



**PRACTICAL ANSWERS
TO POVERTY**

IAP SMOKE AND HEALTH

REPORT ON

IMPACT ASSESSMENT OF IAP SMOKE MONITORING ACTIVITIES AT KOGONY & KAJULU LOCATIONS KISUMU DISTRICT

REPORT BY

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LIST OF ABBREVIATIONS AND ACRONYMS

ARI	Acute Respiratory Infections
ACP	Access Control Profile
COLD	Chronic Obstructive Lung Diseases
ITDG	Intermediate Technology Development Group
IAP	In Door Air Pollution
FGD	Focus Group Discussions
PICs	Products of Incomplete Combustion
WHO	World Health Organisation
NCCCK	National Council of churches of Kenya
YWCA	Young Women Christian Association
WEDCO	Women development Co-operation
IGA	Income Generation Activities

1.0 EXECUTIVE SUMMARY

The ITDG Smoke Project was launched on May 6, 1998. The aim of the project is to contribute to the reduction of exposure to indoor air pollution in the light of these negative health effects. Working with 50 households in rural Kenyan communities, participatory technology development through participatory research methodologies has enabled the project to alleviate this pollution in people's kitchens.

An impact Assessment of the project activities was undertaken at Kisumu, Kajulu and Kogony sublocations between 23rd and 31st of December 2004. The period coincided with the festive Christmas holidays and offered the best opportunity to find the household representatives right at their homes.

During the assessment participatory techniques as well as key informant interviews were undertaken with household representatives in 22 households out of the targeted 27 households. Use was made of guided discussions where by the respondents provided information on noted aspects of impact realized in the households.

The reception in most of the households interviewed was good with the owners more than willing to participate. However the women of the households were in most instances either busy or not readily available. This situation necessitated interviews of other households who also installed smoke alleviation interventions.

Specifically the assessment sought to establish the impact of the interventions in various aspects namely; change in household environment, health and health risks, time, changes in income released from fuel savings and interpersonal relationships at household levels. The assessment also focussed on the negative impacts of the interventions. In this aspect the assessment sought to establish the problems arising from the interventions and any other problems associated with the various interventions.

Generally, the responses exhibited similar sentiments and there was a common spirit that the interventions impacted more positively than negatively to the daily lives of the beneficiaries. The cross cutting perception of the beneficiaries was that smoke alleviation through the various interventions had led to a better livelihood as compared to the situation in the past.

Findings revealed that since the installation of interventions to reduce IAP in the households there has been marked change in the frequency and intensity of infections and illnesses related to in door air pollution. Discussions during the interviews revealed that most of the positive impact was experienced by those households that had installed the stove and smoke hood. This they attributed to the nature and quantity of

smoke that is emitted from the stove and how it is led through the smoke hood out of the kitchen into the sky to the safety of the household.

Broadly the assessment also revealed that a lot of changes in use of income released from fuel savings within the households. Majority of the household with the interventions have experienced a new lease of life. Their standards of living have slightly improved. A number have engaged in other income generating activities from the minimal savings they accrued from using the interventions. Another finding was the use of these interventions has led to saving more time in cooking and cleaning giving the womenfolk a window of opportunity to pursue other household chores.

Use of the smoke hood has led to cleaner and hygienically safer houses. It was observed that most houses with these interventions have experienced less soot and smoke in their houses. The windows and eaves spaces have enhanced visibility through improved lighting. It was shared that it was now easier to undertake more household chores within the house as there was more natural light even in the evening. Another added advantage as shared by the respondents was the improved circulation of fresh air with the houses and kitchens. It was explained that it was now more comfortable to cook and stay in the house even when cooking was in progress.

2.0 BACKGROUND & INTRODUCTION

The ITDG Smoke Project was launched on May 6, 1998. The aim of the project was to contribute to the reduction of exposure to indoor air pollution in the light of these negative health effects. Working with 50 households in rural Kenyan communities, participatory technology development through participatory research methodologies enabled the project to alleviate this pollution in people's kitchens. Evaluation of changes in pollution levels and community views about the process and interventions was carried out.

The Household Energy Project. Baseline monitoring in the kitchens in these areas showed that smoke levels were unacceptable high: in West Kenya, the levels were 1713ug/m³. By involving communities in areas where ITDG is well-known and respected, participation and co-operation from people in monitoring the smoke levels of their houses was assured. The main objectives of the project were twofold: to improve the quality of life, through reduction in indoor air pollution, for households in these study areas: and to develop a participatory methodology for further research into appropriate ways to alleviate indoor air pollution. These objectives were to be achieved through:

- Carrying out a baseline assessment of pollution and exposure, fuel use and house structure.
- Identifying participatory ways of alleviating indoor air pollution through development and installation of interventions. (Interventions, within the context of this project, were identified as any changes which took place as a result of project activities which could affect the levels of indoor air pollution to which the occupants of the kitchen, especially women and children, were exposed.)
- Evaluation of changes in pollution and exposure, community views of the process used and the acceptability and affordability of the interventions
- Empowerment of communities by making them aware of the risks associated with household smoke and enabling mechanisms for its alleviation.
- Development of a strategy in a national context for dissemination and sustainability within the market constraints of the communities.
- Exchanging experience internationally to strengthen Kenyan work and to contribute to implementation of best practice in other countries.
- Development of a replicable participatory methodology on appropriate methods for reducing indoor air pollution. This methodology will form the basis for future work in international studies on indoor air pollution and interventions.

The primary concern of the project was to reduce indoor air pollution. There were substantial reductions in the particulate matter and carbon monoxide levels in the sample households after the interventions were installed.

The project has seen the project households accrue socio-economic, health, and cost benefits as a results of project activities and interventions. Whilst maintaining cultural requirements of housing design, the project has made improvements in ventilation, natural lighting, maintenance and general comfort in these households.

- Substantial reductions in indoor air pollution will have a positive impact on the health of the community
- Provision of more time to engage in economic activities through using stoves, rather than three-stone fires.
- Increased income through manufacture of smoke hoods, stoves, windows and frames for eaves spaces
- Savings realised through reduction in use of kerosene lamps and burning fuel more efficiently in stoves
- The community noted a reduction in time and money spent in hospitals with burns, coughs, eye, and chest pains
- Improved status of project women within community
- Women have gained confidence through the participatory activities
- Project team empowered with skills in data handling and analysis

Reduction in fuel consumption through stove use with consequent reduction in pressures on biomass sources.

The ITDG Smoke Project was launched on May 6th 1998. The aim of the project was to contribute to the reduction of exposure to indoor air pollution in the light of these negative health effects.

3.0 SCOPE OF THE ASSEMENT

Broadly the main objective of the assessment was to pull together the impact of the IAP smoke monitoring activities of ITDG-EA, in Kisumu, Kogony and Kajulu locations. The six-day assessment exercise entailed visiting and interviewing 30 households and representatives. The main thrust of the impact was placed on the following key areas of impact:

- Change in household environment
- Health impacts
- Health risks
- Time and use of time
- Changes in use of income released from fuel savings
- Interpersonal relationships at household level(between child, wife and husband)

The assessment also focussed on the negative impacts of the interventions. In this aspect the assessment sought to establish the problems arising from the interventions and any other problems associated with the various interventions.

The households visited were pre-coded and mobilized before the exercise began in earnest. The 30 households have been involved actively within the project and have participated in various monitoring activities as undertaken by the project.

4.1 Methodology

The impact assessment involved the combination of skilled outsiders (the interviewer) coupled with the participation of insiders (household interviewees) that enabled the two groups to complement and enrich the information base. It also enabled the in-depth understanding of the perception of the beneficiaries of the IAP reduction interventions. This approach enabled the generation information that would be useful for planning project activities and identifying potential problems.

The target community covered Kisumu, Kogony and Kajulu locations. The Assessment was directed by the use of checklists to gather the information that was entered into spreadsheet, analyzed and subsequently interpreted before being collated into the report herein.

Data Collection

Data was collected by the use of a checklist. The checklist focused on:

- (a) Change in household environment
- (b) Health impacts
- (c) Health risks
- (d) Time and use of time
- (e) Changes in use of income released from fuel savings
- (f) Interpersonal relationships at household level(between child, wife and husband)
- (g) Negative impact of the interventions

The interviews were conducted in their local language (luo and swahili) and the responses were recorded in English. A total of 27 household were involved.

Data collection was divided into primary and secondary data.

Secondary Data

This was collected from records availed by Intermediate Technology Development Group-Kisumu Office. This data covered the main thrust of the Energy Program's interventions.

Primary Data

The primary data collection process was through discussions with sampled households. The discussions were undertaken to generate mainly qualitative information. Participatory tools were utilized during this exercise.. The households interviewed were not given emoluments for the information they provided but were given transport reimbursements for their participation.

4.0 ASSESSMENT FINDINGS

An analysis of the findings from the assessment are presented here below in summary;

4.1 Health Impacts

Generally it is observable that there is difficulty in differentiating any causes of illnesses when extreme poverty, manifested in malnutrition, poor housing affects people's lives in most communities. However there are several serious illnesses for which indoor air pollution is a major factor. It can be further stated that each of the fuels used in the household has particular health problems associated with it. Broadly these aspects include the smoke, heat and smell emitted by the fuels used. Findings from the assessment revealed that most of the women and children are exposed to high levels of indoor air pollution as a result of smoke from using some fuels. Smoke consists of many gases and particles, which are known to have serious effects on health. Particulate and carbon monoxide are the most lethal. Respirable particulates (PM_{resp}) are the small particles of smoke (10microns in size), which are inhaled and penetrate deep into the lungs causing Acute Respiratory Infections (ARI) to infants and Chronic Obstructive Lung Diseases (COLD) in adults especially the women who do the cooking. Carbon monoxide (CO) is responsible for poisoning (mainly from charcoal) and lung cancer for use of coal

However it was observed that since the installation of interventions to reduce IAP in the households there has been marked change in the frequency and intensity of infections and illnesses related to indoor air pollution. Discussions during the interviews revealed that most of the positive impact was experienced by those households that had installed the stove and smoke hood. This they attributed to the nature and quantity of smoke that is emitted from the stove and how it is led through the smoke hood out of the kitchen into the sky to the safety of the household.

“ *The improved stove does not use semi-dry wood and hence it produces less smoke compared to the other normal stoves. This smoke is then led out of the kitchen through the smoke hood out of the house. It is now comfortable and nice to stay in the kitchen even when meals are being prepared as compared to the situation before when there was too much smoke* ”
.....Sentiments of an interviewee from Kajulu

Interestingly, households that had only windows and eaves spaces installed as the intervention for reducing IAP recorded less success as they claimed that very little of the smoke emitted from the fuels they use are taken out through this interventions.

Broadly it emerged that since the installation of the IAP reduction interventions most of the households interviewed have suffered less coughs, stinging eyes and colds or running noses. However despite this scenario a number of health risks have been realized. It was shared that the eaves spaces act as inlets for mosquitoes, rain drops and cold air or wind in the night posing a great risk of getting infected by malaria and pneumonia especially for the young children who commonly use the kitchen as their sleeping quarters.

“ Our children, especially the young girls use the kitchen for sleeping. The use of eaves spaces has led to a number of them being vulnerable to infections as a result of mosquitoes that come in through the spaces ”**Sentiments of an interviewee**

Another risk that was mentioned was that the smoke hood after long use collects soot which in some cases drop down into the food while cooking and may contaminate the food. This as mentioned was in cases where the foodstuff being prepared does not necessitate covering the cooking vessel.

4.2 Time Use

It was observed that use of some of the interventions has led to less time used in cooking. In particular, use of “upes” stove takes far less time as once it get hot the heat is contained and preserved on the walls of the stove taking less fuel and less time to cook the foodstuff. In comparison to the three stone cooking that has three openings that dissipate heat and does not heat the pot directly taking a longer time to cook.

It was also observed that reduced indoor air pollution also means that far much less soot is collected on the walls, ceiling, clothes and rooftops leading to less time used on cleaning of the kitchen and the house in general.

Broadly it can be observed that the use of these interventions has led to saving more time in cooking and cleaning giving the womenfolk a window of opportunity to pursue other household chores.

4.3 Cost Saving

The assessment revealed a number of changes in use of income released from fuel savings within the households. It emerged that use of “upes” stove has led to a marked decrease in use of fuel wood in the households. Prior to this the household used a lot their income to access firewood that would be used in large quantities to satisfy the normal domestic requirements.

“ Our savings from firewood has doubled as since the installation of the upesi stove we use half as much firewood as we used to before. This money can now be channeled to other uses in the household including food”Sentiments of an interviewee

Ironically, a number of households prior to installation of the IAP reduction devices such as the upesi stove used more money and time to access firewood as compared to the money they would use on the food to be cooked. This scenario has since changed and now the households can access more food or higher quality of food with the savings from the fuels as a result of the use of these IAP reduction devices. Another area in which the households have made savings by using the devices have been in the health related costs. Previously high percentage of the meager incomes of the households was spent on accessing medical services as a result of smoke-related illnesses and diseases. However with the installation of the IAP reduction devices these illness and diseases have markedly reduced leading to some substantial savings.

Broadly the assessment revealed a lot of changes in use of income released from fuel savings within the households. Majority of the household with the interventions have experienced a new lease of life. Their standards of living have slightly improved. A number have engaged in other income generating activities from the minimal savings they accrued from using the interventions.

4.4 Changes in Household Environment

The assessment also revealed a number of changes in the household environment as a result of the installation of the IAP reduction devices. Discussions during interviews revealed that the use of the smoke hood has led to cleaner and hygienically safer houses. It was observed that most houses with these interventions have experienced less soot and smoke in their houses.

“ My house now smells and looks better than it used to be. I am no longer afraid to have visitors stay over in my homestead. They can be assured of no coughs and no itching eyes even in my small kitchen”Sentiments of an interviewee

It also emerged that houses with windows and eaves spaces experienced enhanced visibility through improved lighting caused by the intervention. It was shared that it was now easier to undertake more household chores within the house as there was more natural light even in the evening.

Another added advantage as shared by the respondents was the improved circulation of fresh air with the houses and kitchens. It was explained that it was now more comfortable to cook and stay in the house even when cooking was in progress.

4.5 General Safety Issues

The general safety conditions around the interventions was also an issue of concern. It was underscored that instances have been reported of heat having serious physical health effects on users of particular fuels through burns from open fires from various fuels.

However with the installation of the Upesi stove it was observed that the fireplace has become safer than it used to be. This was attributed to the nature of the stove and its placement within the hood. It was also observed that the stove is more stable and secures cooking vessels safely with minimum risk of tumbling over.

“ The upesi jiko is so stable that even when a child or adult accidentally tumbles over he or she stands less risk of burning from direct fire or heat ”Sentiments of an interviewee

Broadly it can be observed that on issues of safety use of some of the interventions has received appreciation from the households interviewed.

4.6 Negative Impacts of the Interventions

Despite the positive accolades for the use of smoke alleviation interventions by most of the households interviewed a number of shortcomings were also underscored. These negative impacts were highlighted and are presented below “

- **Eaves spaces:** Some of the respondents indicated that the spaces let mosquitoes and rain drops. This situation posed a health risk particularly to young girls who use the kitchen as their sleeping quarters.
- **Smoke hood:** A small number of the households shared the handicap that the base of the smoke hood was low and therefore rather un comfortable to use when cooking. The need for frequent cleaning of the walling inside the hood was also viewed as a time consuming and cumbersome task. A number of the households also felt disgusted by the frequent leaks around the smoke hoods' point of entry on the roof tops of their houses. It was also observed that during rainy seasons hanging of wet wood over the fireplace on the roof was used as a coping mechanism to dry the wood over a period of time as the cooking went on. However with the advent of the smoke hood this was impracticable because the hood casing enclosed the heat.
- **Windows and eaves spaces:** As single interventions, it was observed by some households that these interventions do not let out enough smoke to avoid indoor air pollution

The table below is a summary of the findings from the household interviews:

HH NUMBER	HEALTH- CHANGES NOTED BY INTERVIEWEE	COST SAVING/ INCOME GENERATION	TIME SAVING/ REDUCED TIME	ENVIRONMENT - INDOOR AND OUTDOOR	OTHER CHANGES NOTED BY INTERVIEWEE
K02	<ul style="list-style-type: none"> Reduced smoke related illnesses like itchy eyes, coughing, blocked nose Less frequent visits to the hospital, less money spent on over the counter medicine The fire is enclosed thus less risk of fire related accidents 	<ul style="list-style-type: none"> Upesi jiko uses less firewood thus fuel budget has reduced remarkably Improved income generation in that the time saved on cooking is spent on income generating activities e.g. agriculture Reduced health costs 	<ul style="list-style-type: none"> Upesi jiko cooks faster thus less time is spent in the kitchen Less time is spent on cleaning the house since there is less smoke to cover the walls, roof and furniture in soot 	<ul style="list-style-type: none"> The smoke hood lets out extra heat thus the house is cooler There is a marked reduction in the amount of smoke in the house while cooking The house is cleaner thus brighter 	<ul style="list-style-type: none"> Improved relations amongst the family members since they can all sit together in the kitchen during and after cooking to discuss the days events
K05	<ul style="list-style-type: none"> Reduced smoke related illnesses like blocked and running nose Cooking area is enclosed and set aside thus reduced risk of fire accidents 	<ul style="list-style-type: none"> Upesi jiko uses less firewood thus savings can be spent on other household needs, like food Reduced health related expenses 	<ul style="list-style-type: none"> The jiko preserves heat thus cooks faster which saves a lot of time The extra time is utilized on other household chores 	<ul style="list-style-type: none"> The kitchen is cleaner, has no soot or smell of smoke The absence of smoke means better lighting and even children can read while cooking 	<ul style="list-style-type: none"> The family spends more quality time together, e.g the children play around the mother and the husband can discuss important family matters with the wife as she cooks When it rains heavily the area around the smoke hood leaks
K07	<ul style="list-style-type: none"> The fire is enclosed which has reduced the risk of accidents The incidences of smoke related illnesses has gone down for both women and children 	<ul style="list-style-type: none"> The food warmer can be used to cook slowly for long, hence one can go around doing other activities that supplement the household income like farming or operating small businesses The jiko uses less firewood thus the fuel savings can be used on other household needs like food 	<ul style="list-style-type: none"> The heat in the jiko is enclosed and therefore the food cooks faster Less time is spent cleaning the kitchen and utensils because there is no soot on the walls, roof and sufurias. The food warmer keeps food warm for long thus saves on time that would have 	<ul style="list-style-type: none"> The reduced smoke makes the kitchen generally cleaner and better lit The smoke gets out through a direct route thus the external environment is also less polluted 	<ul style="list-style-type: none"> The interventions make cooking very discreet, therefore one can cook without visitors knowing Soot collects in the hood and if not cleaned frequently may fall back into the house The base of the hood is too low thus makes it uncomfortable while cooking and smoke doesn't get out as it should The area around

			otherwise been used to heat up the food		the chimney leaks
K08	<ul style="list-style-type: none"> The people who frequent the kitchen complain less about smoke related illnesses like watery eyes, congested chest and runny nose There is only one opening in the jiko which means that fire can not spread and cause accidents 	<ul style="list-style-type: none"> All the firewood goes into the fire thus less is needed to cook a meal. Fuel savings have gone down by half as compared to the traditional three stone fireplace The time saved on cooking is spent to plough farms which is an income generating activity 	<ul style="list-style-type: none"> Fire is not blown all over therefore food takes less time to cook The reduced smoke in the house means things do not get dirty as fast and therefore the frequency and intensity of cleaning has gone down. 	<ul style="list-style-type: none"> There is more fresh air in the house hence visitors can sit comfortably in the house while food is cooking The general external environment is less smoky since the smoke has one outlet 	<ul style="list-style-type: none"> The interventions have made life easier because the cooking area is in the same room as the bed space and sitting space The area around the chimney leaks
K12	<ul style="list-style-type: none"> Reduced smoke related illnesses like chest infections, blocked nose, stinging eyes The fire does not spread hence there is reduced risk of fire related accidents 	<ul style="list-style-type: none"> Reduced health related costs- less money is spent on hospital bills and to buy medicine The jiko uses less firewood therefore there is an increase in fuel savings 	<ul style="list-style-type: none"> The fire is not blown out by the wind therefore one does not have to keep blowing, which saves on time while cooking The jiko preserves heat thus cooks faster 	<ul style="list-style-type: none"> The eave spaces, window and reduced smoke generally mean the house is better lit and aerated The house is cleaner because there is no soot on the roof or the walls 	<ul style="list-style-type: none"> The interventions make cooking very discreet and one can even cook in the presence of visitors without them knowing
K13	<ul style="list-style-type: none"> Upesi jiko only uses dry firewood thus less smoke is emitted and consequently reduced occurrences of smoke related illnesses 	<ul style="list-style-type: none"> The jiko uses less firewood therefore fuel savings have increased and can be used to meet other needs within the house like buying food 	<ul style="list-style-type: none"> The fire is enclosed and therefore cooks faster than the traditional three stone jiko. Time saved can be used on other household chores 	<ul style="list-style-type: none"> The environment in the kitchen is better because there is less smoke. The change is however minimal because there is no smoke hood so the amount of smoke reduction is not very significant The kitchen is better organized 	
K14	<ul style="list-style-type: none"> Reduced smoke related 	<ul style="list-style-type: none"> The upesi jiko uses less 	<ul style="list-style-type: none"> The chimney requires 	<ul style="list-style-type: none"> The house is cleaner 	<ul style="list-style-type: none"> The chimney was too long and was

	illnesses. For instance since the interventions were installed a daughter who had a chest infection has not had any complaints	firewood and therefore fuel savings have increased and can be used on other household needs. <ul style="list-style-type: none"> The reduction of smoke related ailments has consequently led to reduced health costs 	frequent cleaning or else soot collects and may fall into the food	because there is no soot on the walls or roof <ul style="list-style-type: none"> There is improved lighting because there is less smoke 	blown apart by the wind, therefore it leaks <ul style="list-style-type: none"> The wire mesh used to cover the eave spaces had such big openings that a lot of mosquitoes get into the house
K16	<ul style="list-style-type: none"> Reduced health problems brought about by smoke e.g. runny nose and congested chest Less chances of fire related accidents because the fire is enclosed 	<ul style="list-style-type: none"> The jiko uses much less firewood and therefore fuel expenses have gone down by half It is expensive to put up the smoke hood hence hers has been made but not installed 	<ul style="list-style-type: none"> Time is saved on cooking because the fire is enclosed and is all directed to the cooking pot thus food takes less time to cook Cleaning the house is also less frequent and less intense since there is less smoke to cover the walls, roof and furniture with soot 	<ul style="list-style-type: none"> The house is generally cleaner and brighter because of the reduction of smoke emitted into the house The environment surrounding the house is also less smoky because the jiko only uses very dry wood and thus emits less smoke than the traditional three stone fire place 	
K17	<ul style="list-style-type: none"> Since the interventions were installed there are reduced cases of blocked / runny nose and stinging eyes The jiko is very stable therefore reduced risks of accidents e.g. if a child bumps into it while playing it doesn't topple over 	<ul style="list-style-type: none"> Upesi jiko uses less firewood hence fuel expenses have gone down. The Fuel savings are used to buy food and meet other household needs that may arise 	<ul style="list-style-type: none"> The jiko preserves heat and hence cooks faster than the three stone fireplace One does not have to sit by the fire to monitor the cooking because the fire does not go off quite as much. The saved time is used to do other chores around the house 	<ul style="list-style-type: none"> The kitchen is much cleaner than before. There is no soot on the walls or the roof The kitchen is also better lit because there is less smoke 	<ul style="list-style-type: none"> The reduced levels of smoke have brought about better relations within the family and with visitors because people can comfortably sit in the kitchen and catch up on events even when cooking is in progress.
K19	<ul style="list-style-type: none"> Reduced smoke related illnesses like coughs, runny nose, red and 	<ul style="list-style-type: none"> The jiko uses half as much firewood hence fuel savings have gone up. The 	<ul style="list-style-type: none"> Food takes less time to cook therefore the extra time is used in the farm 	<ul style="list-style-type: none"> The house is cleaner and better lit thus one is not embarrassed 	<ul style="list-style-type: none"> The interventions make cooking discreet which is very

	<p>watery eyes</p> <ul style="list-style-type: none"> The fire place is safer because the fire is enclosed thus reduced incidences of fire outbreaks 	<p>savings are used on purchasing food</p> <ul style="list-style-type: none"> The food warmer uses absolutely no fuel at all thus saves on the wood that would have otherwise been used to heat up food 	<p>or to look for food</p> <ul style="list-style-type: none"> Time spent on cleaning the house has also reduced because there is no smoke to make the house as dirty as fast 	<p>when visitors sit in the kitchen</p>	<p>important in the African culture especially in the presence of guests</p> <ul style="list-style-type: none"> There are improved relations amongst the family members because they can all congregate in the kitchen and catch up on the days events while food is getting ready During the rainy season however, one cannot dry firewood over the fire because the fireplace is enclosed
K22	<ul style="list-style-type: none"> The fire burns for longer thus less blowing required which is a major cause of coughs and watery eyes 	<ul style="list-style-type: none"> Upesi jiko uses less firewood therefore the fuel savings are used on other household needs like buying utensils The heat preserved in the jiko can be used for ironing clothes which also saves on fuel that would have been purchased for that particular purpose 	<ul style="list-style-type: none"> Takes less time to cook food because the fire is enclosed There is no need to sit by the fire and wait for the food to cook because the fire is not constantly blown off by the wind. The extra time is used to do other household chores 	<ul style="list-style-type: none"> There is no soot to make the walls, roof and furniture dirty hence the house is cleaner and brighter 	<ul style="list-style-type: none"> There are better relations amongst the family members because they have more time to sit together and talk
K24	<ul style="list-style-type: none"> Reduced smoke related illnesses because smoke does not spread in the house but goes out 	<ul style="list-style-type: none"> Changed fuel from firewood to charcoal hence fuel savings have gone up because less charcoal is used in comparison to firewood The income saved is spent on other household needs 	<ul style="list-style-type: none"> The charcoal jiko takes less time to cook food as compared to the traditional three stone fireplace 	<ul style="list-style-type: none"> The reduced smoke has led to a cleaner better lit environment in the kitchen and the house in general The outdoor environment is also less polluted because the charcoal jiko emits less smoke than 	<ul style="list-style-type: none"> There are improved relations amongst the family members and with visitors because everyone can sit in the kitchen without hesitation The area around the smoke hood leaks during the rainy season

				the three stone fireplace	
K25	<ul style="list-style-type: none"> The house is less stuffy hence there is a reduction of smoke related illnesses like coughing, itchy eyes and blocked nose 	<ul style="list-style-type: none"> The only intervention is a window thus savings on cost are not really applicable apart from reduced medical costs 	<ul style="list-style-type: none"> No change experienced 	<ul style="list-style-type: none"> The house is slightly less stuffy and is better lit 	
K26	<ul style="list-style-type: none"> Reduced smoke related illnesses like coughs, runny nose, red and watery eyes The fire place is safer because the fire is enclosed thus reduced incidences of fire outbreaks and children play further from the cooking area 	<ul style="list-style-type: none"> Less income is spent on fuel and the savings are used to supplement food purchases 	<ul style="list-style-type: none"> The fire in the upesi jiko is enclosed thus heat is preserved which means food takes less time to cook 	<ul style="list-style-type: none"> The reduced smoke in the house means the house is cleaner and better lit since it is not engulfed in smoke 	<ul style="list-style-type: none"> The interventions make cooking discreet- "the whole world doesn't have to know that one is cooking"
K27	<ul style="list-style-type: none"> Remarkable reduction of health problems associated with smoke. The intervention (gas cooker) emits almost no smoke at all 	<ul style="list-style-type: none"> Once refilled takes long before it runs out therefore saves on frequent fuel purchases 	<ul style="list-style-type: none"> Cooks food very fast and therefore there is a lot of extra time that is used on other household chores 	<ul style="list-style-type: none"> There is no smoke at all in the house therefore it is cleaner and brighter There is no smoke emitted into the surrounding air therefore the outdoor environment is also much cleaner 	<ul style="list-style-type: none"> A bit expensive to refill and have to wait for the husband to come home from the urban areas so as to refill the cylinder
K28	<ul style="list-style-type: none"> Reduced headaches and red eyes The fire is enclosed therefore less risk of fire outbreaks 	<ul style="list-style-type: none"> Takes less firewood for food to cook thus the savings on fuel have gone up Income previously spent on firewood is spent on food 	<ul style="list-style-type: none"> Takes less time for food to cook and very little supervision required. The extra time can be used in the farm or to do other household chores like washing and taking care of the compound 	<ul style="list-style-type: none"> The house is cleaner, less stuffy and there is no soot to make the walls, roof, clothes and furniture dirty 	<ul style="list-style-type: none"> Improved relations within the family because husband and children now frequent the kitchen to keep the mother company while she is cooking The upesi jiko is difficult to use with semi-dry firewood which makes it difficult to cook during the rainy season

					<ul style="list-style-type: none"> • There is a lot of soot stored in the smoke hood which sometimes contaminates the food
K29	<ul style="list-style-type: none"> • No blowing of fire thus reduced ailments related to inhalation of smoke e.g. coughing, blocked nose and watery eyes 	<ul style="list-style-type: none"> • Income spent on medical bills has reduced • The jiko uses less firewood but there are no fuel savings because firewood is very expensive 	<ul style="list-style-type: none"> • Takes less time to cook food thus some time is saved which can be used on other household chores 	<ul style="list-style-type: none"> • The house is cleaner and less stuffy hence the children can now sleep in the kitchen comfortably 	<ul style="list-style-type: none"> • The area around the hood leaks during the rainy season • Better relations since people can comfortably sit in the kitchen while the woman of the house is cooking
EXTRA INTERVIEW BELOW					
K02 (husband)	<ul style="list-style-type: none"> • Reduced coughing, blocked nose and stinging eyes 	<ul style="list-style-type: none"> • Income previously spent on firewood is spent on food and other arising needs 	<ul style="list-style-type: none"> • Cannot touch much on time since not aware of the time food takes to cook 	<ul style="list-style-type: none"> • The house is much cleaner because there is no soot on the walls and roof 	<ul style="list-style-type: none"> • If the opening of the jiko is blocked, smoke tends to get all over the house instead of out through the hood • The chimney requires frequent cleaning
K05 age 16	<ul style="list-style-type: none"> • Does not tear, cough or have blocked nose when cooking • The fire is enclosed thus one cannot burn easily when cooking 	<ul style="list-style-type: none"> • The jiko uses less firewood than the three stone fireplace 	<ul style="list-style-type: none"> • The fire does not keep going off so the food takes less time to cook 	<ul style="list-style-type: none"> • The house is cleaner and better lit and one can even read while cooking 	
K07 (daughter in law)	<ul style="list-style-type: none"> • The smoke does not get into one's eyes and throat when one is cooking 	<ul style="list-style-type: none"> • The food cooks using less wood thus nowadays less money is spent on buying firewood 	<ul style="list-style-type: none"> • The food takes less time to cook therefore one has more free time to do other things around the house 	<ul style="list-style-type: none"> • The house is clean because there is no smoke to turn the walls and roof black 	<ul style="list-style-type: none"> • The base of the hood is too low that when one is cooking they keep bumping their heads into it
K08	<ul style="list-style-type: none"> • No more coughs runny nose, and stinging eyes while cooking 	<ul style="list-style-type: none"> • The food warmer keeps food hot for long thus saving on fuel that would have otherwise been used to warm the food • When there is a lot of cooking to be done the food warmer can also 	<ul style="list-style-type: none"> • The fire in the upesi jiko is enclosed and thus food takes a shorter time to cook • The house does not have to be cleaned frequently because there is no soot on 	<ul style="list-style-type: none"> • The house is cleaner and brighter 	<ul style="list-style-type: none"> • There are no ashes that are blown into the food while one is cooking • Cooking has become very discreet and visitors can sit in the house without knowing that there is any

		be used and since it does not use any fuel the expenditure on fuel goes down	the walls and roof		cooking in progress
<i>K09 (co-wife)</i>	<ul style="list-style-type: none"> Coughs and eye problems have reduced since the interventions were installed The fire is enclosed hence there is less risk of fire outbreaks 	<ul style="list-style-type: none"> The upesi jiko uses less firewood thus more money is saved on fuel which can be used on other household needs like alternative fuel for lighting 	<ul style="list-style-type: none"> Saves time because food cooks faster than using the traditional three stone fireplace 	<ul style="list-style-type: none"> The house is cleaner and brighter and things in the house do not get dirty 	<ul style="list-style-type: none"> The eave spaces let in rain water and mosquitoes
<i>K13 (husband)</i>	<ul style="list-style-type: none"> There is reduced heat in the house which has reduced fevers in the house The fire is enclosed and hence can not easily cause an accident 	<ul style="list-style-type: none"> The expenditure on firewood has gone down because upesi jiko uses less firewood 			<ul style="list-style-type: none"> The jiko cannot use semi-dry firewood thus making it hard to use during the rainy season
<i>K15 (daughter in law)</i>	<ul style="list-style-type: none"> Reduced smoke related illnesses like eye infections and coughs 	<ul style="list-style-type: none"> The budget for firewood has gone down and the fuel savings are used on other household needs 	<ul style="list-style-type: none"> Food takes less time to cook thus extra time can be used for relaxation and to do other things around the house 	<ul style="list-style-type: none"> The house is cleaner and brighter because the smoke does not spread into the house 	
<i>K18 (co-wife)</i>	<ul style="list-style-type: none"> Reduced smoke related illnesses like runny nose and coughs The way it is constructed makes it difficult for the children to get very close thus reducing the chances of fire accidents 	<ul style="list-style-type: none"> There is less firewood used to cook food hence fuel savings are spent on other needs like food, soap and other small needs that may arise The preserved heat can warm food even after the fire goes off thus saving on extra fuel costs 	<ul style="list-style-type: none"> The jiko preserves heat thus cooks faster and with little supervision hence there is a lot of extra time that can be used on other household chores 	<ul style="list-style-type: none"> There is no smoke to make the house dirty hence the house is better lit and cleaner 	<ul style="list-style-type: none"> There are improved relations amongst the family members since they can all sit together and catch up on the days events while food is getting ready

5.0 CONCLUSIONS & RECOMMENDATIONS

The assessment was successfully concluded, and its findings bring to the fore the achievements, concerns, challenges and problems associated with the implementation of the smoke alleviation interventions. The assessment outcomes provided useful insights by the beneficiaries. The interventions enhanced the awareness of the community on the dangers caused by in door air pollution. Currently a large number of the beneficiaries attest to the fact that In door smoke is harmful to human health and that use o smoke alleviation interventions is a sure way of reducing the health risk

It is my recommendation that:

- Capacity building of local artisans and masons should be undertaken on effective methods of installation of smoke hoods.
- There should be training on maintenance and cleaning of smoke hoods locally
- ITDG should formulate networks with community based structures i.e. groups to strengthen and advocate for use of the interventions widely

APPENDICES

List of Interviewees

	HOUSEHOLD NUMBER	NAME OF REPRESENTATIVE
1	K02	
2	K05	
3	K07	
4	K08	
5	K12	
6	K13	
7	K14	
8	K16	
9	K17	
10	K19	
11	K22	
12	K24	
13	K25	
14	K26	
15	K27	
16	K28	
17	K29	
18	K02	
19	K05	
20	K07	
21	K08	
22	K09	
23	K13	
24	K15	