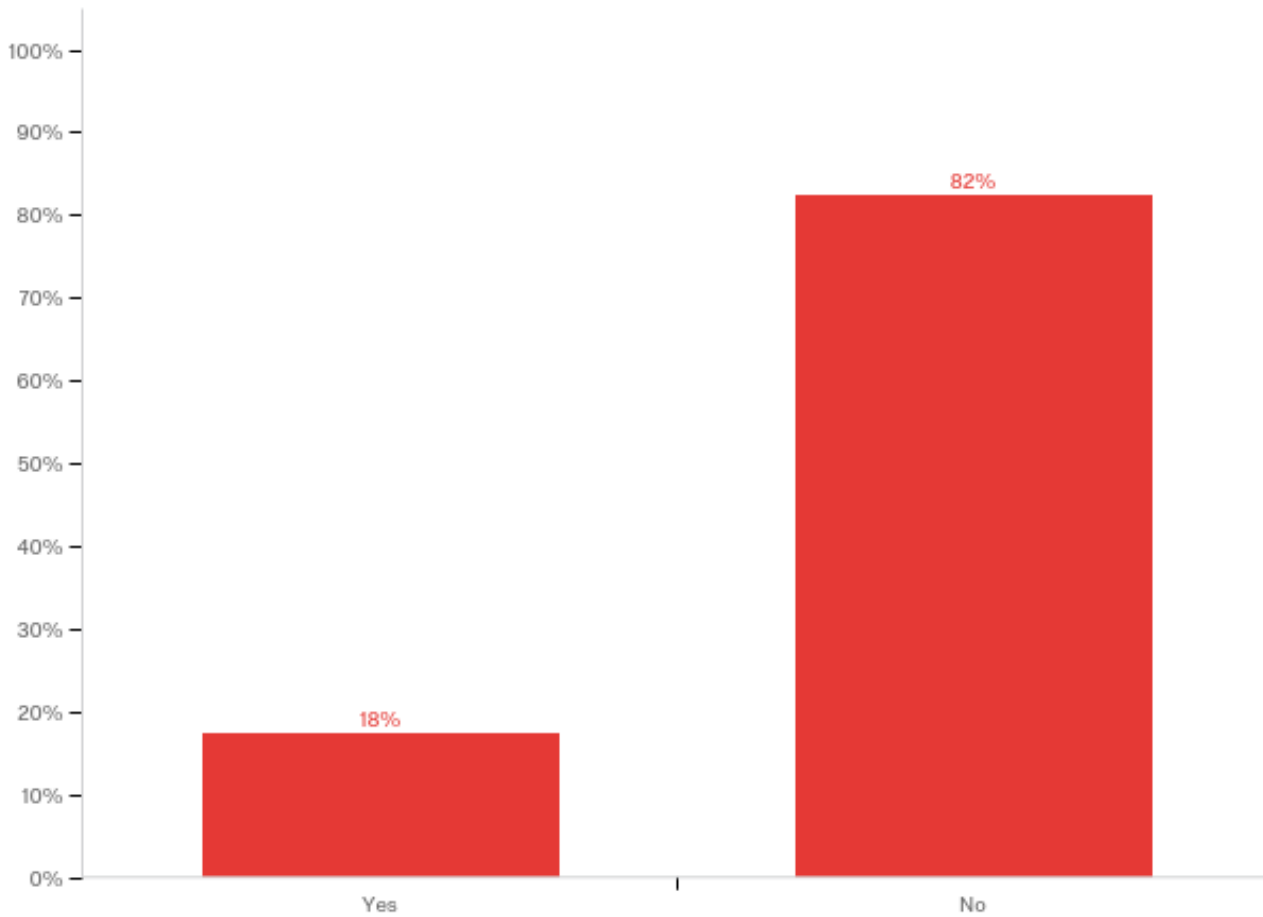
Part of the reason that families have such strong personal feelings about their stoves is that traditionally, there is a spiritual significance to the daily ritual of cooking. Because stoves are part of the process of producing food for a family, they are considered to act as an interface with the Divine. This belief is present in most households regardless of religion, and is simply expressed through differing rituals. If such beliefs are not respected, new stoves might not be welcomed. But if they are respected, families show great openness to transfer their existing rituals to new stoves.

Cleaning, decoration and prayer rituals have common elements, but vary by family, community, village, etc. Stoves are commonly cleaned and maintained using a water and cow dung mixture. The cow dung is a necessary ingredient for many families, because the cow (like the stove) is a source of food, and thus can have a religious or simply traditional significance. In many Hindu households, stoves might receive a daily cleaning, decoration with flowers and/or religious symbols, and ritual candle lighting and prayer. A tribal household might routinely clean and decorate its cookstove (but not follow any religious rituals), with the aim of keeping the cooking area looking neat and tidy.



With the old stove, maybe I had more control. I built it myself, and could control when and where it was built as I may be superstitious about this. I saw how it was built and know how it was built, in the way my family has built stoves for many years, it was a tradition. Suddenly this foreign thing comes and I don't have as much control over the process, and so perhaps my trust and feelings towards the stove change, perhaps my relationship to the deity then changes (Laya staff explanation of stove users perspective).

Q10: Since getting the NEW cookstove(s), are there any foods that you would prefer to cook using the OLD cookstove(s)?



If Yes, which foods?

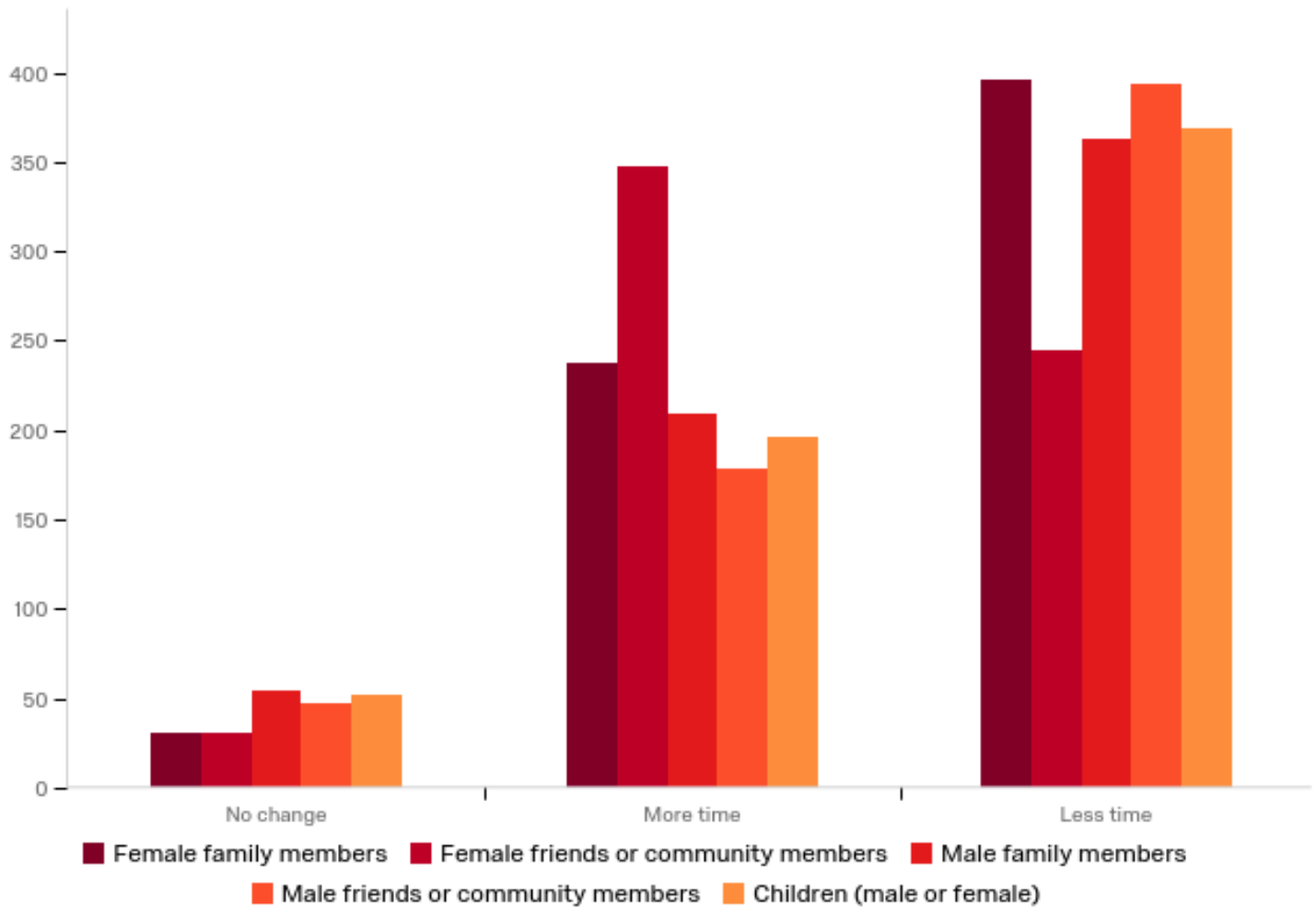
curries
tea, ragi, upma, vegidly
sama, rice, hot
water

Research shows that most stove users have adapted their cooking habits to the new stoves. 82.5% of survey respondents prefer to cook using their new cookstove. Only 17.5% prefer using their old stove for activities such as boiling water or preparing ragi malt, curries, rice, and tea.

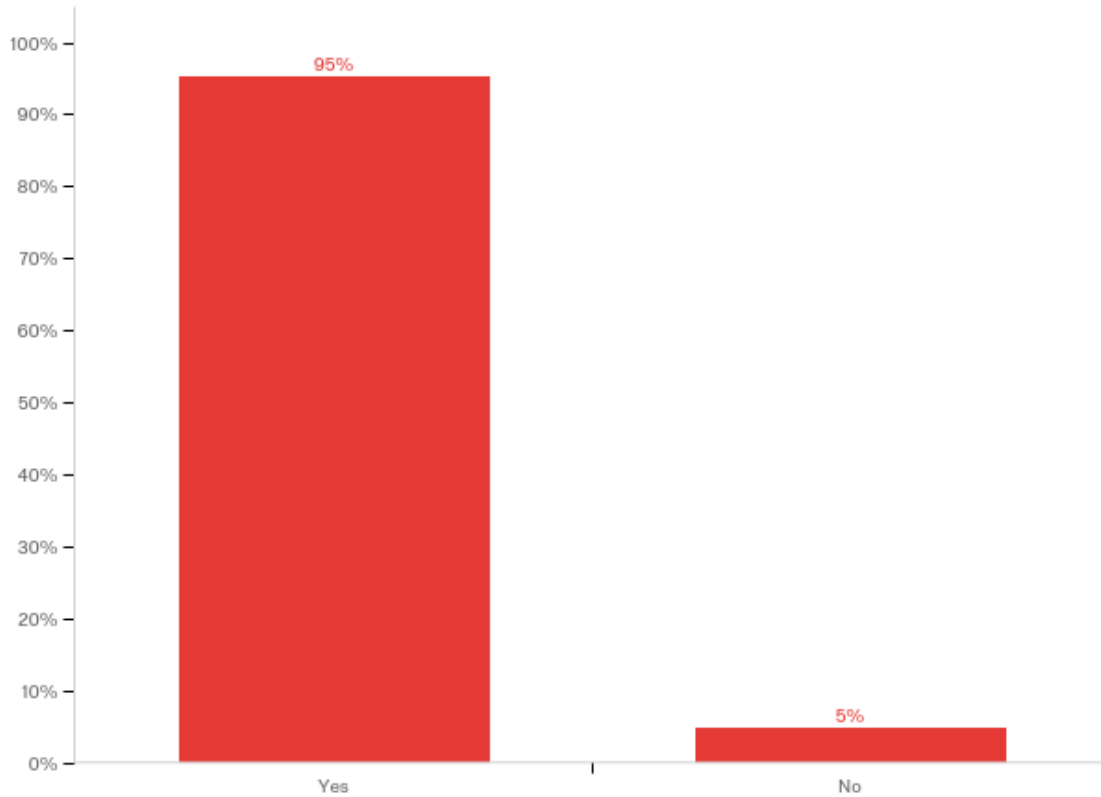


Survey results indicate that many family, friends, and community members spend less time in the cooking area with the new stove, as compared with the old stove. In some cases, these same groups of people (especially female friends or community members) are spending more time around the new cookstoves.

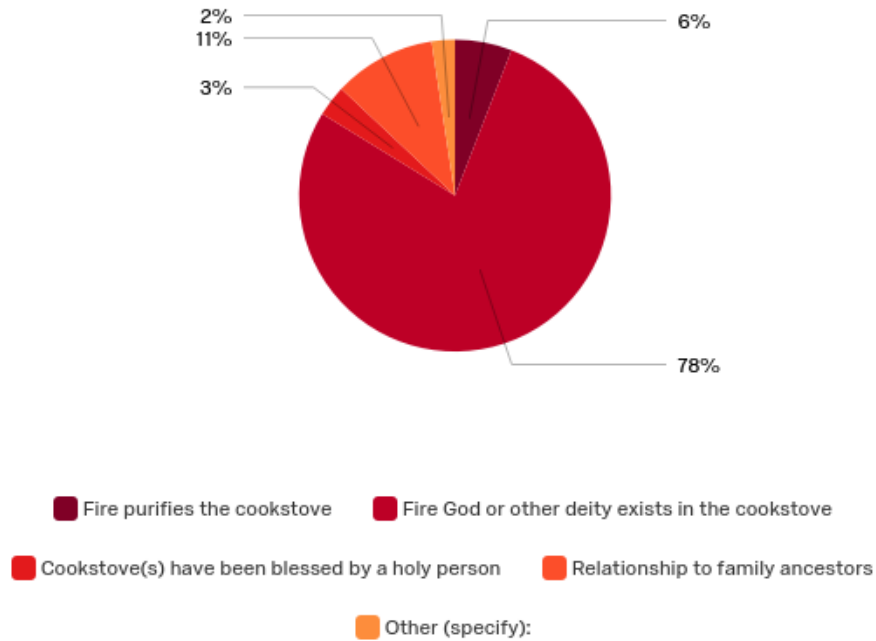
Q13: Do the following people spend more or less time in the cooking area with the NEW cookstove(s), as compared with the OLD cookstove(s)?



Q14: In your opinion, are cookstove(s) religious, sacred, or pure?

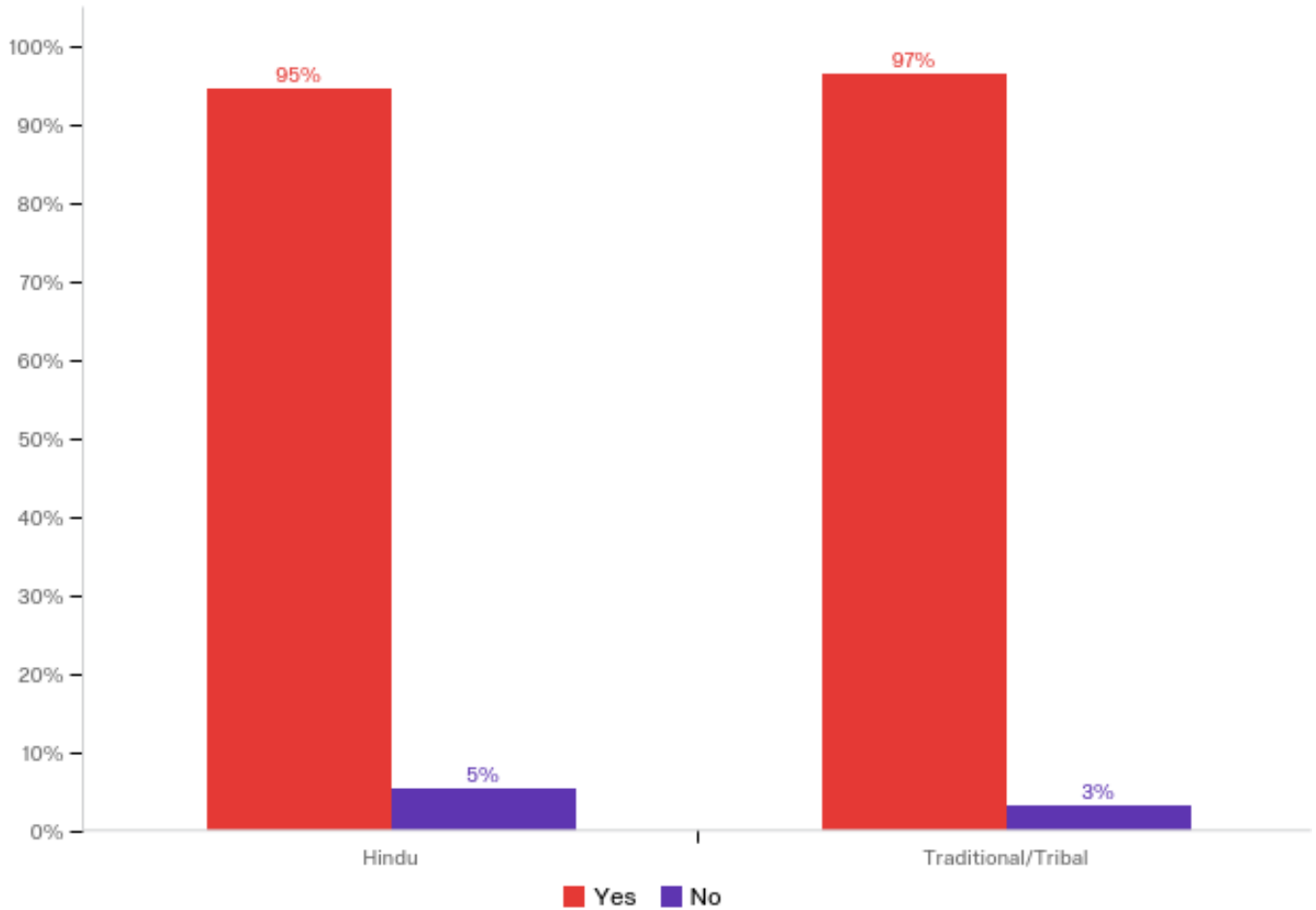


Q14a: If Yes, what makes them religious, sacred, or pure?



According to our survey, almost all respondents consider their cookstoves to be sacred. The top reason given by far for this belief was: Fire god or other deity exists in the cookstove (78% of respondents).

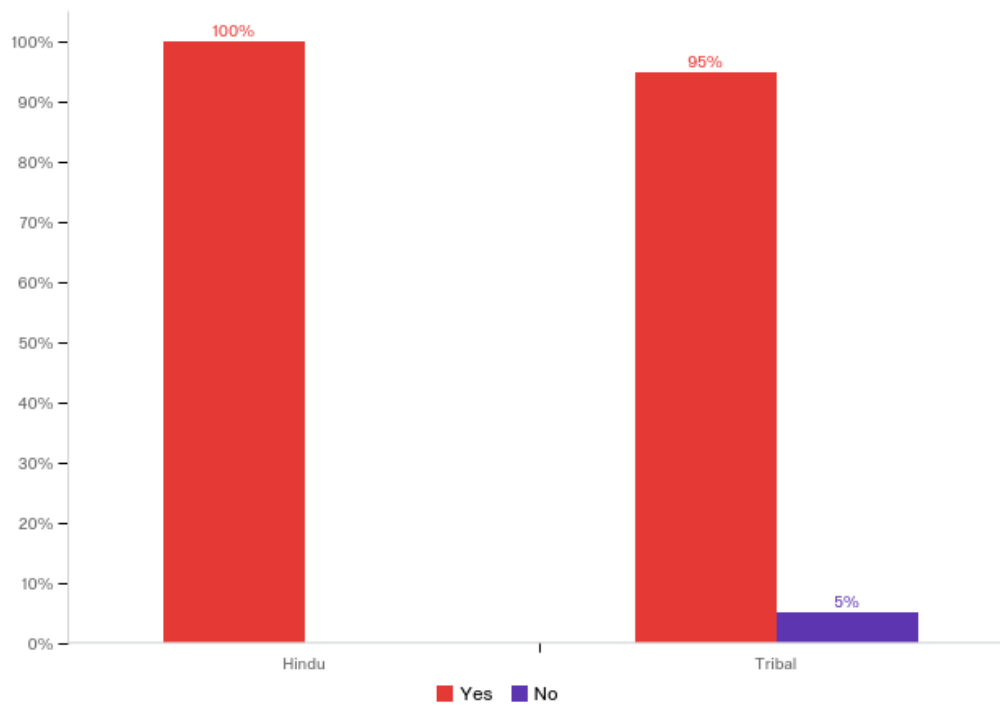
Q15: Did you decorate or purify your OLD cookstove(s) with designs, cow dung, etc.?



If Yes, why?



Q16: Do you decorate or purify your NEW cookstove(s) with designs, cow dung, etc.?

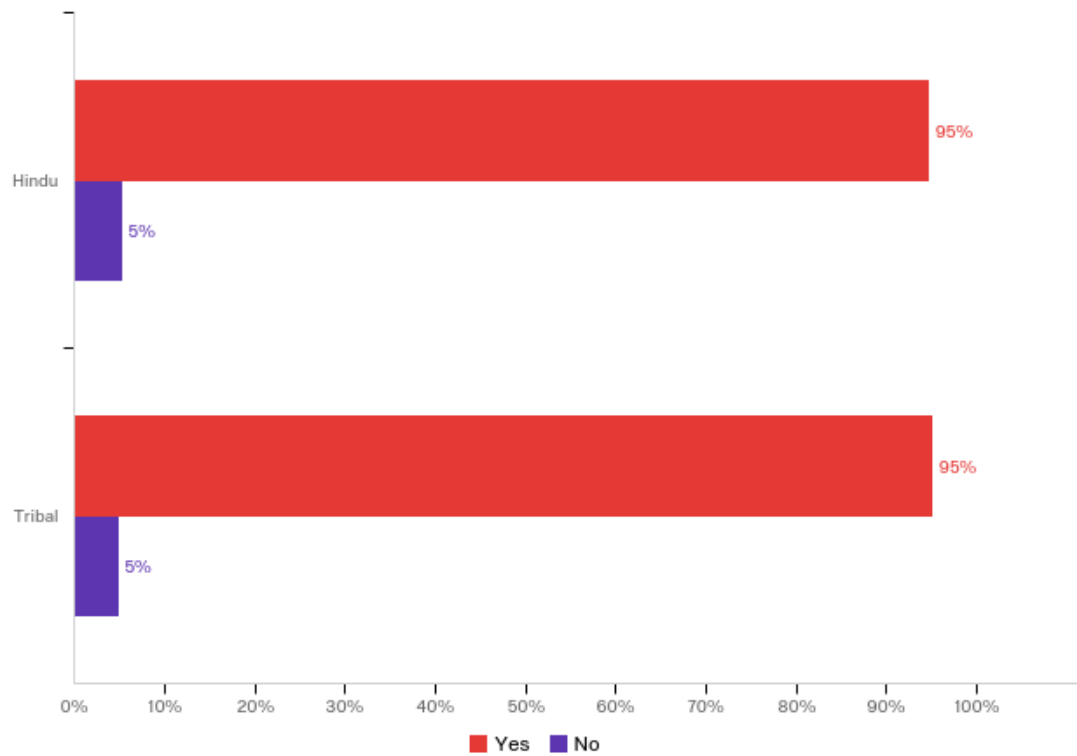


If Yes, why?

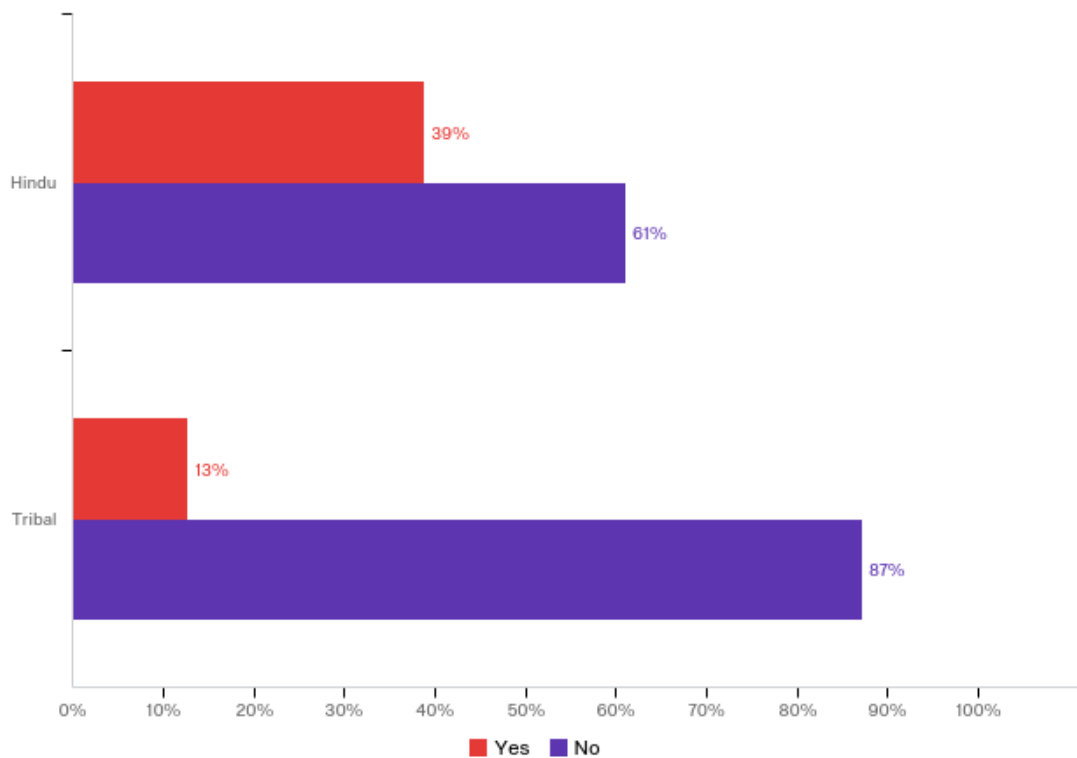
clean
tidy habit
neat
nice traditional
food
cooking
family
belief

Almost all survey respondents report decorating or purifying their cookstoves for the purpose of keeping the household clean and tidy. In addition, the use of decoration and purification rituals is unchanged between old and new stoves. These observations highlight not only the willingness of project participants to adapt cultural traditions for new technologies, but also the importance of including such cultural considerations in clean cookstove implementation projects in order to increase new stove adoption and retention rates.

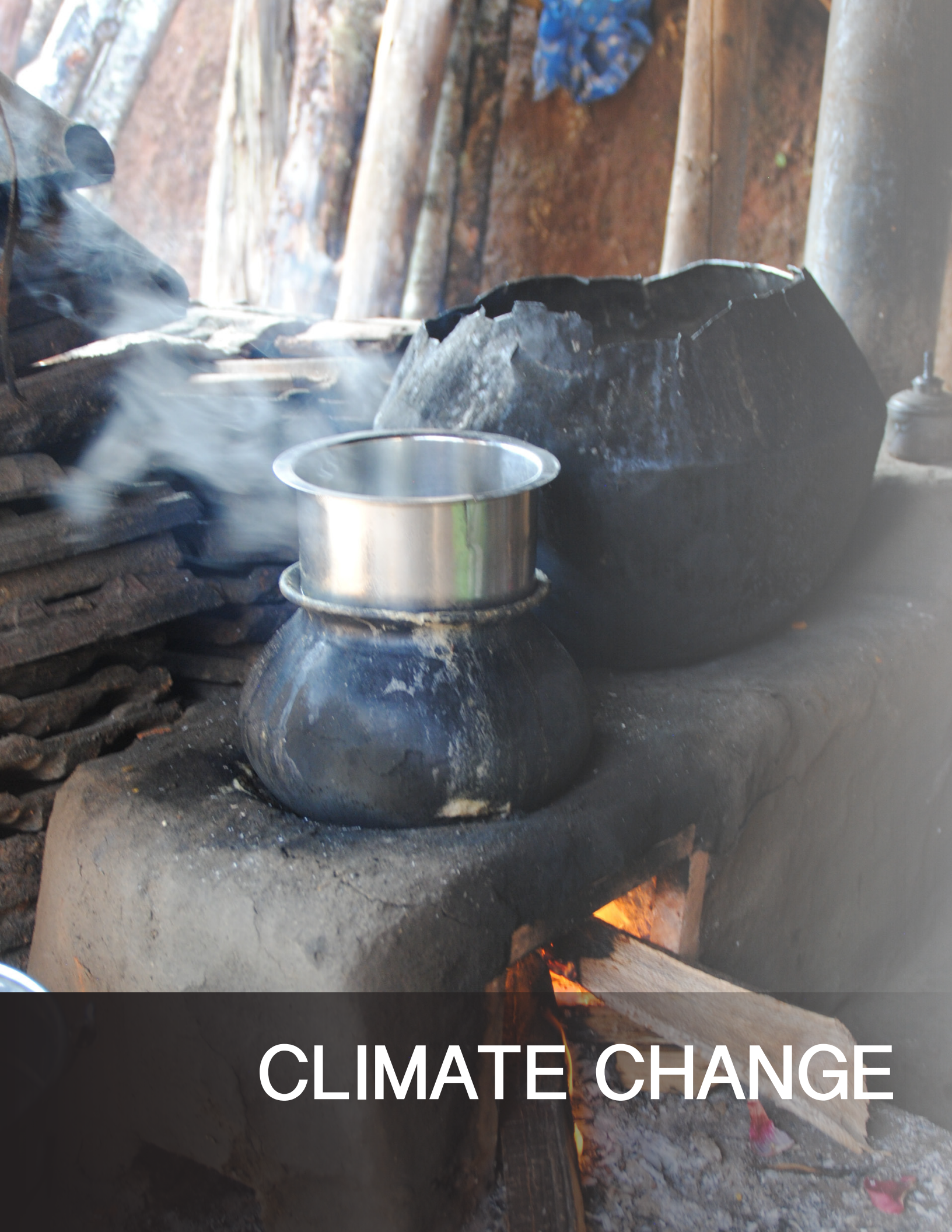
Q14: In your opinion, are cookstove(s) religious, sacred, or pure?



Q17: Do you do prayer or ritual with your cookstove(s)?



Regardless of religion (Hindu or Tribal), almost all respondents view their stoves as possessing some aspect of sanctity. A noticeably smaller number of respondents do prayer with their stoves, and within that group, respondents of Tribal religion use prayer rituals the least.

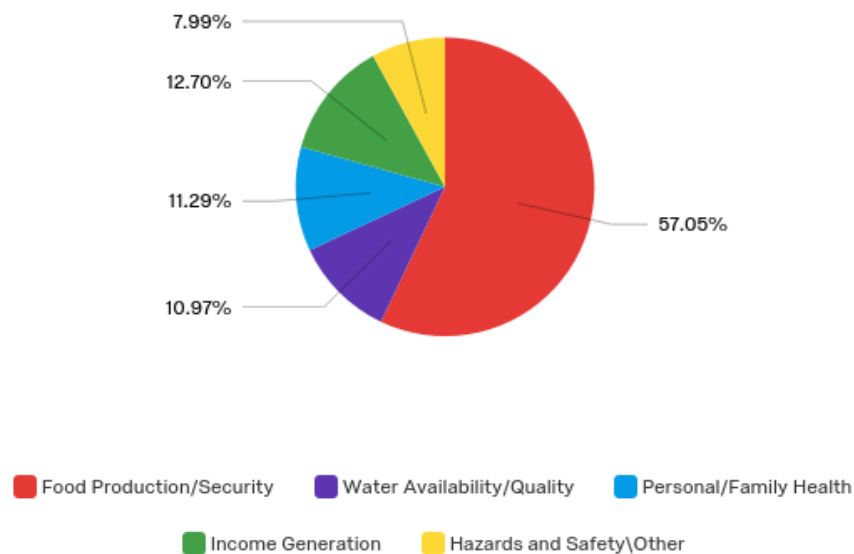


CLIMATE CHANGE

INTRODUCTION

Climate change questions were focused on two components 1) Perceptions of climate change, and 2) Perceptions of modernity in relation to improved cookstoves. Perceptions of climate change revealed significant awareness of climate change education. In particular, respondents indicated significant changes in both weather patterns, and the connection of climate change to burning fossil fuels. Fossil fuels in this case were strongly associated with the old cookstoves, rather than the new and improved ones. Furthermore, it was also revealed that there is a sociality at work when it comes to individual respondents, and how others in their community view themselves, and others with improved cookstoves. Respondents viewed other community members with improved cookstoves in high regard.

Which category of impacts are you most concerned about?

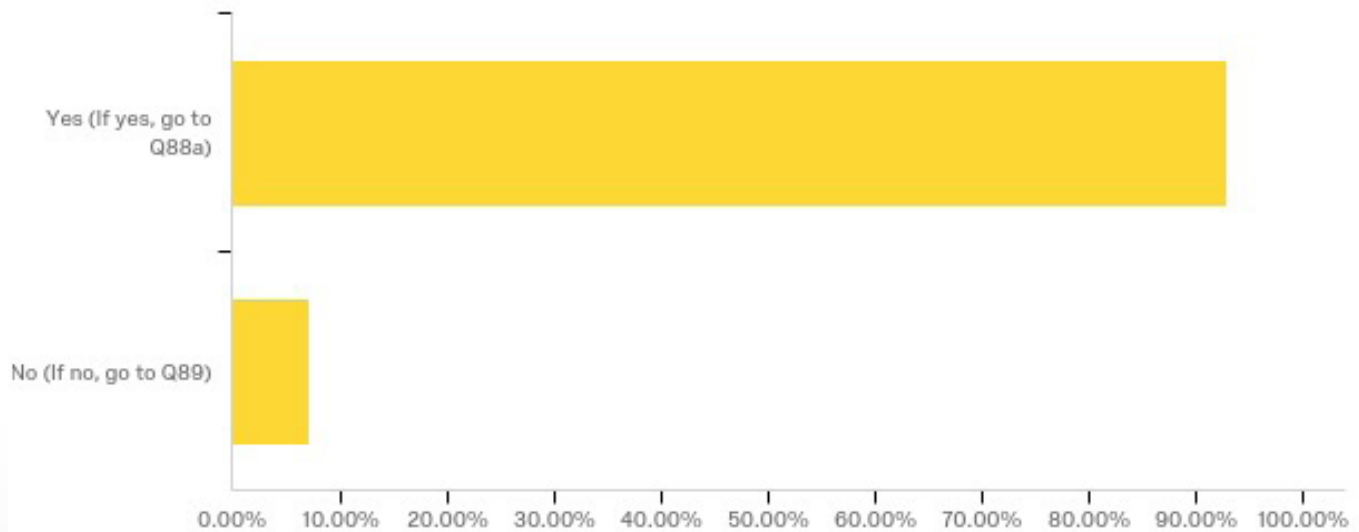


Laya has given us many things, like seed material for agriculture, solar lanterns, saplings for fruit bearing trees, chickens, and the slow sand filter (Female Stove User).

Q86: Do you see changes in weather patterns (climate change) as a serious threat?

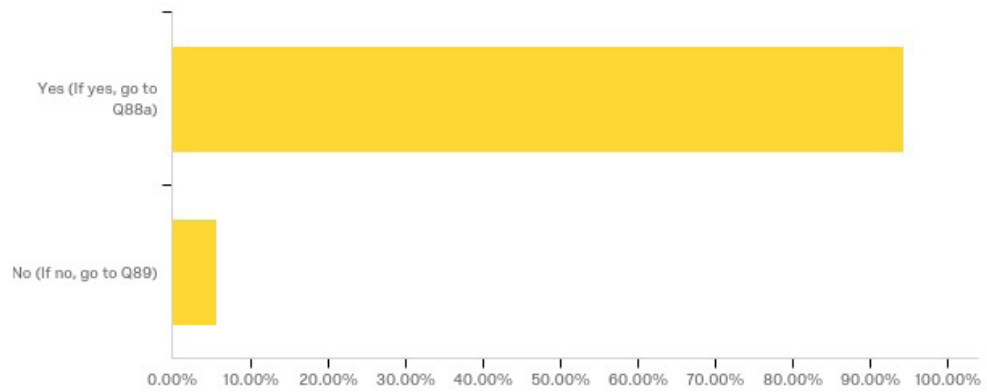


Q87: Do you think humans are to blame for changes in weather patterns (climate change) and resulting impacts?

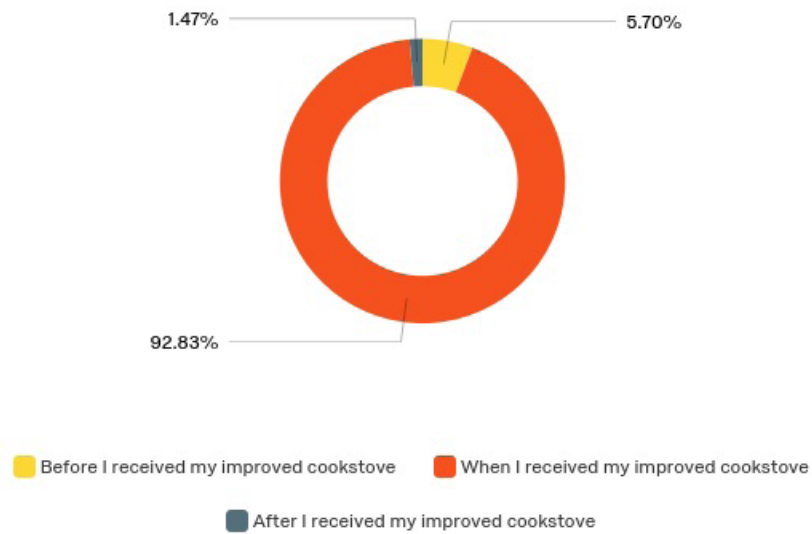


There is a lot of change in the weather, recently we have not gotten very good rain (Female Stove User).

Q88: Did your old cookstove contribute to changes in weather patterns (climate change)?



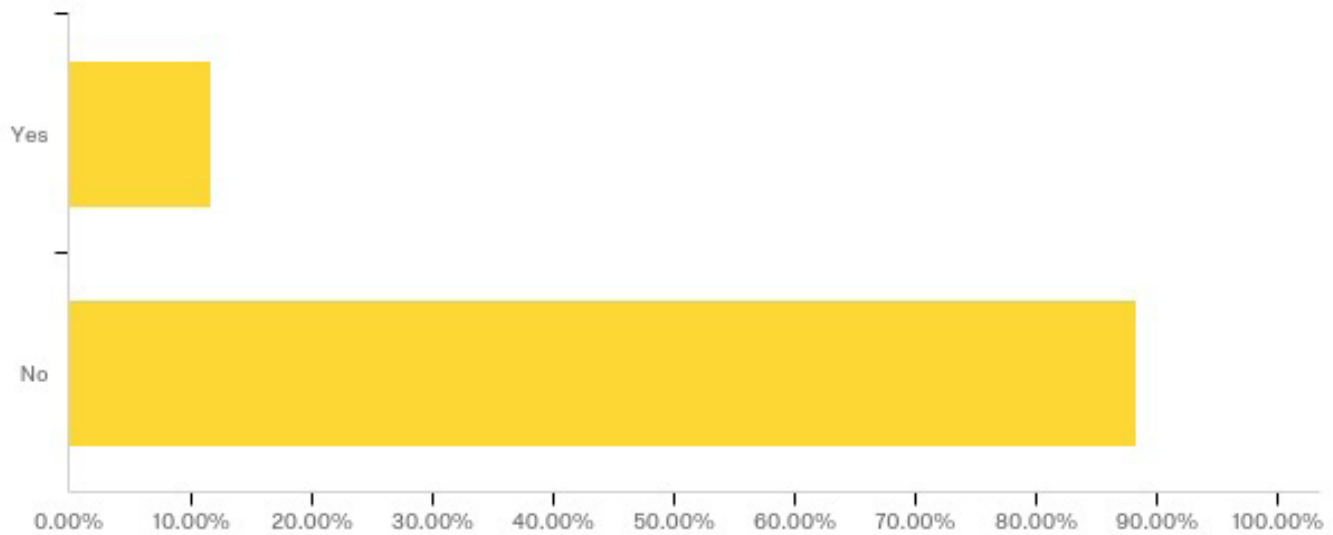
Q88a: If yes, when did you learn about your stove's contribution to changes in weather patterns (climate change)?



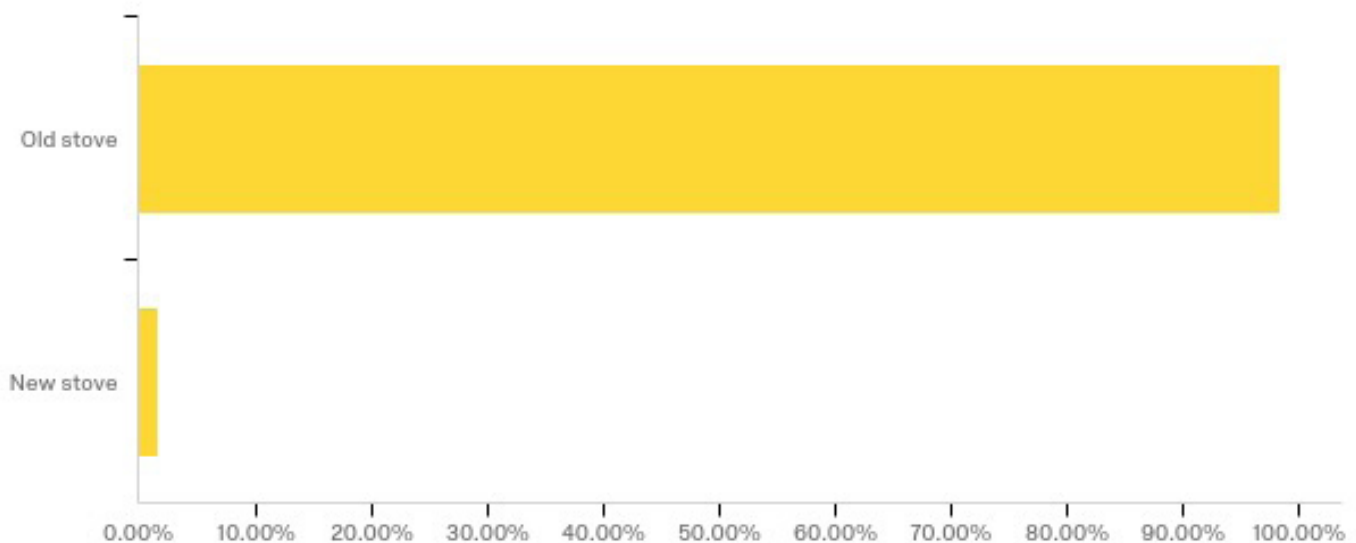
Climate change education is being communicated at the time of improved cookstove installation, to a very successful degree.



Q89: Does your new cookstove contribute to changes in weather patterns (climate change)?



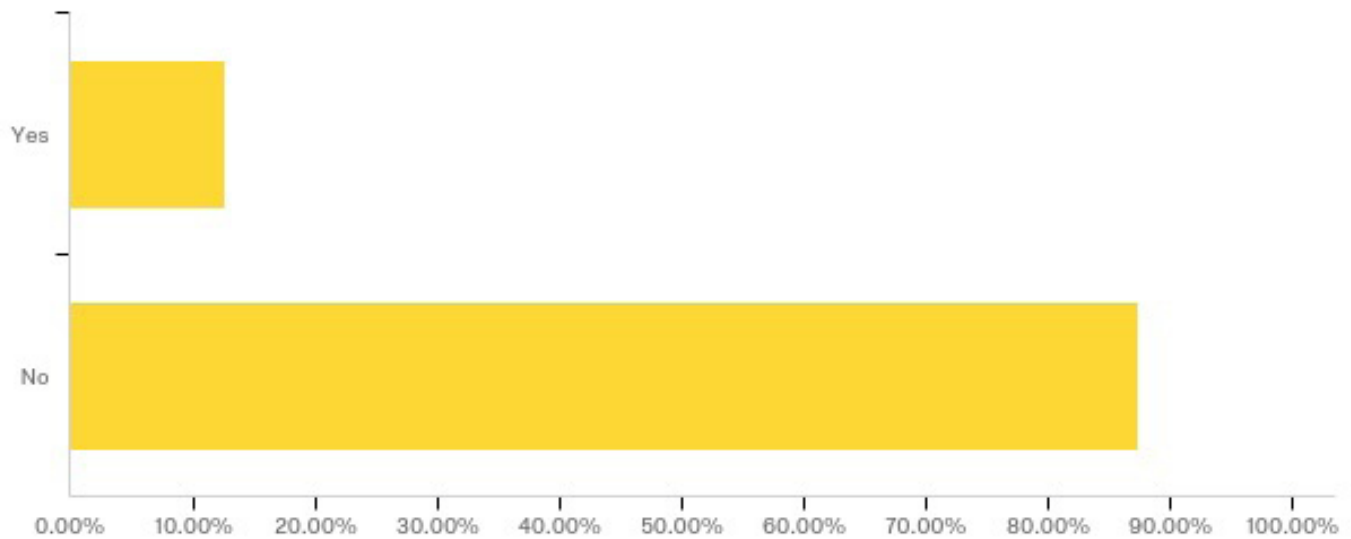
Q89a: If yes, which cookstove contributes more to changes in weather patterns (climate change)?



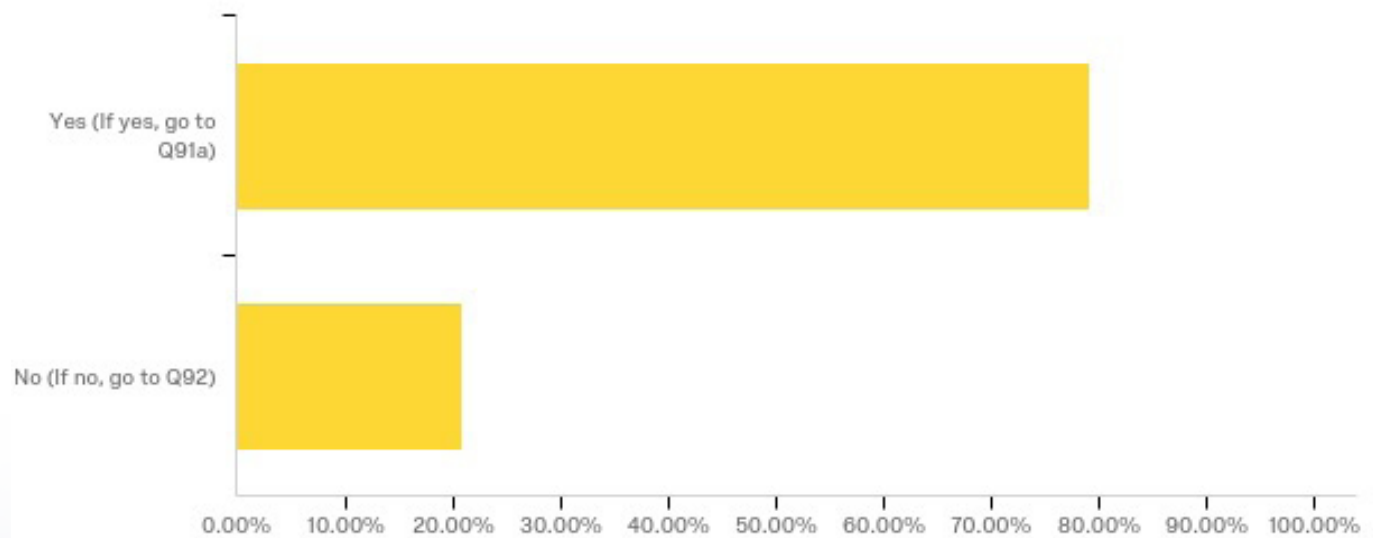
The forest has reduced in the last 15 years, there is less jackfruit and mango in the forest, as there are less of these trees now (Female Stove User).

Respondents indicate an over 90% response rate that reveals that old traditional cookstoves release more harmful pollution than newer stoves. Respondents also recognize that improved cookstoves contribute to less deforestation.

Q90: Does your current cookstove contribute to deforestation?

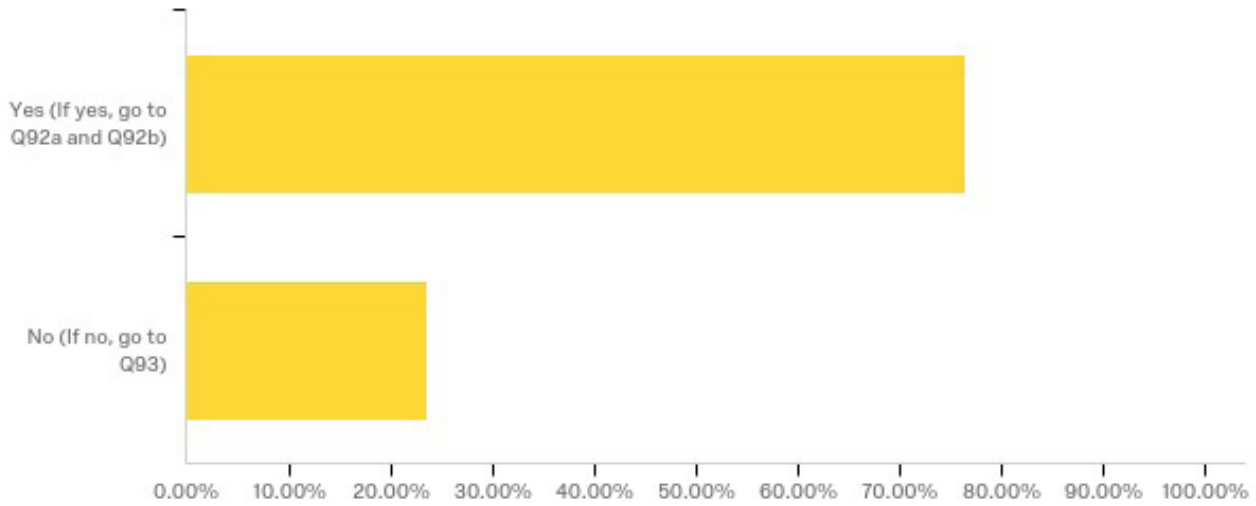


Q91: Has owning an improved cookstove changed how other village members view your household?

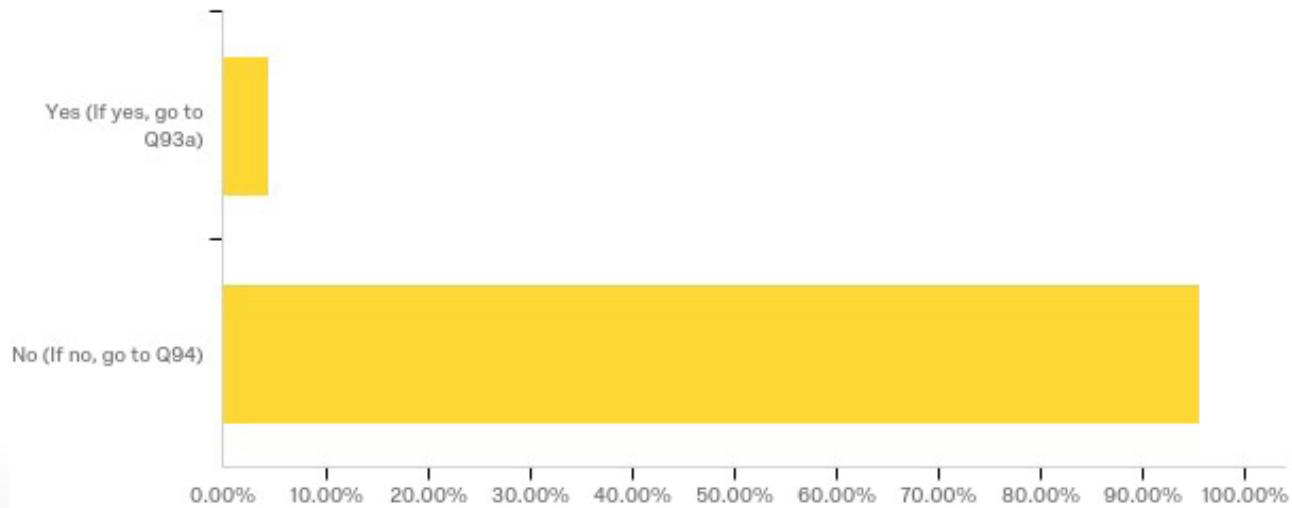


Household dynamics indicate a positive attitude toward owning an improved cookstove. Households tend to view other households with improved cookstoves in high regard.

Q92: Do you view yourself differently because you own an improved cookstove?



Q93: Do you feel pressure to switch from your traditional stove to an improved stove?



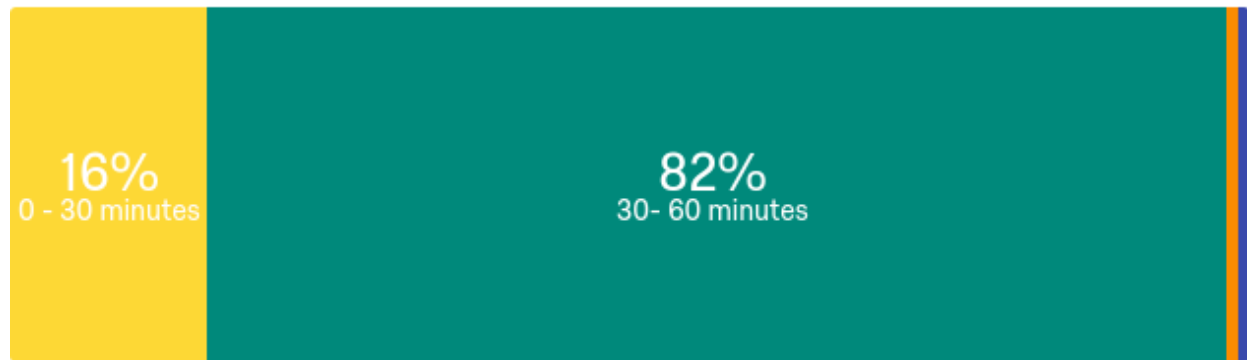
80% of Respondents see themselves differently when using an improved cookstove.





WATER FILTER

Q8: How many minutes less per day do you use your stove?



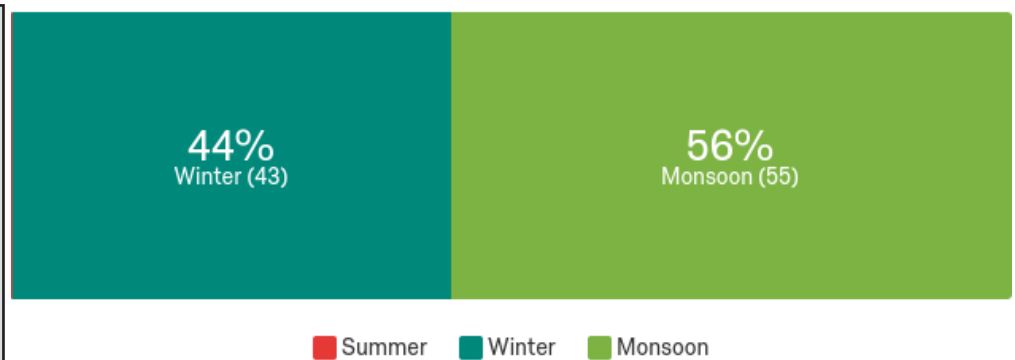
■ 0 - 30 minutes ■ 30 - 60 minutes ■ 1 - 2 hours ■ More than 2 hours

Over 95% of respondents who have a bio-sand water filter report that the amount of time they spend using their stove has decreased since receiving the filter, as they spend less time boiling water. In addition, 100% of respondents say that the amount of fuel they require during certain seasons is decreased due to the water filter. During those times, users say they might save 30-60 minutes per day by not having to boil water.

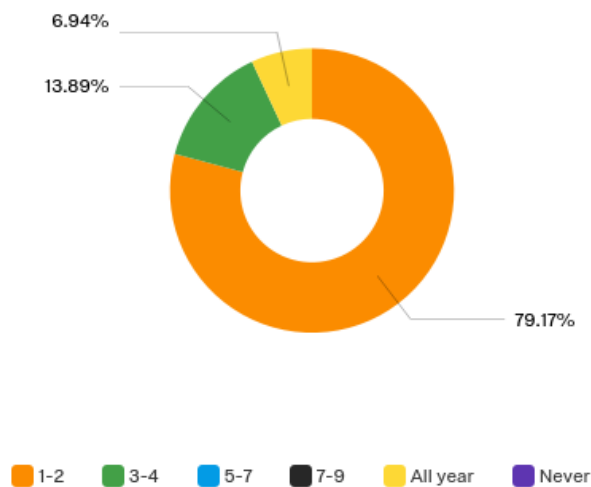
We like the water is clean, clear, drinkable. The water is very good once it is filtered. It happens in all season and doesn't matter what type of water it is. We like the type of water it comes out of it. Even in summer the water is cool, it is nice to drink (Female Stove User).

Q12: During which season do you boil water for drinking?

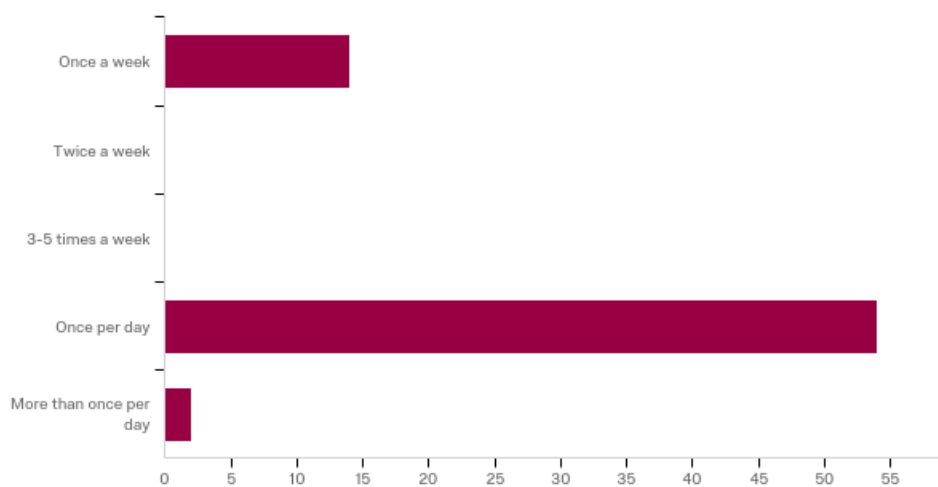
These questions give insight into the seasonality of water quality, and indicate during what times and how frequently different families have to boil water. This information is a proxy for how much annual fuel/ emissions or time savings we can expect from the water filter. It is clear that water quality is worst during the monsoon, and best during the dry months of the summer. Most families report only 1-2 months during which they must boil water for drinking, but during that time they have to boil water at least once a day to use for drinking.



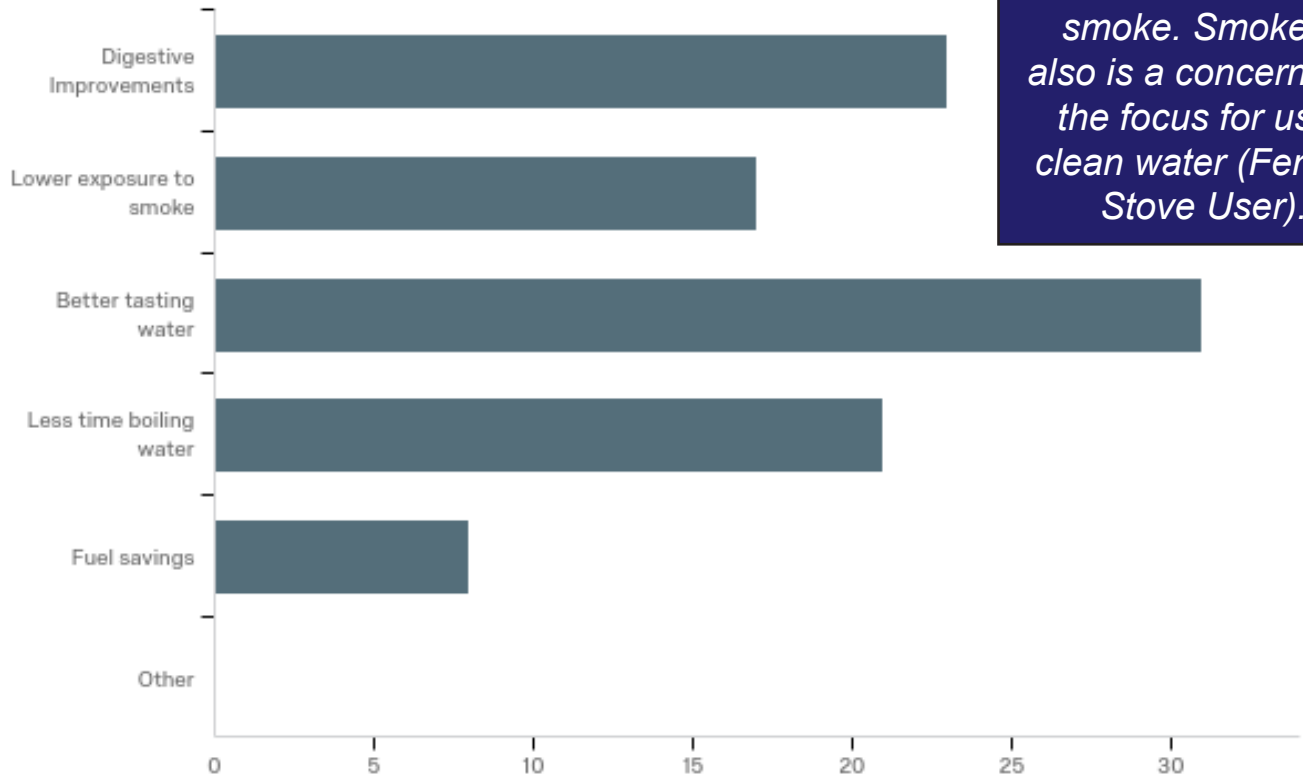
Q13: On average, how many months out of the year do you boil water for drinking?



Q14: During the months in which you boil water for drinking, how often do you boil water?



Q17: What is the biggest benefit from the water filter?



Water is more of a concern for us than smoke. Smoke is also a concern, but the focus for us is clean water (Female Stove User).

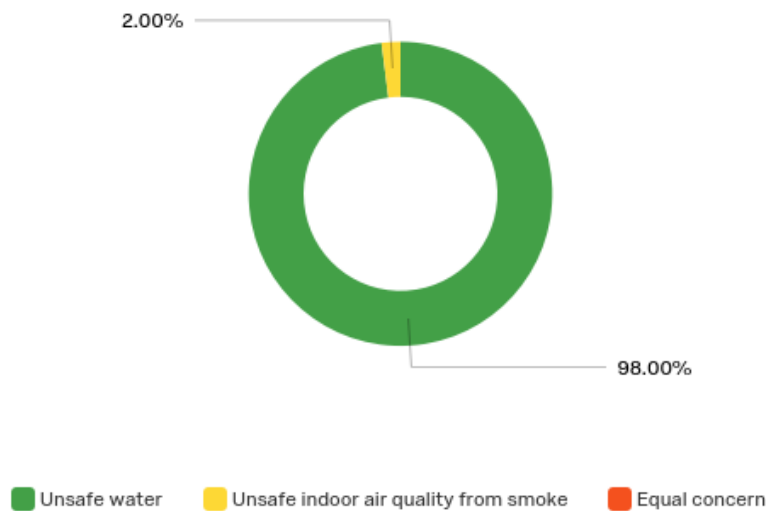


According to a majority of respondents, the greatest benefit of the filter is the improved taste of the water, a notable benefit in quality of life. However, many also emphasize better digestive health, time savings from boiling water, and less exposure to smoke as important benefits of the filter.



The strong majority of people who received a water filter report that the filter has decreased concern about water quality and water born disease in their village. They say that before receiving the filter, they were very concerned about water quality, and now the overwhelming majority indicate that they are no longer concerned about water.

Q22: Before receiving a filter and/or improved stove, what was of greater concern?



All but two of the respondents say that before receiving their filter, potable water was a more significant health concern in their household than smoke from their cookstove. Similarly, when asked if they would prefer to have their biosand filter or their clean cookstove, respondents unanimously answered that the filter is more important to them. These results illustrate that water quality is an enormous concern for people in these areas, and that water filters may be a more important health benefit for them than the improved stoves.

ಶೋಧನಾ ಕಾರ್ಯಕ್ರಮ
1. Sun day
2. Mon day
3. Tues day
4. Wednes day
5. Thurs day
6. Fri day
7. Satur day

BLOCK BOARD
* ಪ್ರಕಟಣೆ *
ಡಿ. 11-01-2017 ರಿಂದ 19-01-2017
ತರಕು ಸಂಕ್ರಮಣ ಸಂಕ್ರಮಣ -
20-01-2017 ನ ಪಾಠ್ಯಕ್ರಮ ಸಂಸ್ಥೆ
ಪಾಠ್ಯಕ್ರಮ -> ಇಟ್ಟು
ಪಾಠ್ಯಕ್ರಮ ಪಾಠ್ಯಕ್ರಮ
MPPS-ಅಂಡಿ
10/1/2017



University of Colorado
Denver

