switchasia GRANTS PROGRAMME

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Study Report

KNOWLEDGE, ATTITUDE,PRACTICE (KAP)

EVOLVING A WOEN CENTERED MODEL OF EXTENSION OF IMPROVED COOK STOVE FOR SUSTAINED ADOPTION AT SCALE –SWITCH ASIS-ii (BACHAT)

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CHAPTER - 1

BACKGROUND

A large part of the world's population uses fuel wood for household cooking and space heating, mostly in developing countries. Energy from traditional biomass fuel is thought to account for nearly one-tenth of all human energy demand today (more than hydro and nuclear power together), and wood-based fuels probably make up some two-thirds of household use.

In poor developing-country households, wood, charcoal and other solid fuels (mainly agricultural residues and coal) are often burned in open fires or poorly functioning stoves. Incomplete combustion leads to the release of small particles and other constituents that have been shown to be damaging to human health in the household environment. Too little is known, however, to distinguish any differences in health effects of smoke from different kinds of biomass.

Given that levels of household solid fuel use are expected to remain high, efforts to improve household air quality are concentrated on improving stove efficiency and venting the smoke away from the home.

With proper stoves and good fuel burning practices, fuel wood and charcoal as well as other biomass can be burned cleanly, producing mostly carbon dioxide and water. Such conditions are difficult to achieve in poor rural and urban areas where small-scale inexpensive wood-burning stoves are used. Wood fuel that is not properly burned to carbon dioxide is diverted into products of incomplete combustion – primarily carbon monoxide, but also benzene, butadiene, formaldehyde, poly aromatic hydrocarbons and many other compounds posing health hazards. The best single indicator of the health hazard of combustion smoke is thought to be small particles, which contain many chemicals.

1.1. PROJECT BACKGROUND

CARE India's SWITCH-Asia II ICS (Improved Cook Stove) initiative is an attempt to set up a Women-Centered Extension Model for Adoption of ICS among Forest Dependent Households (FDHs). The project seeks to increase the adoption of sustainable lifestyles among FDHs in states like- Chhattisgarh and Odisha. Both Chhattisgarh and Odisha states have a substantial population of economically poor and tribals (Chhattisgarh- with 45% economically poor and 31% tribals; while Odisha- with 36% economically poor and 23% tribals), they are largely dependent on forest. These population which comes around 19 million, residing in and around forest coverage area, were highly dependent on forest for fuel wood for their household needs like-cooking.

The project adopts an incremental approach to increase awareness of women on clean energy options for household use and also influenced men to be supportive to them in this endeavor. Women were facilitated acquisition of Improved Cook Stove with financial and technical inputs and other stakeholders in the ICS ecosystem for a clean energy transition. The project was supported women to test ICS options against different parameters like- device functionality, affordability, "smokelessness", ease of use and other individual and Forest Dependent Household preferences and take an informed decision.

CHAPTER –2

PROJECT AREA

The study was conducted in three districts namely– Jashpur in Chhattisgarh, Kalahandi and Kandhamal districts in Odisha states. The study (women-centered extension model for adoption of ICS among Forest Dependent Households) was conducted on adoption of ICS practices introduced in the project areas, mainly on both men and women on clean energy option for household use through outcome indicators of KAP(Knowledge, Attitude and Practice).

CHAPTER - 3

THE STUDY

3.1 Objective

Under the project, CARE India is working on Evolving a Women-centred Model of Extension of Improved Cook Stoves (ICS) for Sustained Adoption at Scale with support from EU in Odisha and Chattisgarh. The overall objective of the project is to promote sustainable adoption of ICS as a clean cooking energy solution among forest-dependent households (FDH), through a combination of capacity building, collectivization, market development, and multi-stakeholder engagement actions, resulting in 10,000 women from FDHs using ICS and developing a sustainable ICS adoption model for replication among 800 million rural households in the country who use traditional and polluting cook stoves.

A combination of approaches such as value chain development and capability enhancement of women from marginalized households, and influencing men and key value chain actors are being adopted to generate demand and ensure market based supplies of ICS for the poor keeping in mind their requirements and ability to pay.

The project aims to increase the awareness of women on clean energy options for household use, facilitate acquisition of ICS, financial and technical interventions, and influence men and other stakeholders in the ICS ecosystem to be supportive of women's endeavors for clean energy transition. The project works on innovative, women-led extension methodologies and tools, and engagement with women leaders from existing Self Help Groups (SHGs) as Sustainable Household Energy (SHE)-Champions for peer influence and education on Sustainable Consumption and Production.

3.2 Objectives of the study

As part of SWITCH Asia II project - Knowledge, Attitude, Practice (KAP) study is planned to be undertaken on annual basis to understand the level of ICS adoption being introduced by the project. Annual KAP studies will also help to understand the changes brought by the program activities over the period of time in addition to feeding into the final evaluation of the program and contributing to establish causal linkages with some of the process and interventions.

The study looked at indicators related to Knowledge, positive changes in attitudes and general practices (particularly output and outcome indicators specific to the project) in order .

The project specific objectives are as follows:

- To measure the achievement of outcomes
- To assess contribution of the project towards advancing 5 domains of change of CARE India (Capacity, capability and self-esteem ; leadership at multiple levels ; positive attitude and enabling environment of the stakeholders ; enabling policy)
- To measure the change trends within the project

3.3 Methodology Implemented

3.3.1 Timeframe and human resource involved

The survey was conducted in the month of March and April, 2018. The team of data collectors included MSW students of Government Autonomous College, Bhawanipatna in Odisha and field volunteers from Chhattisgarh, who understand local language and can collect data from field.

3.3.2 Tools

A standard format was used for collection of information. The nature of data collected from household (HH) interview participatory tools and techniques. The collected data was then cleaned and verified.

3.3.3 Study area, sampling size and selection

The study was conducted in 3 districts - Jashpur in Chhattisgarh and Kalahandi & Kandhamal in Odisha state. In year 1, a total of 505 forest dependent households (FDHs) were selected randomly from Jashpur, Kandhamal and Kalahandi districts. 166 households selected from 3 blocks of Kalahandi, 166 households selected from 3 blocks of Kandhamal and 173 households selected from 2 blocks of Jashpur district. In year 2, 166 households selected from 3 blocks of Kalahandi, and 173 households selected from 2 blocks of Jashpur district and 502 households from 3 cohorts in Kandhamal district.

CHAPTER - 4

MAJOR FINDINGS

Table:4.i- General info on profile of respondents and comparison with Y1 KAP study
The detailed profile of the respondents of the study is given below;

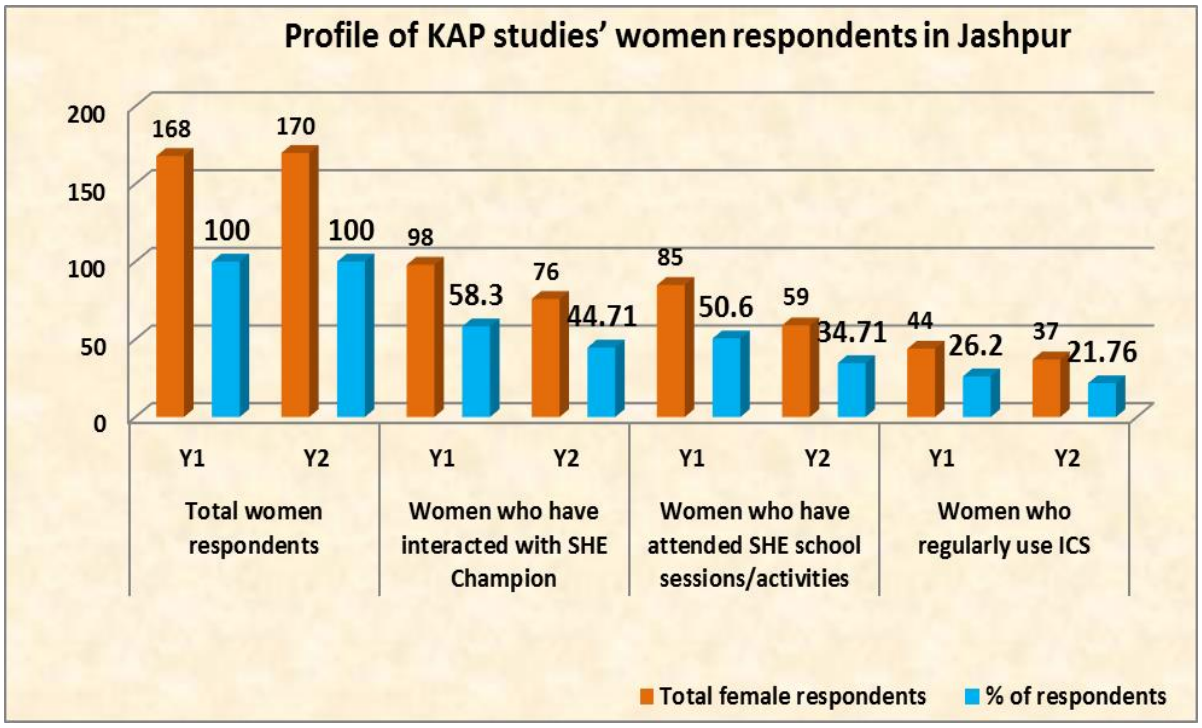
Profile of respondents	Total Male Respondents		
	Jashpur	**Kalahandi**	**Kandhamal**
Total male respondents	*100%*	*100%*	*100%*
SHE Champion / male change agent	*1.15%*	3.61%	3.61%
ICS purchaser	12.72%	20.48%	12.72%
Spouse of SHE Champion	35.29%	4.80%	4.80%
Attended field days of SHE school	21.39%	*0%*	NA
Involved in ICS enterprise	3.47%	2.41%	NA

Table:4.ii- Bachat project's profile of KAP studies' women respondents: Y1 vs. Y2 (district wise)

The district wise and year wise detailed profile of women respondents of Bachat project's of KAP studies is presented below;

	Jashpur								**Kalahandi**								**Kandhamal**						
	Total women respondents		Women who have interacted with SHE Champion		Women who have attended SHE sessions/activities		Women who regularly use ICS		**Total women respondents**		Women who have interacted with SHE Champion		Women who have attended SHE sessions/activities		Women who regularly use ICS		**Total women respondents**		Women who have interacted with SHE Champion		Women who have attended SHE sessions/activities		Women who regularly use ICS
	Y1	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**	**Y2**	**Y1**
Total female respo	***168***	***170***	**98**	**114**	**85**	**59**	44	**85**	***166***	**166**	81	**114**	78	123	14	32	166	189	39	NA	52	189	1
% of responders	***100***	***100***	***58.3***	***67.05***	***50.6***	**34.71**	26.2	**50.76**	***100***	***100***	48.8	68.67	47	74.10	8.4	19.28	100	37.6	23.5	NA	31.3	37.6	0.6

Graph:4-a : Profile of KAP studies' women respondents in Jashpur district (Chhatisgarh)



The profile of KAP studies' women respondents in Kalahandi district (Odisha) has been shown in the following graphical presentation.

Graph-4-b: Profile of KAP studies' women respondents in Kalahandi district (Odisha)

4.1. Knowledge Related Indicators

4.A. General knowledge on cooking energy

The awareness of women on different types of stoves in Jashpur district (Chhattisgarh) is presented in the following table.

Table-4.1.1: Awareness of Women on different types of stoves in Jashpur district (Chhattisgarh)

Types of Stove	Jashpur (Chhattisgarh)			
	Year-1		Year -2	
	Frequency of "yes" response	Percentage (%)	Frequency of "yes" response	Percentage (%)
Traditional Cook Stove	164	97.6	170	100.00
Charcoal Stove	36	21.4	135	79.41
Kerosene Stove	157	93.5	163	95.88
LPG	159	94.6	155	91.18
Electric Stove	68	40.5	106	62.35

Bio Gas	60	35.7	78	45.88
Solar Stove	15	8.9	70	41.18
Others/ ICS	11	6.5	141	82.94

The above table shows that in year-1, most women(164 nos) in the Jashpur district i.e 97.6% have aware about the traditional Cook Stove. Similarly, the other types of stoves like LPG and Kerosene Stove the nos of women aware about these types of stove are 159 and 157 which is 94.6 % and 93.5% respectively. In year-1, very few women are aware about the Solar Stove and Charcoal Stove. It is only 6.5% and 21.4% respectively.

Similarly, in the same district in year-2,the situation of awareness has been improved a lot due to the active intervention. The awareness of women in this district on Traditional Cook Stove has been improved to 100%.That is, all the respondents in the study are aware about the traditional Cook Stove. In case of Solar Stove and Charcoal Stove the level of awareness has been improved considerably, as stated in the above table and in the following graph.

Graph-4 C: Awareness of Women on different types of Stoves in Jashpur district (Chhattisgarh)

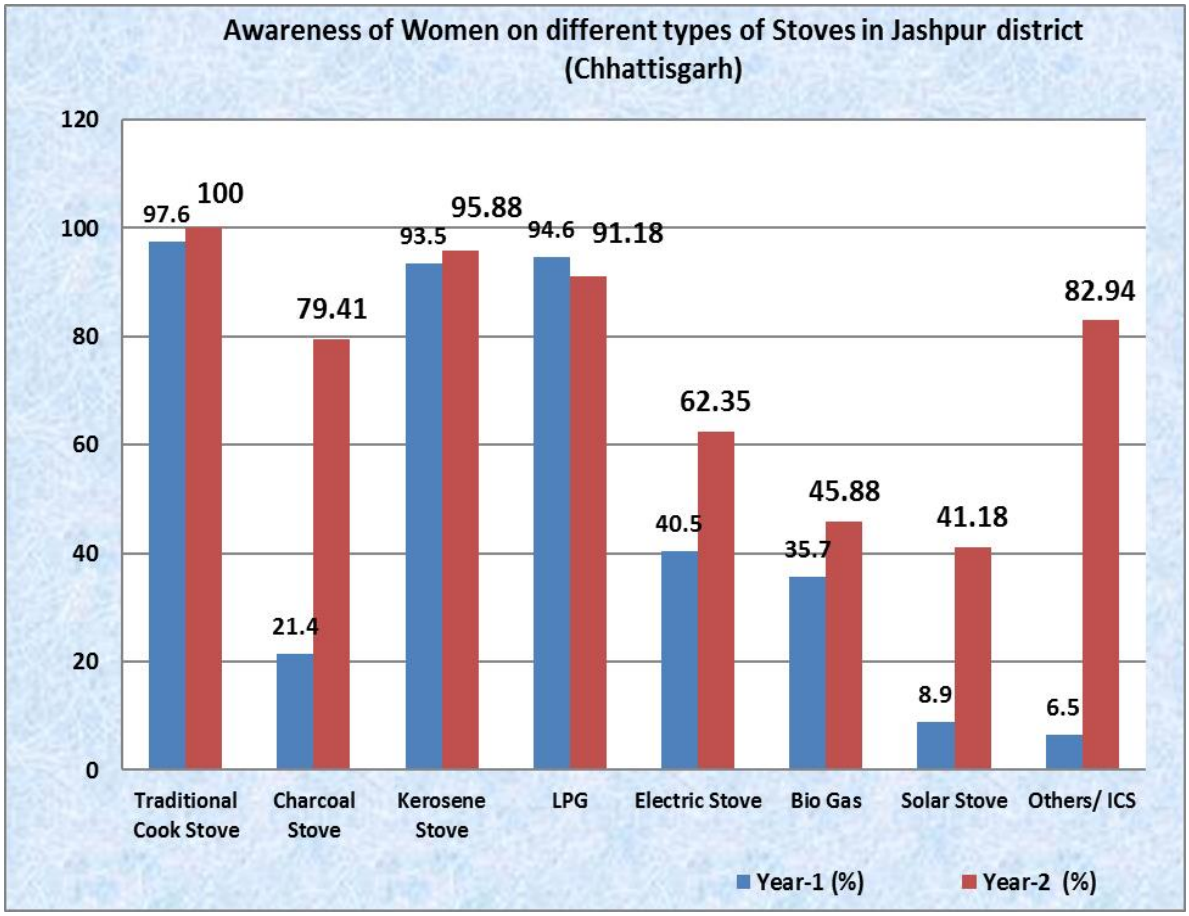


Table-4.1.2 : Awareness of Women on different types of Stoves in Kalahandi district (Odisha)

Types of Stove	Kalahandi (Odisha)			
	Year-1		Year-2	
	Frequency of "yes" response	(%)	Frequency of "yes" response	(%)
Traditional Cook Stove	166	100	166	100
Charcoal Stove	2	1.2	35	21.08
Kerosene Stove	10	6	61	36.75
LPG	10	6	73	43.98
Electric Stove	4	2.4	60	36.14
Bio Gas	2	1.2	19	11.45
Solar Stove	0	0	14	8.43
Others/ ICS	14	8.4	43	25.90

But in case of Kalahandi district, which is a tribal district of Odisha, all the women respondents of the study areas are aware about the traditional Cook Stove. The awareness level about the other types of stoves in the district is very less as stated in the above table and in the following graph.

Graph- 4d: Awareness of Women on different types of Stoves in Kalahandi district (Odisha)

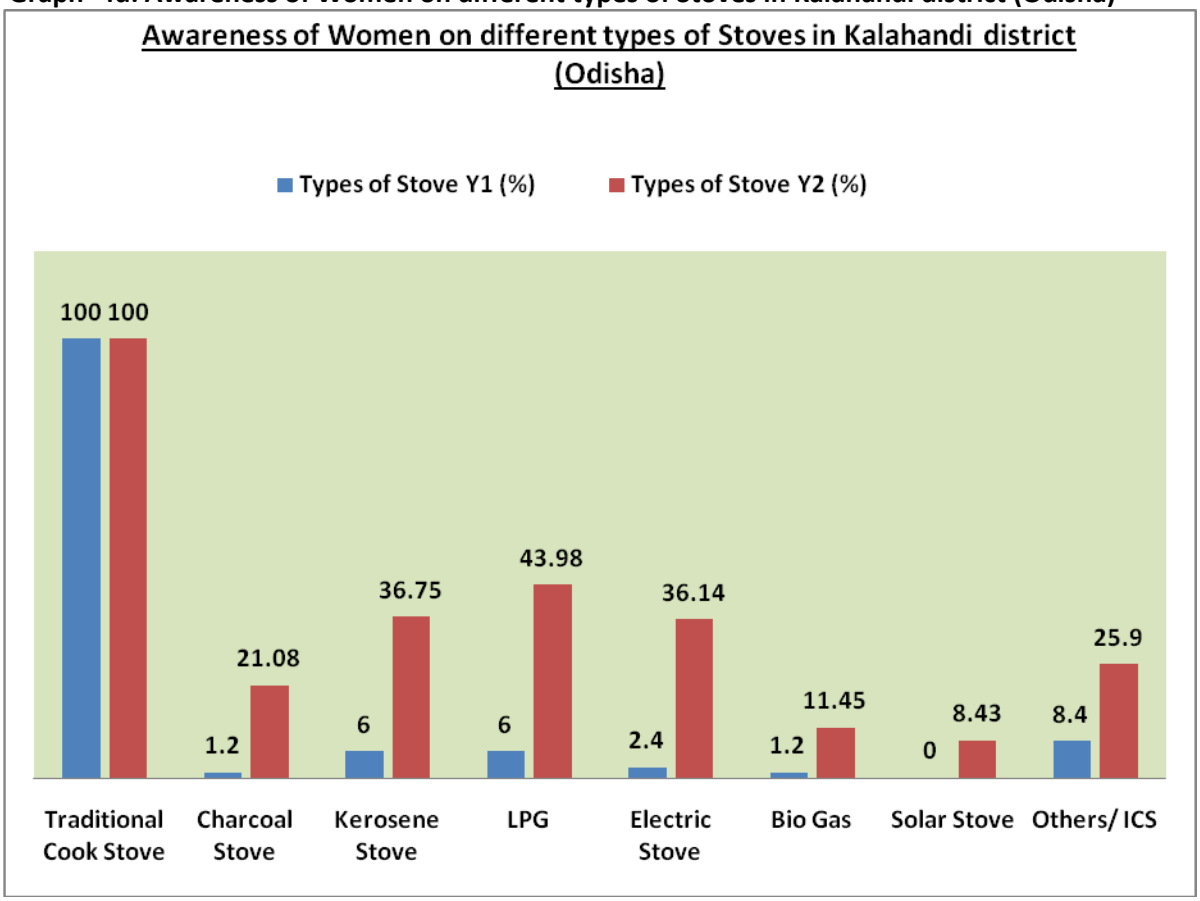


Table-4.1.3 :-Evolution of women and men's knowledge on different types of stoves (district wise)

A district wise and gender wise comparison of women's and men's knowledge on different types of stoves have presented in the following table in absolute term.

Types of Stove	Jashpur				Kalahandi				Kandhamal			
	Year 1		Year 2		Year 1		Year 2		Year 1		Year 2	
	W	M	W	M	W	W	W	M	W	M	W	M
Traditional mud stove	164	164	170	173	166	166	166	166	166	166	498	498
Charcoal stove	36	45	135	127	2	1	35	41	9	10	180	124
Kerosene stove	157	154	163	162	10	14	61	72	23	18	140	169
LPG stove	159	163	155	149	10	18	73	75	32	30	73	90
Electric stove	68	63	106	98	4	11	60	64	3	9	6	22
Biogas stove	60	51	78	82	2	2	19	17	8	5	0	25
Solar stove	15	17	70	57	0	0	14	13	0	0	0	10
Others	11	8	141	126	14	12	43	39	6	4	33	40

Table-4.1.4:- Inter-districts comparison on the women's knowledge of different types of stoves (States and district wise)

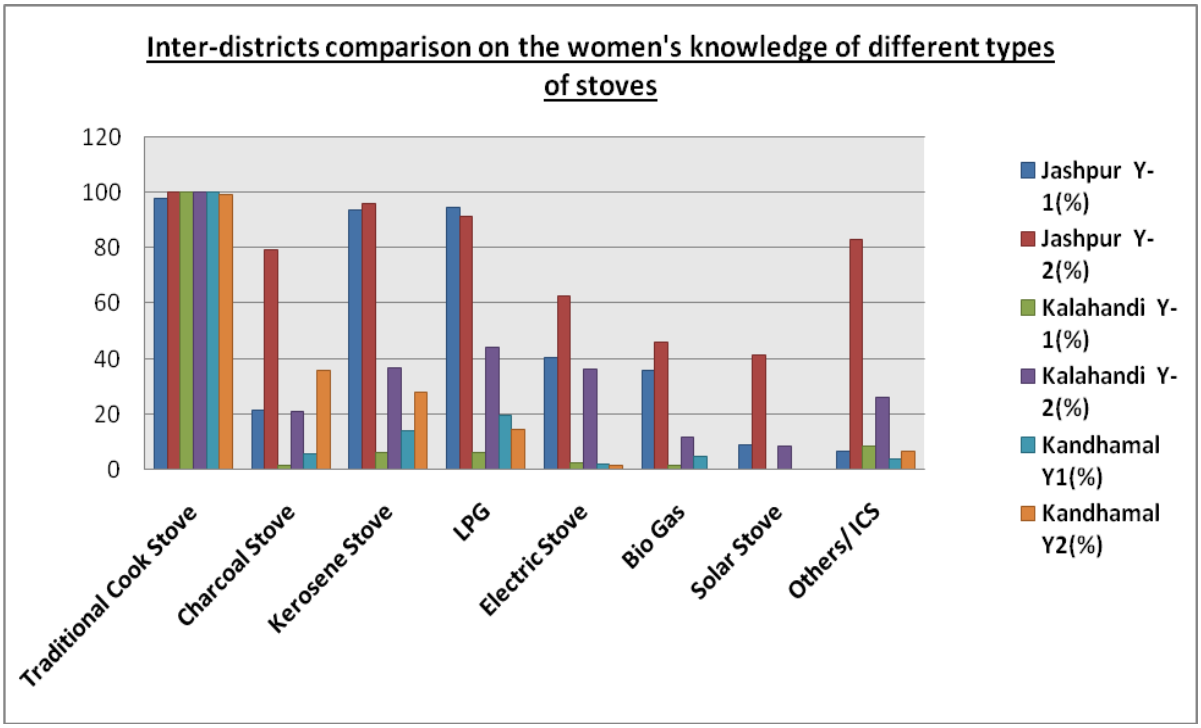
An Inter-districts comparison on the women's knowledge of different types of stoves is shown in the following table and graph.

Types of Stove	Jashpur		Kalahandi		Kandhamal	
	Y-1(%)	Y-2(%)	Y-1(%)	Y-2(%)	Y1(%)	Y2(%)
Traditional Cook Stove	97.6	100.00	100	100	100	99.2
Charcoal Stove	21.4	79.41	1.2	21.08	5.4	35.8
Kerosene Stove	93.5	95.88	6	36.75	13.9	27.8
LPG	94.6	91.18	6	43.98	19.3	14.54
Electric Stove	40.5	62.35	2.4	36.14	1.8	1.2
Bio Gas	35.7	45.88	1.2	11.45	4.8	0
Solar Stove	8.9	41.18	0	8.43	0	0
Others/ ICS	6.5	82.94	8.4	25.90	3.6	6.7

It is very clearly presented in the table and depicted through the graph that in care of women's knowledge on traditional cook stove in three districts in two states are more or less same, though there is a little difference in year-1 of Jashpur district.

In year-1 , the districts has shown a significant differential trend in the level of awareness and knowledge in different types of stove except Traditional Cook Stove. The cases in year-2 are nearly the same for both the districts. The comparative analysis shows that the level of awareness is more in the Jashpur district (Chhattisgarh).

Graph-4-E Inter-districts comparison on the women's knowledge of different types of stoves



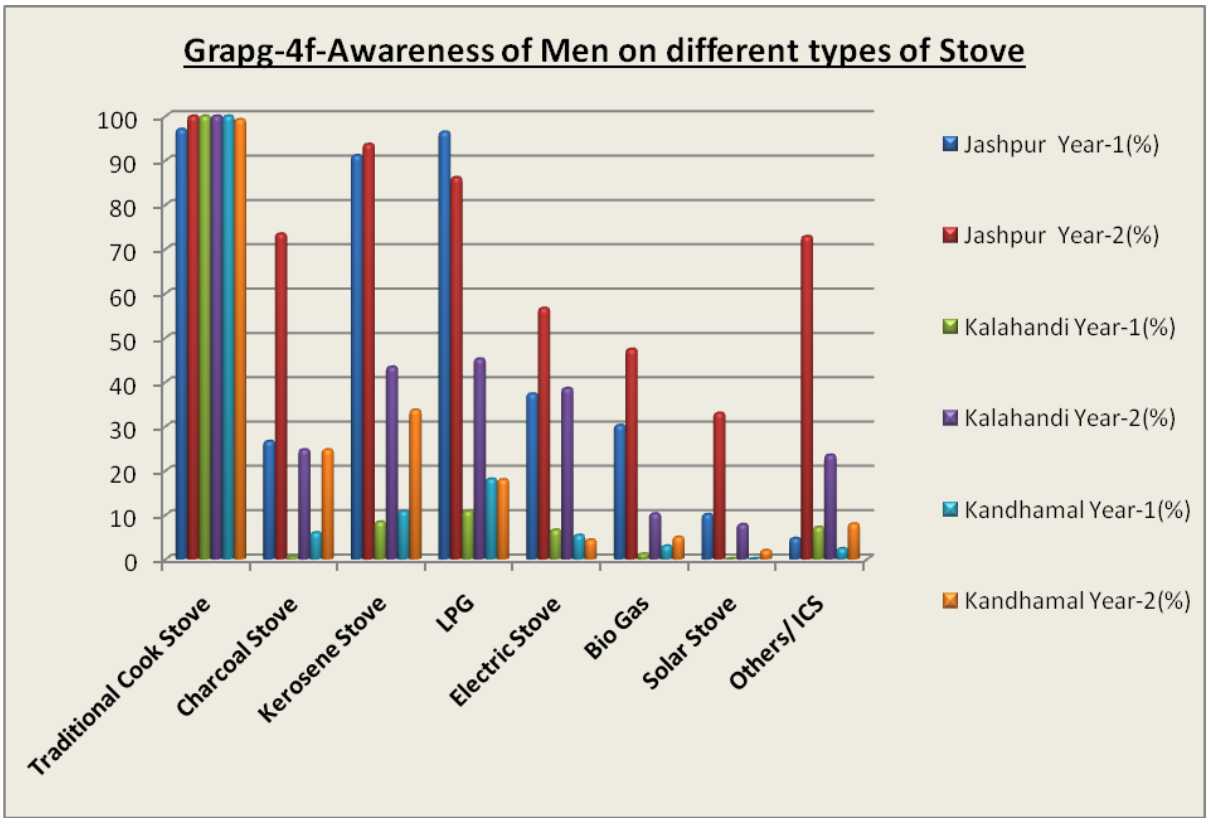
The district-wise awareness level of men on different types of stoves is shown in the table as well as in the following graph.

Table 4.1.5:- Awareness of Men on different types of Stove (District-wise)

Types of Stove	Jashpur		Kalahandi		Kandhamal	
	Year-1(%)	Year-2(%)	Year-1(%)	Year-2(%)	Year-1(%)	Year-2(%)
Traditional Cook Stove	97	100	100	100	100	99.2
Charcoal Stove	26.6	73.41	0.6	24.70	6.0	24.7
Kerosene Stove	91.1	93.64	8.4	43.37	10.8	33.67
LPG	96.4	86.13	10.8	45.18	18.1	17.94
Electric Stove	37.3	56.65	6.6	38.55	5.4	4.38
Bio Gas	30.2	47.40	1.2	10.24	3.0	4.98
Solar Stove	10.1	32.95	0	7.83	0	2
Others/ ICS	4.7	72.83	7.2	23.49	2.4	7.97

It is seen in the above table that the awareness level of men on different types of stoves in both the districts are not symmetric. Except traditional cook stove in both the districts and in both the years, the level of awareness is more in Jashpur district than that of the Kalahandi And Kandhamal district. But in case of Kalahandi district the level of awareness on the knowledge of different types of stoves has been increased in year-2 than year-1. The comparative analysis is shown in the above table and following graph.

Graph-4-F- Awareness of Men on different types of Stove



District and Gender wise comparison between women and men on knowledge indicators on types of stoves in two states

The district and gender wise comparison between women and men on knowledge indicators on types of stoves in two states is presented through the following table and graph.

Table-4.1.6:- District and Gender wise comparison between women and men on knowledge indicators on types of stoves in two states

Types of Stove	Jashpur				Kalahandi				Kandhamal			
	Year 1		Year 2		Year 1		Year 2		Year-1		Year-2	
	W	M	W	M	W	M	W	M	W	M	W	M
Traditional mud stove	97.6	97	100	100	100	100	100	100	100	100	99.2	99.2
Charcoal stove	21.4	26.6	79.41	73.41	1.2	0.6	21.08	24.7	5.6	6.0	35.86	24.70
Kerosene stove	93.5	91.1	95.88	93.64	6	8.4	36.75	43.37	13.9	10.8	27.89	33.67

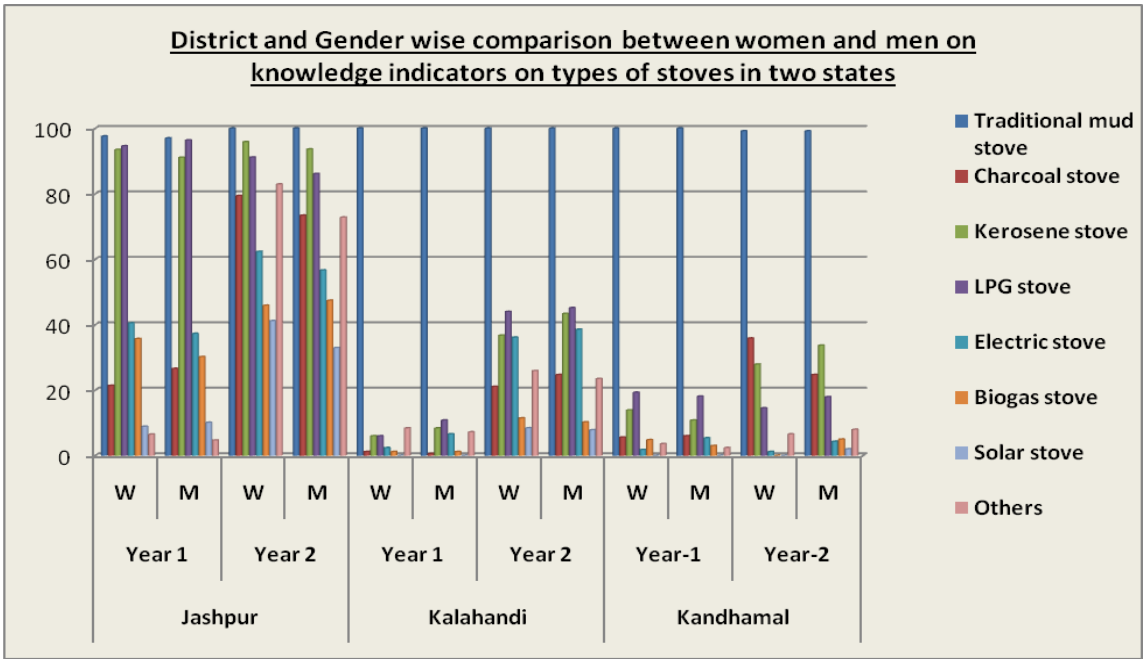
LPG stove	94.6	96.4	91.18	86.13	6	10.8	43.98	45.18	19.3	18.1	14.54	17.93
Electric stove	40.5	37.3	62.35	56.65	2.4	6.6	36.14	38.55	1.8	5.4	1.2	4.3
Biogas stove	35.7	30.2	45.88	47.4	1.2	1.2	11.45	10.24	4.8	3.0	0	4.98
Solar stove	8.9	10.1	41.18	32.95	0	0	8.43	7.83	0	0	0	2
Others	6.5	4.7	82.94	72.83	8.4	7.2	25.9	23.49	3.6	2.4	6.57	7.97

In year-1, the knowledge level of women in the districts i.e Jashpur, Kalahandi and Kandhamal are significantly different. The knowledge level of women in Jashpur districts is more prominent than that of the Kalahandi district. Except the case of traditional mud stove, the knowledge of women on other types of stoves like Charcoal stove, Kerosene stove, LPG stove, Electric stove, Biogas stove and Solar stove Kalahandi district lagging behind the Jashpur district. Even in Kalahandi district the women have no knowledge on solar stoves and even only less than 10% women have knowledge on such types of stoves in year-1.

In year-2, the woman have a sound knowledge on different types of stoves in Jashpur district, but the status of knowledge of women in Kalahandi district is slightly improved than what it was in the year-1 .
But so far as the knowledge of men on different types of stoves in both the districts in year-1 is concerned, it has seen that in the 1st year the level of knowledge is more in the district Jashpur than Kalahandi district. The knowledge level of women for the purpose in Kalahandi district is very dismal.

In case of knowledge of men in year-1, though it is more pronouncing in Jashpur district than Kalahandi district. But an interesting fact is that, the extent of knowledge in year-2 of Kalahandi district has been enhanced. The entire analysis is also depicted in the following graph.

Graph-4-g- District and Gender wise comparison between women and men on knowledge indicators on types of stoves in two states



The district and year wise knowledge of men on different types of fuel have been analyzed through the following table and graph.

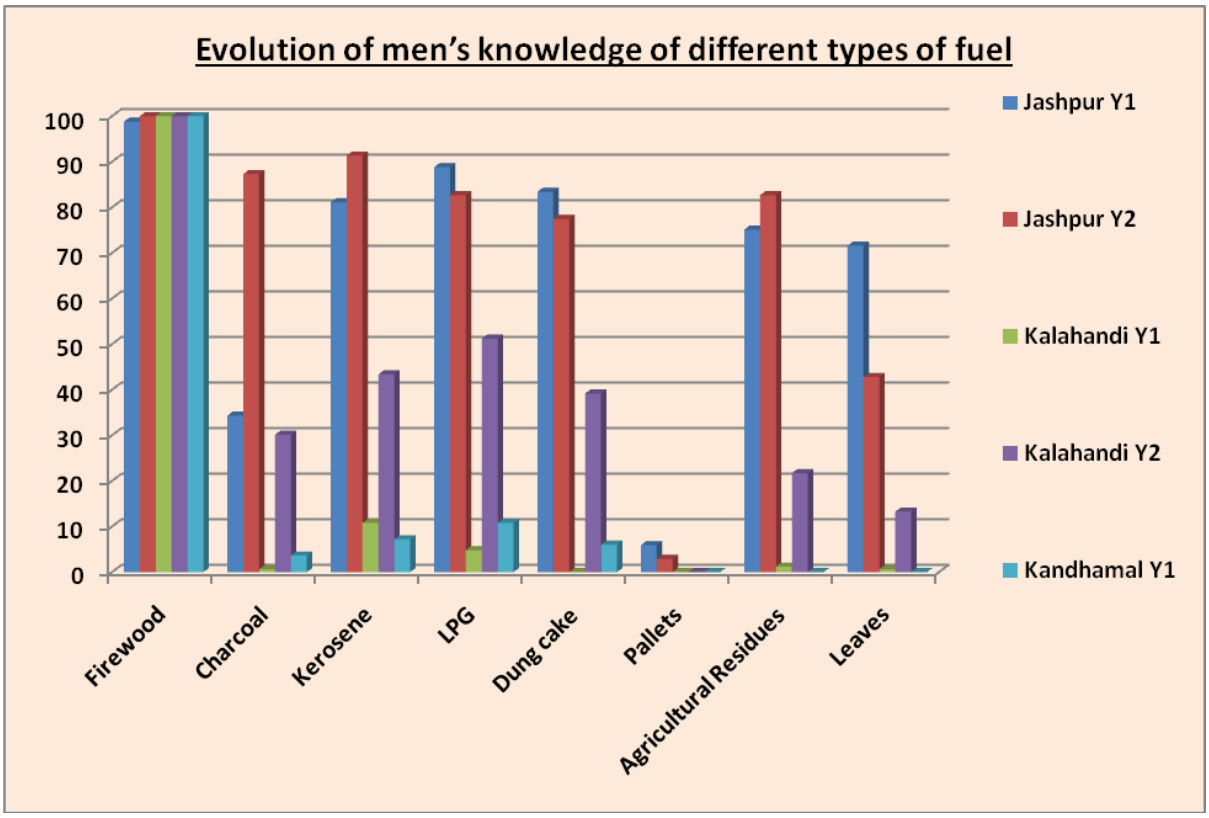
Table- 4.1.7:- Evolution of men's knowledge of different types of fuel (district wise)

Types of Fuel	Jashpur (Chhattisgarh)				Kalahandi (Odisha)				Kandhamal (Odisha)	
	Year-1		Year-2		Year-1		Year-2		Year-1	
	"yes" response	%	"yes" response	%	"yes" response	%	"yes" response	%	"yes" response	%
Firewood	167	98.8	173	100.00	166	100	166	100	166	100
Charcoal	58	34.3	151	87.28	1	0.6	50	30.12	6	3.6
Kerosene	137	81.1	158	91.33	18	10.8	72	43.37	12	7.2
LPG	150	88.8	143	82.66	8	4.8	85	51.20	18	10.8
Dung cake	141	83.4	134	77.46	0	0	65	39.16	1	6
Pallets	10	5.9	5	2.89	0	0	0	0.00	0	0
Agricultural Residues	127	75.1	143	82.66	2	1.2	36	21.69	0	0
Leaves	121	71.6	74	42.77	1	0.6	22	13.25	0	0

The above table shows that the knowledge of men on different types of fuel in Jashpur district in year-1 sounds more than that of the Kalahandi and Kandhamal districts. More specifically, the picture is more deteriorated in Kalahandi district. Even the knowledge on dung cake, pallets, charcoal, agricultural residues and leaves is very negligible and also they have no knowledge at all.

But in case of year-2, though the knowledge level of men on different types of stoves in Jashpur district is also more, the situation regarding the knowledge of men in Kalahandi district has been improving than previous year.

Graph-4.h-Inter-district comparison of men's knowledge on different types of fuel



4.B :- ICS General Awareness

Table 4.1.8:- Evolution of respondents declaring they have heard about ICS (district and gender wise)

Jashpur				Kalahandi				Kandhamal			
Year 1		**Year 2**		**Year 1**		**Year 2**		**Year 1**		**Year 2**	
W	M	W	M	W	M	W	M	W	M	W	M
145 *(86.3 %)*	130 *(76.9 %)*	149 *(87.64 %)*	137 *(79.19 %)*	129 *(77.7 %)*	106 *(63.9 %)*	165 9.40%	166 *(100 %)*	101 (60.8 %)	87 (52.4 %)	400 (79.6 %)	294 (58.6 %)

The respondents of three districts in two states have given their views that they have heard about ICS but the degree of responses are different in the districts. In Jashpur district in first and second year average 72.56% women respondents have heard about ICS and average 78% men respondents in the district have given their views that they heard about ICS.

In Kalahandi district in first and second year average 88.55% women respondents have heard about ICS and average 81.95% men respondents in the district have given their views that they heard about ICS . But in year-2 in Kalahandi district 100% male respondents have given their views that

they have heard about the ICS and in the same year the 99.4% women respondents have given their views that they have heard about the ICS. It indicates that the level of awareness in the Kalahandi district in year-2 is very praiseworthy.

In Kandhamal district, 60.8% (average) women respondents and 79.6% (average) women respondents mentioned that they have heard about ICS in Year 1 and Year 2 respectively. Where as, 52.4% (average) male respondents and 58.6% (average) men mentioned that they have heard about ICS in Year 1 and Year 2 respectively.

Graph - 4. I- Evolution of respondents declaring they have heard about ICS (district and gender wise)

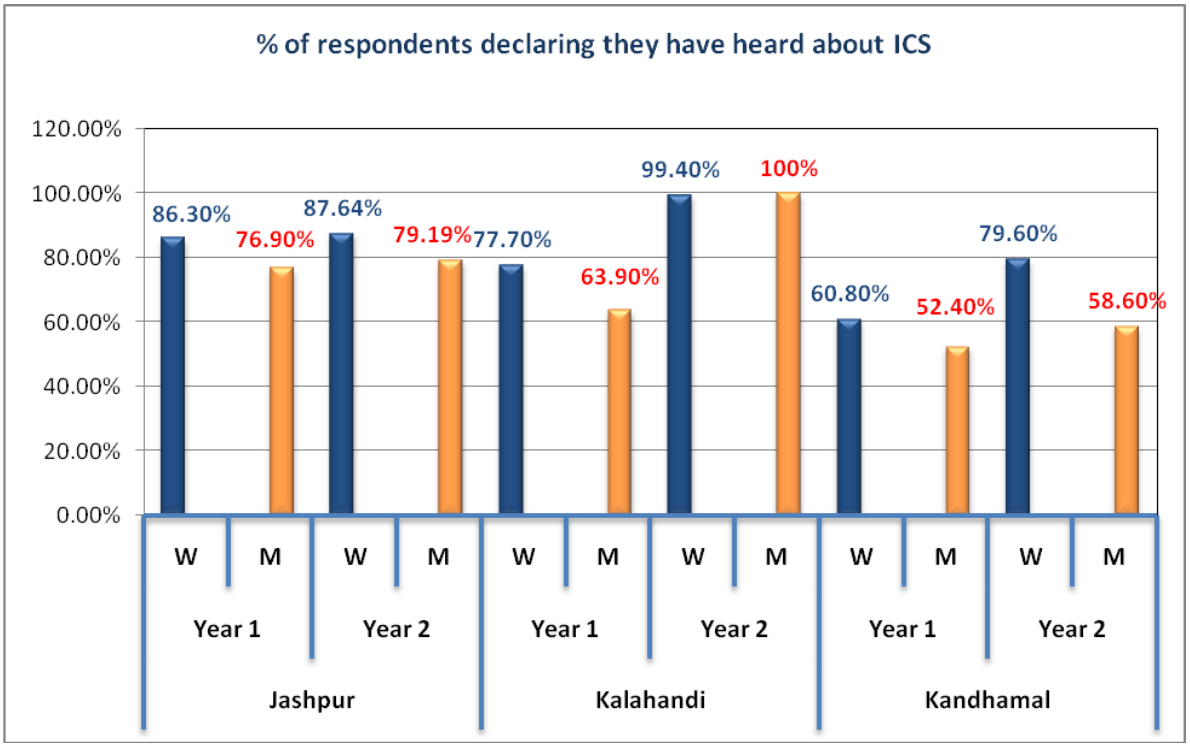


Table -4.1.9 :- Evolution of respondents declaring they have seen an ICS (district and gender wise)

Jashpur				**Kalahandi**				**Kandhamal**			
Year 1		**Year 2**		**Year 1**		**Year 2**		**Year 1**		**Year 2**	
W	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**
152 90.5%	133 78.7 %	141 82.94%	128 73.99%	109 65.7 %	72 43.4 %	166 100%	163 98.19%	40 24.1 %	32 19.3 %	484 96.7%	294 (58. 6%)

In Jashpur, Kalahandi and Kandhamal districts the respondents have given their views that they have seen an ICS but in Jashpur district in first and second year about 90% and 83% women respondents have seen an ICS and about 78% and 74% men respondents have seen an ICS . Similarly, in

Kandhamal district in first and second year about 24% & 97% women respondents mentioned that they have seen an ICS and about 19% & 59% men respondents have seen an ICS respectively.

Similarly in Kalahandi district in first and second year about 66% and 100% women respondents have seen an ICS and about 43% and 98% men respondents have seen an ICS . It indicates that the level of awareness in the Kalahandi district in year-2 is very appreciable. The details of these analyses are in the above table and we expressed in below graph.

Graph-4-J-Evolution of respondents declaring they have seen an ICS (district and gender wise)

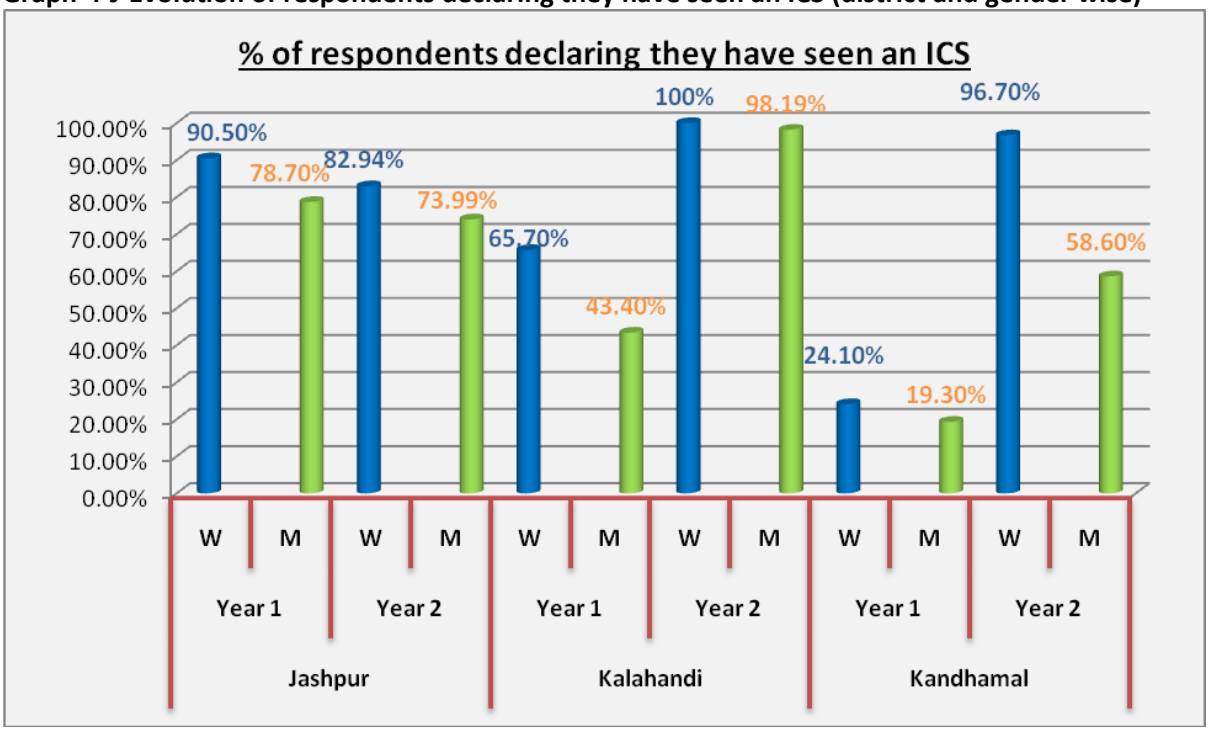


Table-4.1.10:- Women's knowledge on fuel characteristics requirements for proper ICS functioning

Fuel Characteristics	**Jashpur**	**Kalahandi**	**Kandhamal**
Adjust size to smaller pieces *only*	50 *(29.41 %)*	45 *(27.10%)*	368 73.30%
Ensure fuel dryness only	120 *(*70.59*%)*	117 *(70.48%)*	269 53.58%
Both size and dryness	0	4 *(2.40%)*	0
Others	0	0	0

With respect to the women's knowledge on fuel characteristics requirements for proper ICS functioning, it has been seen from the above table that 70.59% and 70.48 % and 53.58% women respondent told to ensure only fuel dryness as a requirement of fuel characteristics in Jashpur, Kalahandi and Kandhamal districts respectively. But in case of the fuel characteristic i.e adjust size to smaller pieces only the responses of women respondents in Jashpur, Kalahandi and districts were *29.41% and 27.10% and 73.90%* respectively.

Graph-4-K- Women's knowledge on fuel characteristics requirements for proper ICS functioning

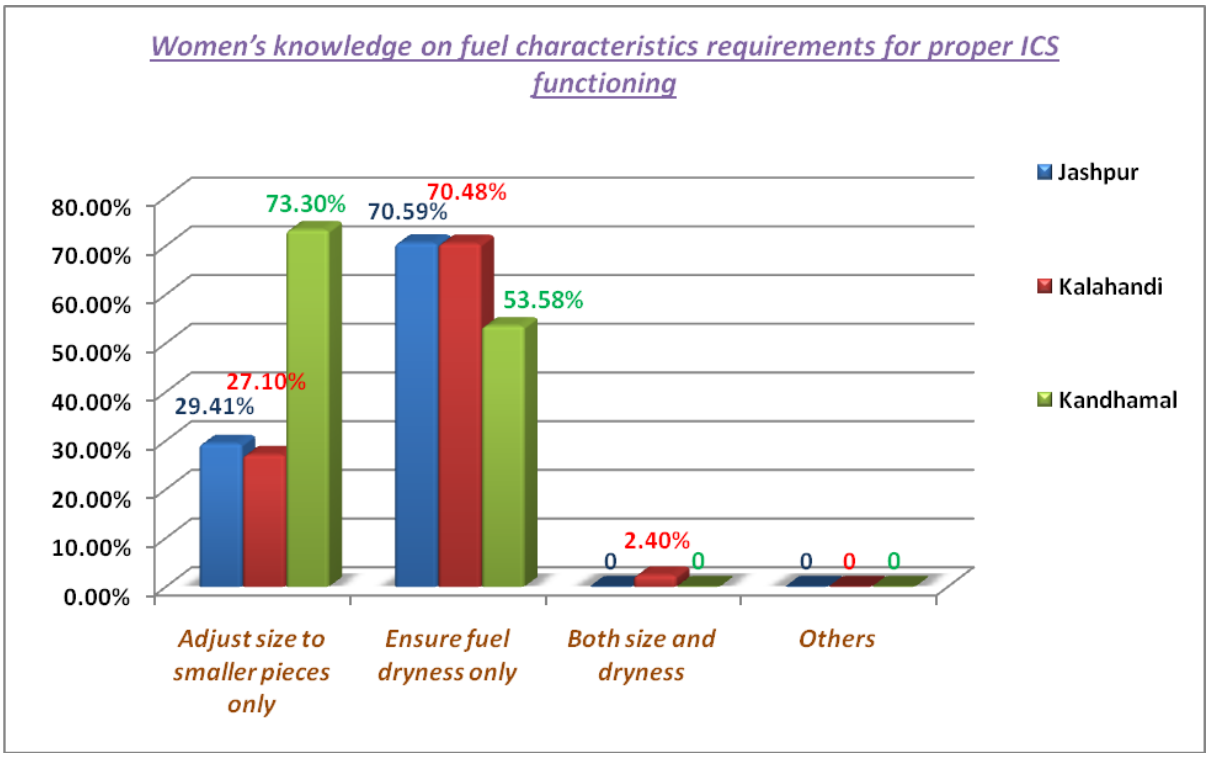


Table-4.1.11 :- Women's knowledge on relation between fuel, ICS and better forest resource management*(%)*

	Jashpur	**Kalahandi**	**Kandhamal**
Optimal use of firewood can contribute to better forest management	90 *(52.94%)*	166 *(100%)*	84 *(*16.73%*)*
ICS use can contribute to better forest resource management	150(88.24%)	166 (100%)	458*(*(91.23%)
Fuel saving leads to better forest resource management	148(87.06%)	143 (86.14%)	458*(*91.23%*)*

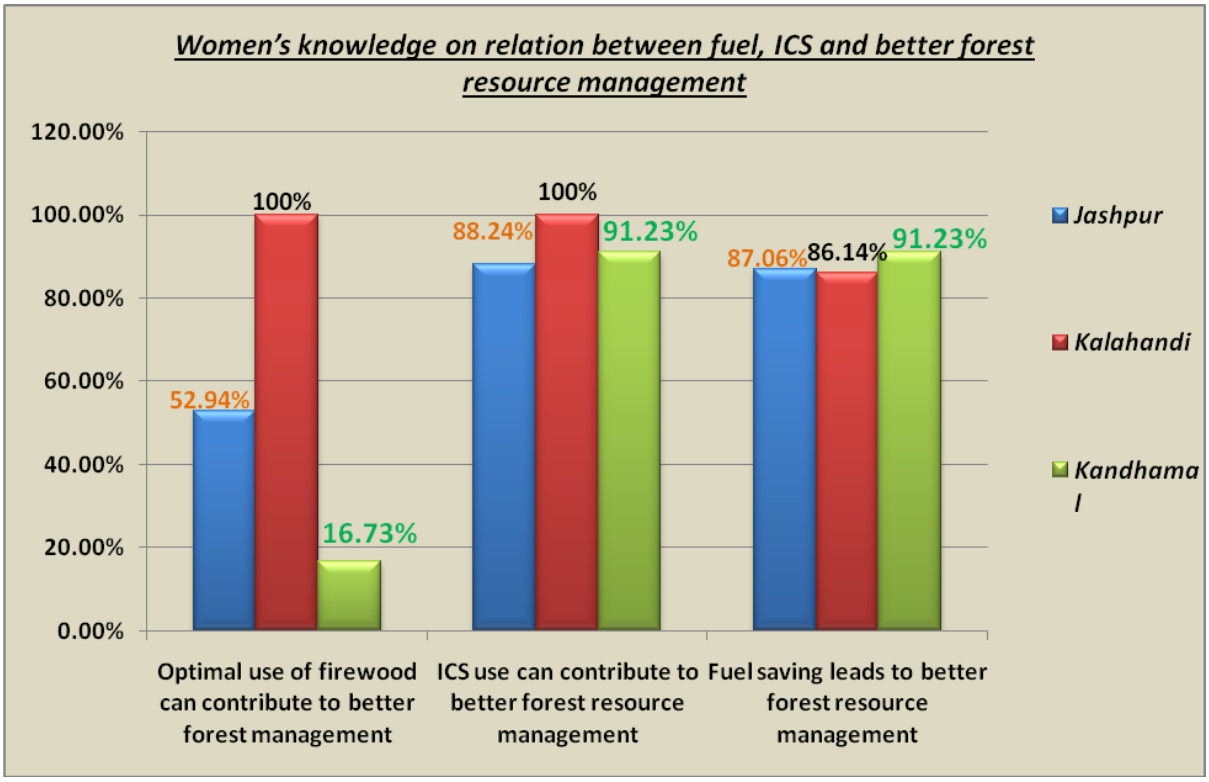
In case of better forest and resource management the women's knowledge on importance of use of fuel has been analysed for two districts through the above table and below graph.

All the respondents from Kalahandi district i.e 166 (100%),*52.94%* respondents from Jashpur district and 16.87% from Kandhamal district said in favour of the fact that the optimal use of firewood can contribute to better forest management.

Likewise, all the respondents from Kalahandi district i.e. 100% and 88.24% respondents from Jashpur district and 91.23% from Kandhamal district told in favour of the fact that the ICS use can contribute to better forest resource management.

Similarly, 86.14% respondents from Kalahandi district and 87.06% respondents from Jashpur district and 91.23% from Kandhamal district told in favour of the fact that the fuel saving leads to better forest resource management.

Graph-4-L-**:-** **Women's knowledge on relation between fuel, ICS and better forest resource management**



In the context of women's knowledge on methods to optimize fuel use while cooking has discussed through the table as well as in the graph below.

Table 4.1.12:- Women's knowledge on methods to optimize fuel use while cooking

Methods to optimize fuel use	**Jashpur**	**Kalahandi**	**Kandhamal**
Turn off fire after use	58 (34.11%)	58(34.94%)	301(59.96%)
Use dry fuel only	72 (42.35 %)	62(37.35%)	408(81.27%)
Use only required fuel quantity for cooking only	40 (23.53%)	40(24.10%)	NA
All replies above were quoted	0	1(0.60%)	NA
Two of the replies above were quoted	0	5(3.01%)	NA
Others	0	0	NA

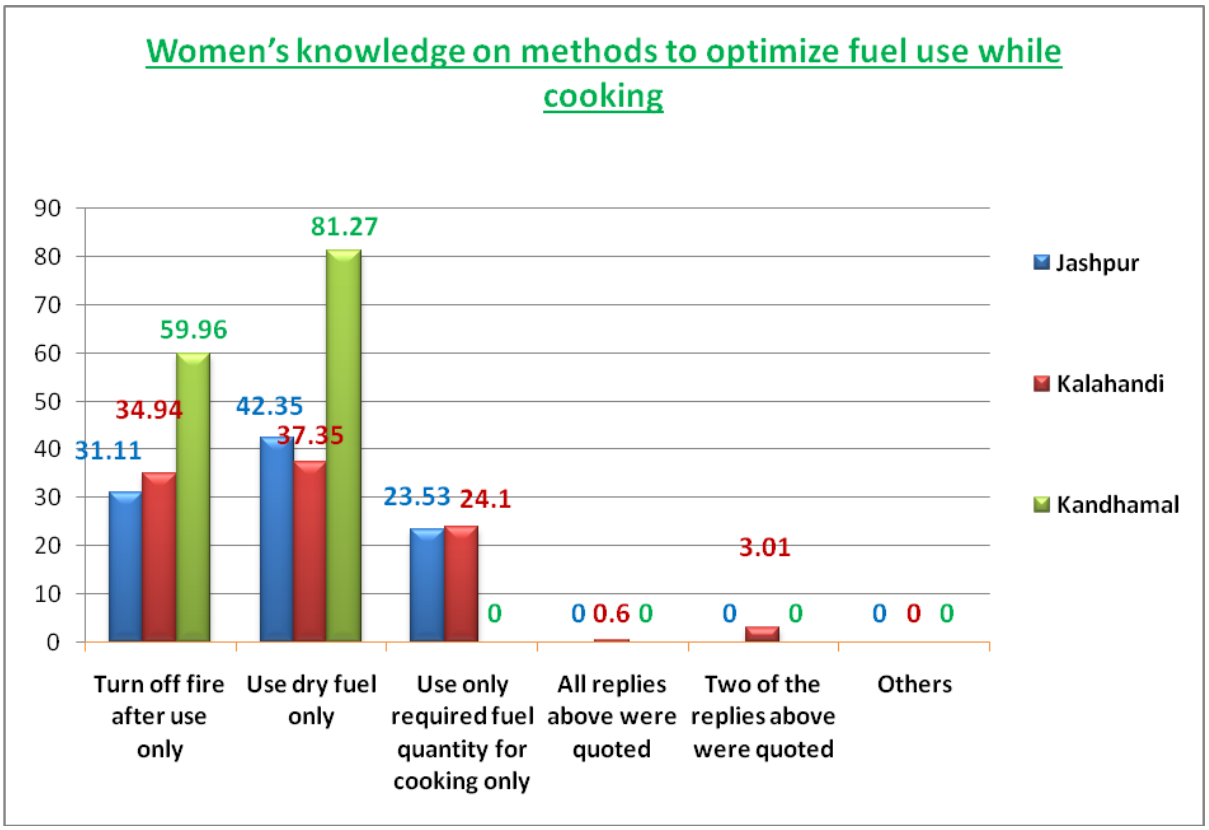
Out of the three different individual methods to optimize fuel use while cooking as mentioned in the above table, the women's knowledge about these methods are in average level.

In Jashpur district 42.35 % respondents said the use of dry fuel is the best method for optimize use of fuel while cooking. But In Kalahandi district 37.35% and in Kandhamal 81.27% respondents favored this method.

Further, Jashpur district 34.11% respondents said to turn off fire after use is the best method for optimize use of fuel while cooking. But In Kalahandi district 34.94% and in Kandhamal 59.96% of respondents favored this method.

Similarly, 23.53% respondents in Jashpur district said use of only required fuel quantity for cooking is the best method for optimize use of fuel while cooking. But In Kalahandi district 24.10% respondents favored this method for optimize use of fuel.

Graph-4-M:- Women's knowledge on methods to optimize fuel use cooking



4.C: Awareness on TCS use risks and benefits of ventilated cooking area

Table-4.1.13 :- Evolution of issues stated as related to smoke (gender and district wise)

	Jashpur				Kalahandi				Kandhamal	
	Year 1		Year 2		Year 1		Year 2		Year 1	
	W	M	W	M	W	M	W	M	W	M
HH Air pollution	93(55.4%)	99 (58.6%)	167 (98.24%)	172 (99.42%)	41(24.7 %)	39(23.5%)	166 (100%)	166 (100 %)	32 (19.3%,	41 (24.7%)

Eyes problems	128(76.2%)	116 (68.6%)	170(100%)	172 (99.42%)	34(20.5%)	29(17.5%)	166 (100%)	165 (99.40%)	26 (15.7%,	25 (15.1%)
Coughing	141(83.9%)	143 (84.6%)	170(100%)	172 (99.42%)	86(51.8%)	67(40.4%)	166 (100%)	162 (97.59%)	88 (53.0%,	66 (39.8%)
Headache	59(35.1%)	63 (37.3%)	168(98.82%)	167 (96.53%)	83(50%)	64(38.6%)	160 (96.39%)	161 (96.99%)	72 (43.4%,	55 (33.1%)
Breathing problem	141(83.9%)	134 (79.3%)	161(94.71%)	166 (95.95%)	41(24.7%)	39(23.5%)	150 (90.36%,	15 (90.96%)	31 (18.7%,	34 (20.5%)
Tearing and burning of eyes	153 91.1%)	156 (92.3%)	170(100%)	147 (84.97%)	152(91.6%)	138(83.1%)	0	0	150 (90.4%,	142 (85.5%)
Blackening of pots/ wall/roofs	154(91.7%)	164(97.0%)	154(90.59%)	147 (84.97%)	125(75.3%)	115(69.3%)	147 (88.55%,	137 (82.53%)	146 (88.0%,	139 (83.7%)

Table- 4.1.14 :- District wise comparison on issues stated as related to smoke

Issues related to smoke	**Jashpur**				**Kalahandi**				**Kandhmal**	
	Year 1(%)		**Year 2(%)**		**Year 1(%)**		**Year 2(%)**		**Year 1(%)**	
	W	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**
HH Air pollution	55.4	58.6	98.24	99.42	24.7	23.5	100	100	19.3	24.7
Eyes problems	76.2	68.6	100	99.42	20.5	17.5	100	90.4	15.7	15.1
Coughing	83.9	84.6	100	99.42	51.8	40.4	100	97.59	53.0	39.8
Headache	35.1	37.3	98.82	96.53	50	38.6	96.39	96.99	43.4	33.1
Breathing problem	83.9	79.3	94.71	95.95	24.7	23.5	90.36	90.96	18.7	20.5
Tearing and burning of eyes	91.1	92.3	100	84.97	91.6	83.1	0	0	90.4	85.5
Blackening of pots/wall/roofs	91.7	97	90.59	84.97	75.3	69.3	88.55	82.53	88.0	83.7

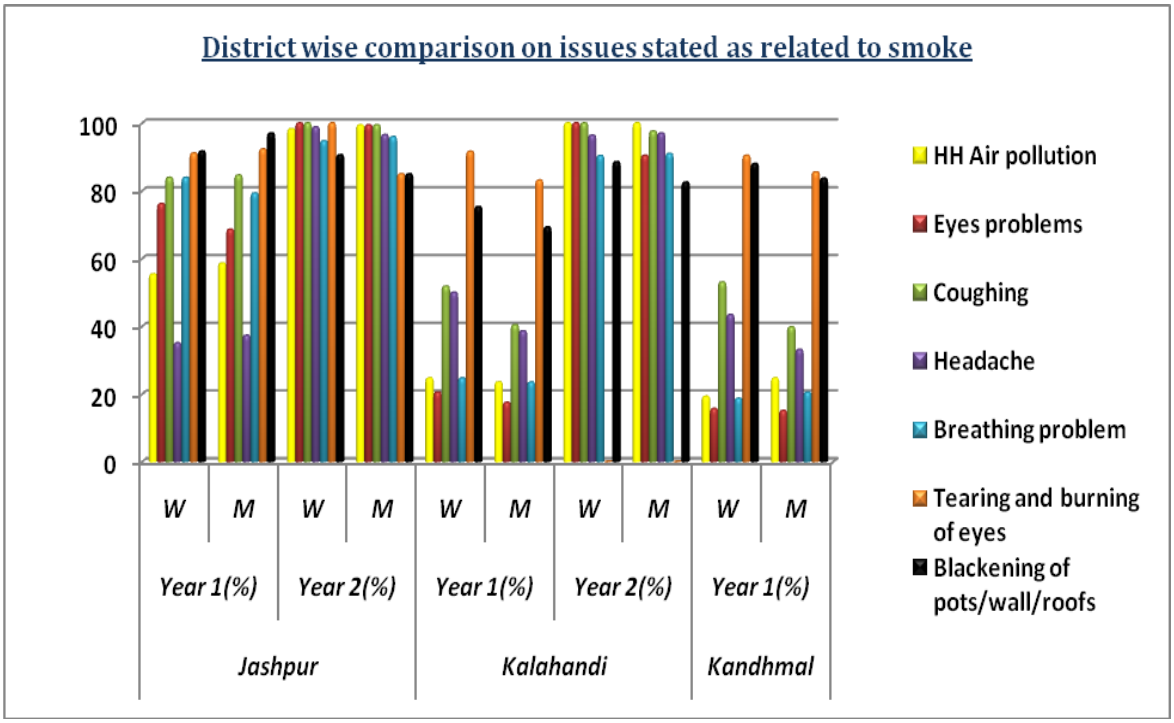
Gender and district wise different types of issues were stated by the respondents in two districts have been analyzed in the above table and following graph.

In Jashpur district more than 90% of both men and women respondents said the different types of issues related to smoke. In year-1 more than 91% women told due to cooking smoke some problems

like tearing and burning of eyes has been occurring. Again it affects the kitchen infrastructure like blackening of pots/wall/roofs as well. Further, 84.97% women are of the opinion that on account of smoke the problems like coughing and breathing.
In year-2, 100% women respondents told that eyes problems and coughing are their problems due to smoke. Further, about 90 to 98% women respondents told that they have been facing some acute problems like air pollution, headache, breathing problem, blackening of pots/wall/roofs. In the same year, more than 99% male respondents told the problems like air pollution, eyes problems and coughing on account of kitchen smoke. Again, about 85% male respondents told that due to kitchen smoke the problems like tearing and burning of eyes and blackening of pots/wall/roofs has been occurring which are affecting their life adversely.

Similarly, in Kalahandi district, 91.6% women respondents in year-1, told that due to kitchen smoke they are facing the problems like tearing and burning of eyes. But in year-2,all women respondents are of the opinion that they are confronting the problems like air pollution, eyes problems and coughing. About more than 93% women in year-2, are facing problems like headache and breathing problem due to smoke. But majority of male respondents in Kalahandi in year-2 have given their views that they have been facing many acute problems like air pollution, eyes problems, coughing, headache and breathing on account of kitchen smoke.

Graph: 4.O:- Comparison of women and men on awareness of emission of smoke and its effect



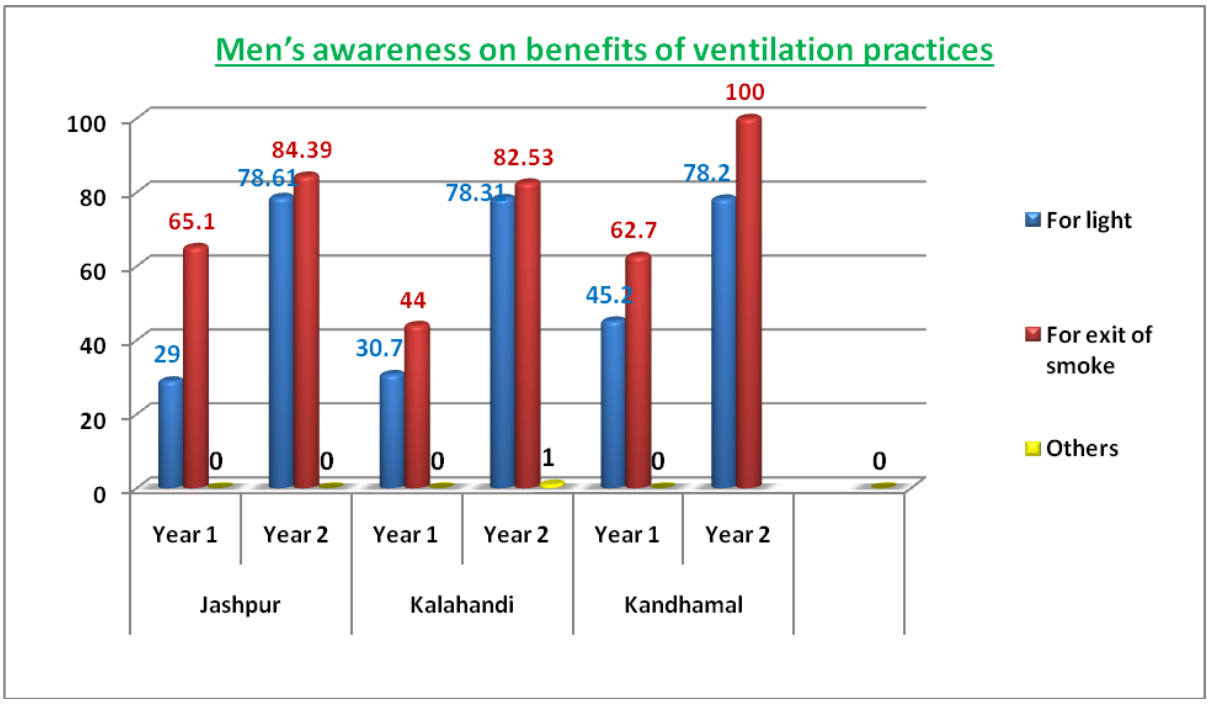
A district-wise comparative analysis have been made regarding the men's awareness on benefits of ventilation practices in Jashpur and Kalahandi districts. In both the districts about 30% male in year-1 and more than 78% male respondents in year-2 are of the opinion that the major benefit of ventilation practices is for light. Similarly more than 82% male respondents in year-2 and about 50% respondents are of the opinion that the major benefit of ventilation practices is for exit of smoke from the kitchen.

Table-4.1.15 :- Evolution of men's awareness on benefits of ventilation practices' (District-wise)

	Jashpur	**Kalahandi**	**Kandhamal**

	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
For light	49 *(29.0%)*	136*(78.61%)*	51*(30.7%)*	130*(78.31%)*	75(45.2%)	392(78.2%)
For exit of smoke	110 *(65.1%)*	*146(84.39%)*	*73*(44.0%)	137*(82.53%)*	104(62.7%)	502(100%)
Others	0	0	0	1	0	0

GRAPH-4-P- **Evolution of men's awareness on benefits of ventilation practices' (District-wise)**



4.C :- Specific Knowledge on ICS

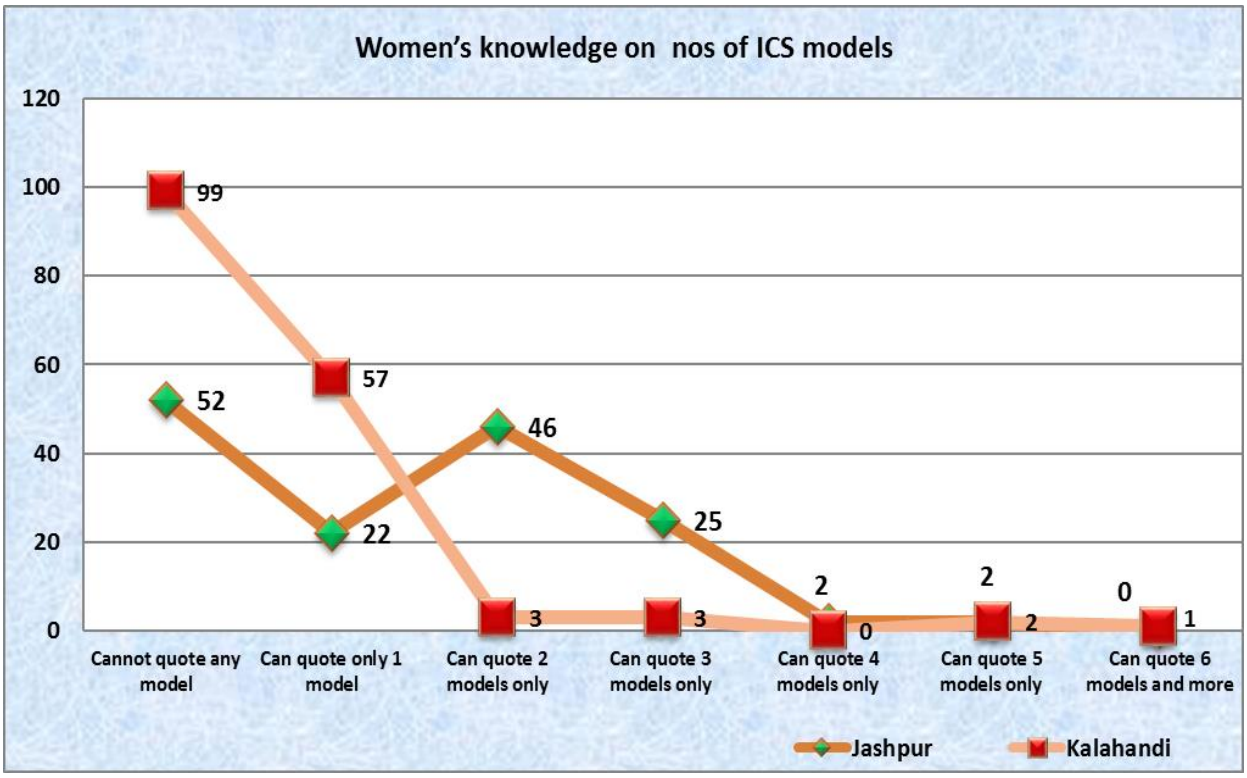
The women's knowledge on the nos of ICS models in both the districts have presented in the following table and graphs. In Kalahandi and Jashpur districts, 99 and 52 nos of women respondents respectively could not quote any model. In Kalahandi district 57 women respondents quoted only one model. About more than 25% women respondents quoted two or three or four models, where the nos of women respondents in Kalahandi district are very less with this effect.

Table-4.1.16 :- Women's knowledge on nos of ICS models

Models	**Jashpur**	**Kalahandi**
Cannot quote any model	58	99
Can quote only 1 model	24	57
Can quote 2 models only	51	3
Can quote 3 models only	31	3
Can quote 4 models only	2	2

Can quote 5 models only	2	2
Can quote 6 models and more	0	1

Graph-4.Q:- Women's knowledge on nos of ICS models



The women's knowledge on different models of ICS in two districts are depicted in the following table. It is observed from the table that 99 women in Kalahandi district do not know any types of model and 67 women knows about the following types of models.Similarly,52 women in Jashpur district do not know any types of model and 101 women knows about the below mentioned types of models.

Table-4.1.17 :- Evolution of respondents declaring they know how to use an ICS (district and gender wise)

Jashpur				**Kalahandi**				**Kandhamal**			
Year 1		**Year 2**		**Year 1**		**Year 2**		**Year 1**		**Year 2**	
W	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**
119 70.8 %	95 56.2%	123 72.35%	92 53.18%	84 50.6%	46 27.7%	160 96.39%	87 52.41%	24 14.5 %	15 9.0%	467 93.7%	294 58.6%

In year-2, Kalahandi district 96.39% women respondents knows about how to use an ICS. In these two years more than 50% women respondents knows about how to use an ICS. In all the three

districts it is observed that knowledge of women regarding ICS usage has invariably increased. But so far as the male counterparts are concerned their knowledge are not satisfactory to this effect. The details are in the following pie chart.

GRAPH-4-R **Evolution of respondents declaring they know how to use an ICS (district and gender wise)**

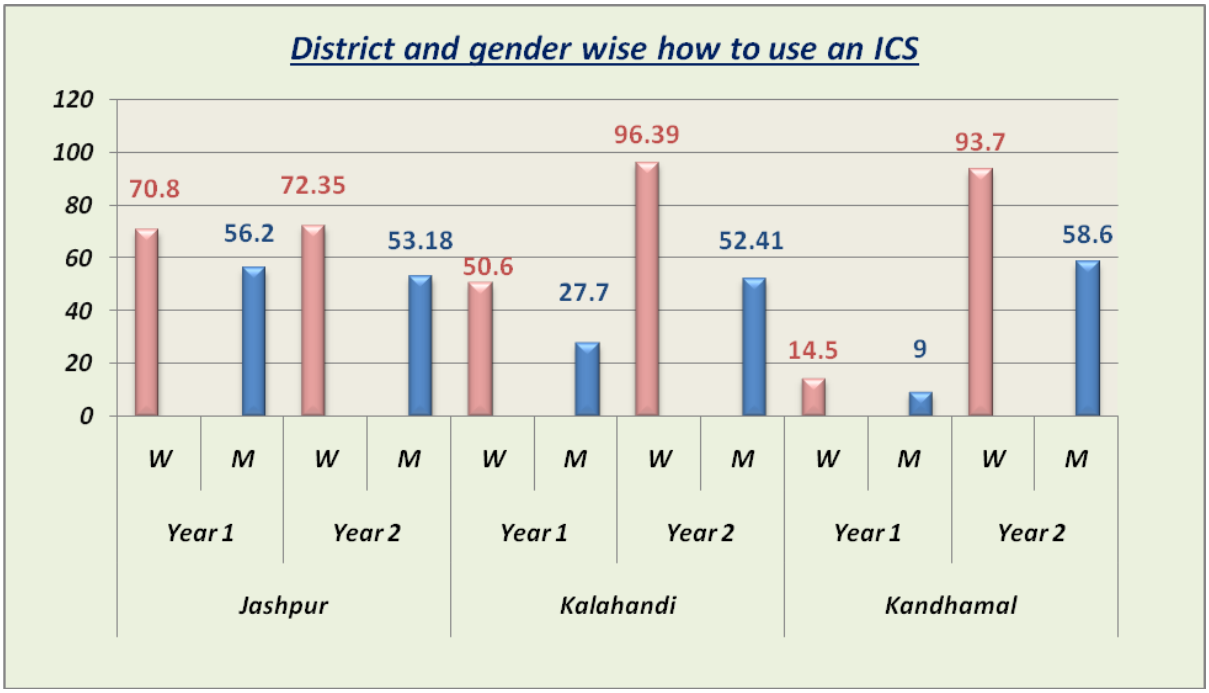


Table-4.1.18 :-: Evolution of knowledge on ICS attributes (gender and district wise)

	Jashpur				Kalahandi				Kandhamal	
	Year 1		Year 2		Year 1		Year 2		Year 1	
	W	M	W	M	W	M	W	M	W	M
Less smoke	163 *(97%)*	163 *(96.4%*	163 *(95.88%*	137 *(79.19%*	83 *(50%)*	48 *(28.9%*	166 *(100%)*	163 *(98.19%*	34 *(20.5%*	17 *(10.2%*
Time saving	142 *(84.5%*	131 *(77.5%)*	162 *(95.29%)*	132 *(76.30%*	20 *(12%)*	11 *(6.6%)*	65 *(39.16%*	119 *(71.69%*	4 *(2.4%)*	4 *(2.4%)*
Cooks fast	124 *(73.8%*	121 *(71.6 %)*	149 *(87.65%)*	109 *(63.01%*	67 *(40%)*	38 *(22.9%*	101 *(60.84%*	98 *(59.04*	33 *(19.9%)*	20 *(12%)*
Easy to Ignite	50 *(29.8%*	51 *(30.2%)*	152 *(89.41%)*	85 *(49.13%*	24 *(14.5%)*	17 *(10.2%*	0	0	5 *(3.0%)*	5 *(3.0%)*
Low maintenanc	41 *(24.4%*	40 *(23.7%)*	132 *(77.65%)*	87 *(50.29%*	10 *(6%)*	7 *(4.2%)*	54 *(32.53%*	76 *(45.78%*	2 *(1.2%)*	2 *(1.2%)*
Portable	63 *(37.5%*	74 *(43.8%)*	135 *(79.41%)*	109 *(63.01%*	36 *(21.7%*	13 *(7.8%)*	51 *(30.72%*	96 *(57.83%*	5 *(3.0%)*	4 *(2.4%)*
Fuel saving/ Reduction	118 *(70.2%*	96 *(56.8%)*	123 *(72.35%)*	105 *(60.69%*	47 *(28.3%*	32 *(19.3%*	109 *(65.66%*	96 *(57.83%*	30 *(18.1%)*	17 *(10.2%*
Reduced blackening	87 *(51.8%*	108 *(63.9%)*	116 *(68.24%)*	101 *(58.38%*	17 *(10.2%*	17 *(10.2%*	64 *(38.55%*	87 *(52.41%*	3 *(1.8%)*	5 *(3.0%)*
Reduced blackening	151 *(89.9%*	160 *(94.7%)*	98 *(57.65%)*	89 *(51.45%*	15 *(9%)*	11 *(6.6%)*	86 *(51.81%*	77 *(46.39%*	8 *(4.8%)*	6 *(3.6%)*
Easy to use	108 *(64.3%*	114 *(67.5%)*	81 *(47.65%)*	87 *(50.29%*	5 *(3%)*	8 *(4.8%)*	56 *(33.76%*	73 *(43.98%*	0	2 *(1.2%)*
Others	0	0	0	0	0	0	0	0	0	0

4.D:- Knowledge of VC actors

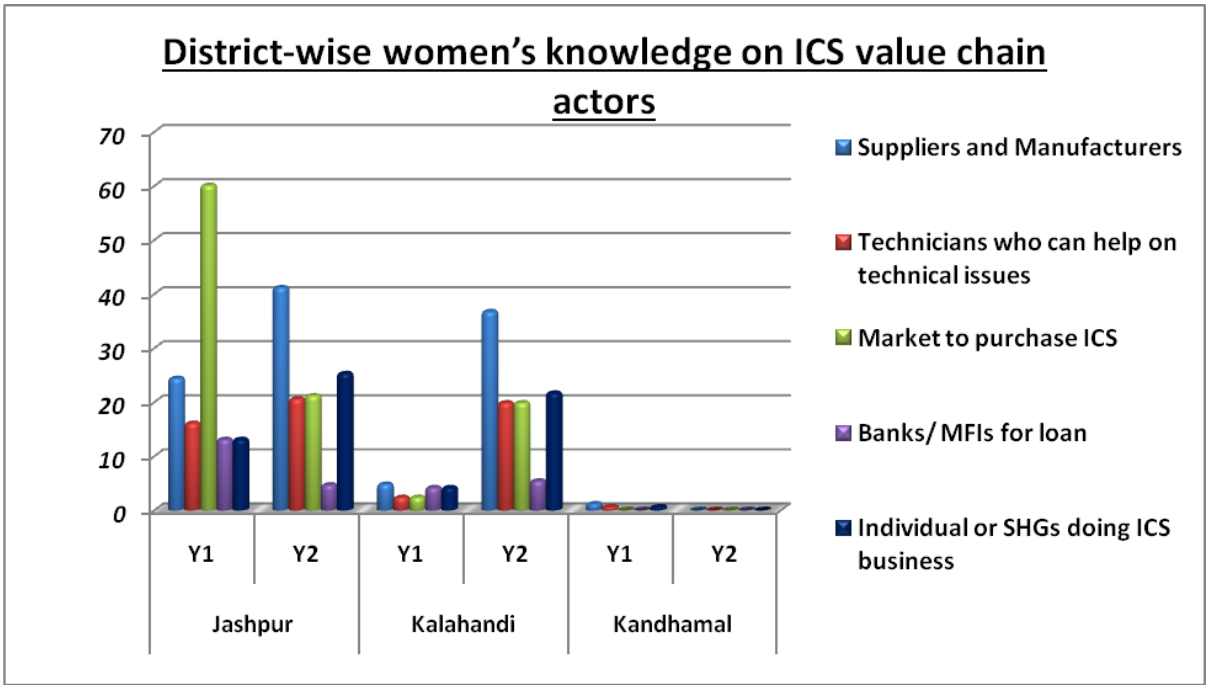
District repartition of VC actors

The women's knowledge on ICS value chain actors like suppliers and manufacturers, technicians, market, banks/ MFIs and individual or SHGs is explained in the following table and graph.

Table 4.1.2.3 :- Evolution of women's knowledge on ICS value chain actors (District-wise)

Knowledge on Value chain actors	Jashpur (Chhattisgarh)				Kalahandi (Odisha)				Kandhamal (Odisha)			
	Y-1		Y-2		Y-1		Y-2		Y-1		Y-2	
	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%
Suppliers and Manufacturers	41	24.4	70	41.18	8	4.8	61	36.75	2	1.2	12	2.39
Technicians who can help on technical issues	27	16.1	35	20.59	4	2.4	33	19.88	1	0.6	6	1.19
Market to purchase ICS	101	60.1	36	21.18	4	2.4	33	19.88	0	0	NA	0NA
Banks/ MFIs for loan	22	13.1	8	4.71	7	4.2	9	5.42	0	0	4	0.79
Individual or SHGs doing ICS business	22	13.1	43	25.29	7	4.2	36	21.69	1	0.6	NA	NA

The above table shows that more than 60% women have the knowledge about the value chain actor i.e Market to purchase ICS. They have very least knowledge on the VC actors like Banks/ MFIs for loan, technicians who can help on technical issues and suppliers and manufacturers. These types of knowledge on different types of value chain actors have also shown in the graphical representation below.



4.2:- Attitude related indicators

Household energy information sharing within households

Table 4.2.1 :- Women's confidence in discussing household energy information vs. Bachat project's profile

Household energy information	Jashpur	Kalahandi
	Total respondents	Total respondents
SHE school sessions are discussed with spouse and other family members	73(42.94%)	66(39.76%)
ICS are discussed with spouse and other family members	87(51.18%)	88(53.01%)
Use of ICS is recommended	75(44.12%)	73(43.98%)

The above table shows the status of women's confidence in discussing household energy information. Total 42.94% respondents in Jashpur district and 39.76% in respondents in Kalahandi district said that the SHE school sessions are discussed with spouse and other family members.

Similarly, total 51.18% respondents in Jashpur district and 53.01% in respondents in Kalahandi district said that ICS are discussed with spouse and other family members. Furthermore, the Use of ICS is recommended by more than 43% respondents in both the districts.

The details are placed in the above table and through the graphical representation.

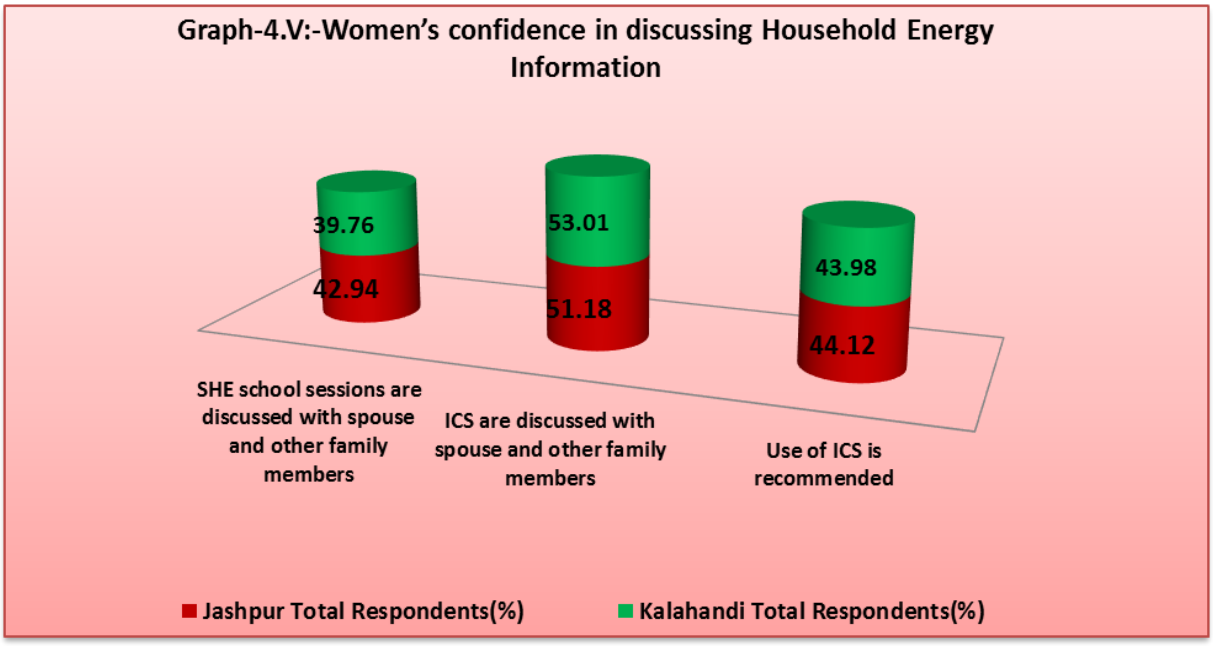
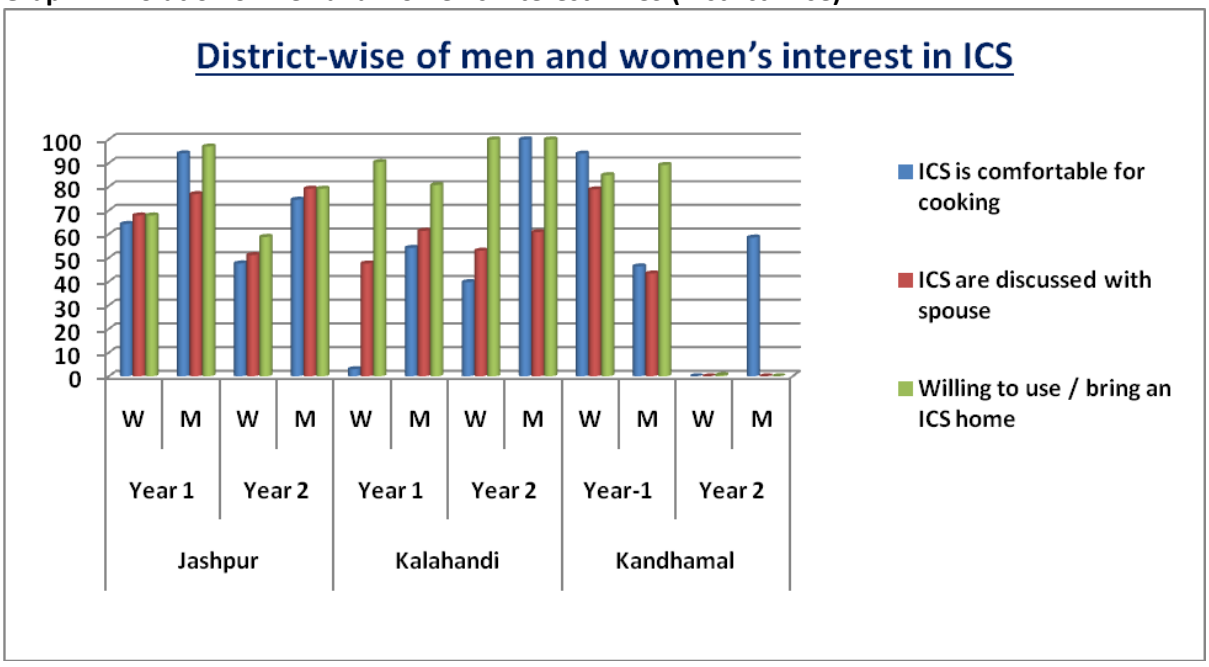


Table 4.2.2:- Evolution of men and women's interest in ICS (District-wise)

	Jashpur				Kalahandi				Kandhamal			
	Year 1		Year 2		Year 1		Year 2		Year-1		Year 2	
	W	M	W	M	W	M	W	M	W	M	W	M
ICS is comfortable for cooking	*108(64.30 %)*	159 *(94.1%)*	81 *(47.65 %)*	129 *(74.57 %)*	5*(3 %)*	90 *(54.2%)*	66*(39.7 6 %)*	166 *(100 %)*	156 (94.0 %)	77 (46.4%)	NA	294(5 8.56)
ICS are discussed with spouse	114 *(67.9%)*	130 *(76.9%)*	87 *(51.18 %)*	137 *(79.19 %)*	79 *(47.6%)*	102 *(61.4%)*	88*(53.01%)*	101 *(60.84 %)*	131 (78.9 %)	72 (43.4%)	NA	NA
Willing to use / bring an ICS home	114 *(67.9%)*	164 *(97%)*	100 *(58.82 %)*	137 *(79.19 %)*	150 *(90.4%)*	134 *(80.7%)*	166 *(100 %)*	166 *(100 %)*	145 (84.9 %)	148 (89.2%)	48.8 %	NA

The above table shows that in year-2 in three districts both the men and women respondents have a strong willingness to use and bring ICS home. In Jashpur district in year-2 and in Kalahandi district in year-2 the willingness is 100%. It is also displayed in the following graph.

Graph-:- Evolution of men and women's interest in ICS (District-wise)

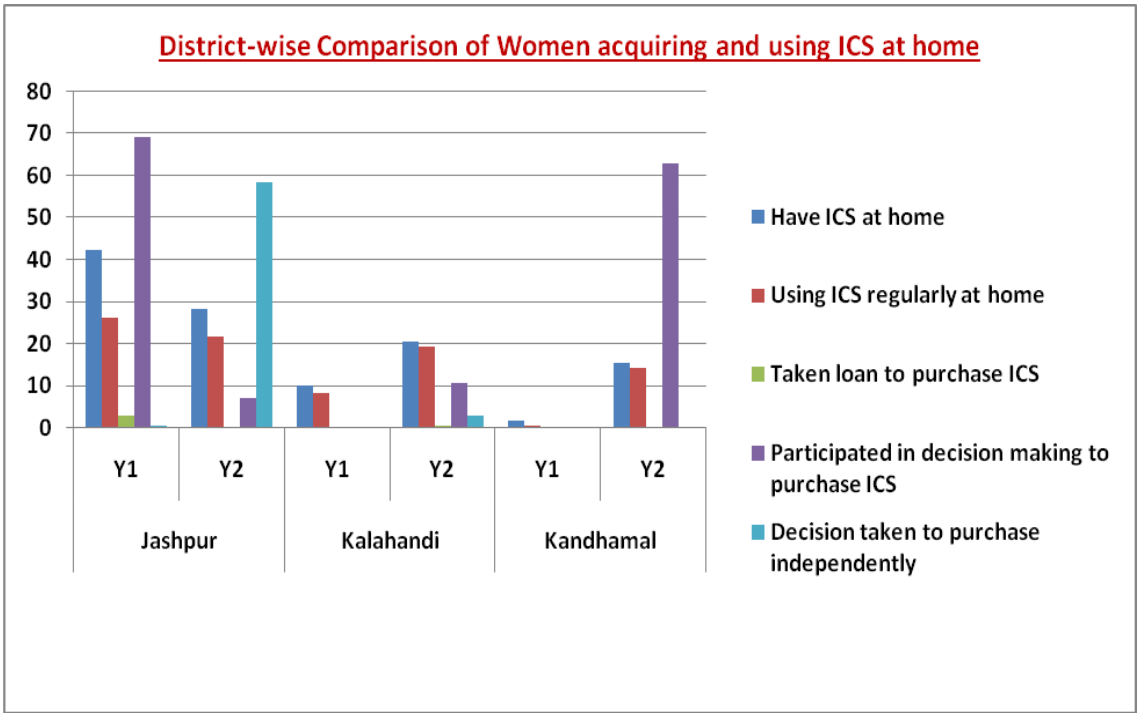


Change in women's preference for ICS

Table 4.2.3 :- District-wise Comparison of Women acquiring and using ICS at home

Acquiring and using ICS	Jashpur (Chhattisgarh)				Kalahandi (Odisha)				Kandhamal(Odisha)			
	Year-1		Year-2		Year-1		Year-2		Year-1		Year-2	
	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%
Have ICS at home	71	42.3	48	28.24	17	10.2	34	20.48	3	1.8	78	15.53
Using ICS regularly at home	44	26.2	37	21.76	14	8.4	32	19.28	1	0.6	71	14.14
Taken loan to purchase ICS	5	3	0	0	0	0	1	0.60	0	0	NA	NA
Participated in decision making to purchase ICS	116	69	12	7.06	0	0	18	10.84	0	0	315	62.7
Decision taken to purchase independently	1	0.6	82	58.24	0	0	5	3.01	0	0	NA	NA

The above table shows that how many women are actually acquiring and using ICS at home. In Jashpur district 58.24% women respondents said they have taken decision to purchase independently in year-2 and 42.3% said they have the ICS at their home in year-1. Similarly In Kandhamal district 62.7% women respondents said they have participated in decision making to purchase ICS in year 2.



Change in men's interest to bring ICS to home

Table 4.2.4 :- District-wise views of men regarding cooking and to bring ICS to home

views of men regarding cooking and to bring ICS to home	Jashpur (Chhattisgarh)				Kalahandi (Odisha)				Kandhamal (Odisha)			
	Year-1		Year-2		Year-1		Year-2		Year-1		Year-2(M)	
	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%
Interested to bring ICS to home	164	97	101	58.38	134	80.7	166	100	148	89.2	91	18.12
ICS comfortable for cooking	159	94.1	129	74.57	90	54.2	166	100	77	46.4	294	58.56
Discuss with spouse on cooking related issues and about ICS	130	76.9	104	60.12	102	61.4	101	60.84	72	43.4	262	52.12
Who will take decision (your spouse)	11	6.5	20	11.56	15	9	20	12.05	8	4.8	NA	NA
Who will take decision (jointly)	142	84	126	72.83	148	89.2	119	71.69	157	94.6	NA	0 NA

If you buy ICS will you involve your wife	156	92.3	137	79.19	132	79.5	129	77.71	131	78.9	125	24.9

In this context the above table explained that 97% men respondents in Jashpur district in year-1 are very much interested to bring ICS to home. But in Kalahandi district 100% respondents are interested to bring ICS home and it is comfortable for cooking. The details are explained in the graph.

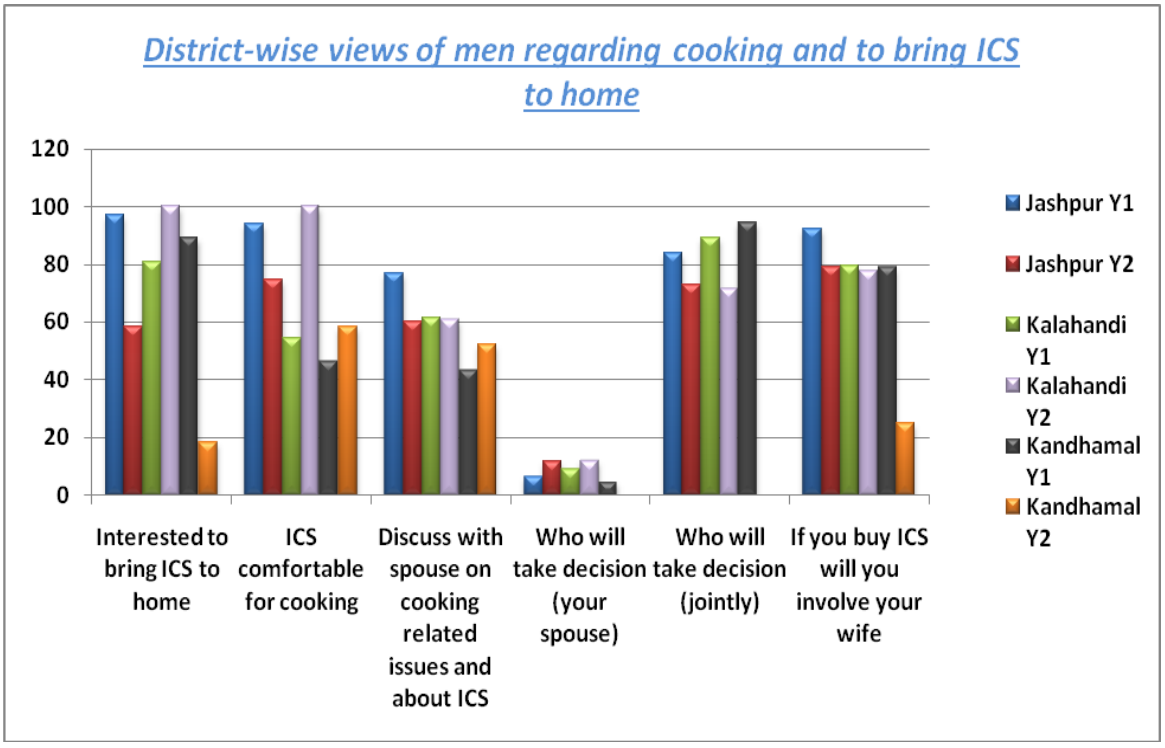
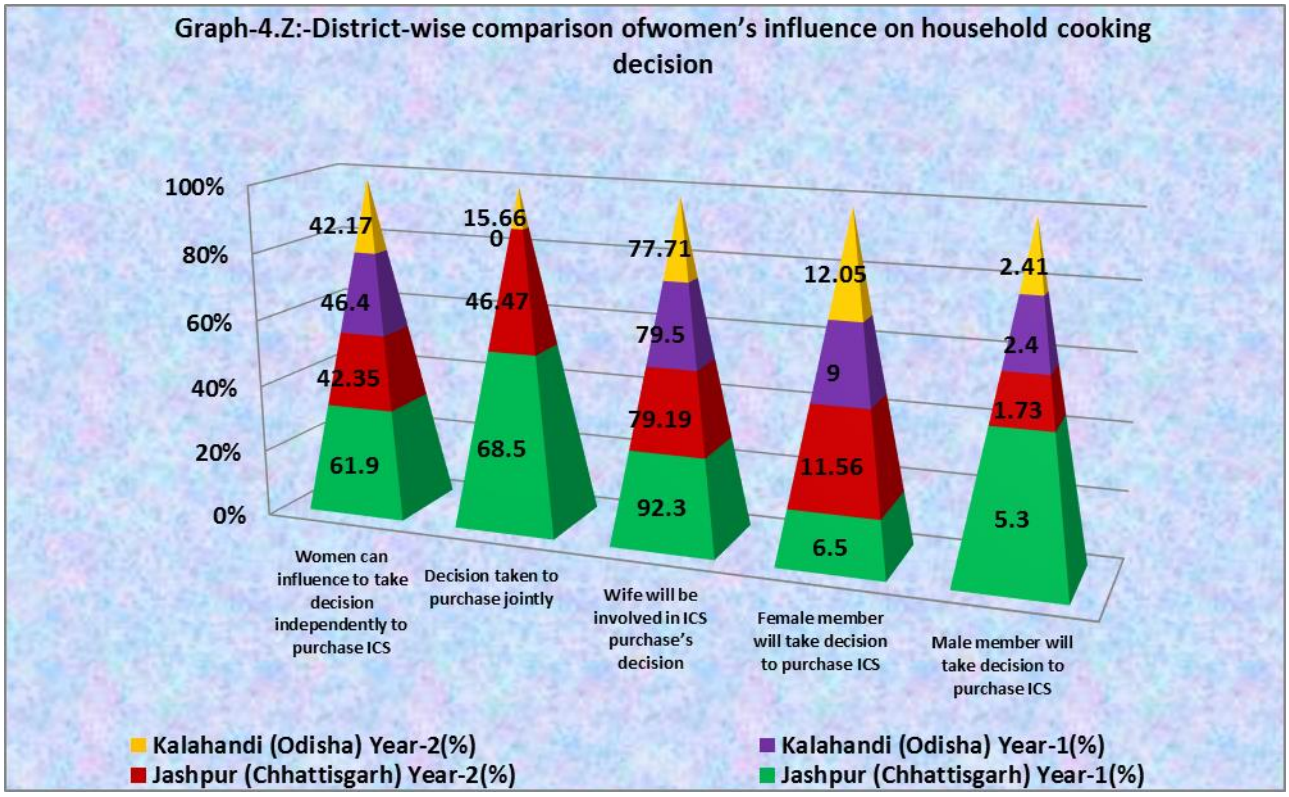


Table 4.2.5 :- Evolution of women's influence on household cooking decision vs Bachat project involvement status (District-wise)

Acquiring and using ICS	**Jashpur (Chhattisgarh)**				**Kalahandi (Odisha)**			
	Year-1		**Year-2**		**Year-1**		**Year-2**	
	Frequency of "yes"	%	Frequency of "yes"	%	Frequency of "yes"	%	Frequency of "yes"	%
Women can influence to take decision independently to purchase ICS	104	61.9	72	42.35	77	46.4	70	42.17
Decision taken to purchase jointly	115	68.5	126	72.83	0	0	26	15.66
Wife will be involved in ICS purchase's decision	156	92.3	137	79.19	132	79.5	129	77.71
Female member will take decision to purchase ICS	11	6.5	20	11.56	15	9	20	12.05
Male member will take decision to purchase ICS	9	5.3	3	1.73	4	2.4	4	2.41

The above table shows that about 62% women respondents can influence to take decision independently to purchase ICS in Jashpur district in year-1 where as 92.3 % respondents told that wife will be involved in ICS purchase's decision. Similarly, In year-2 about 12.56% and 12.05% women respondents told that Female member will take decision to purchase ICS in both the district.



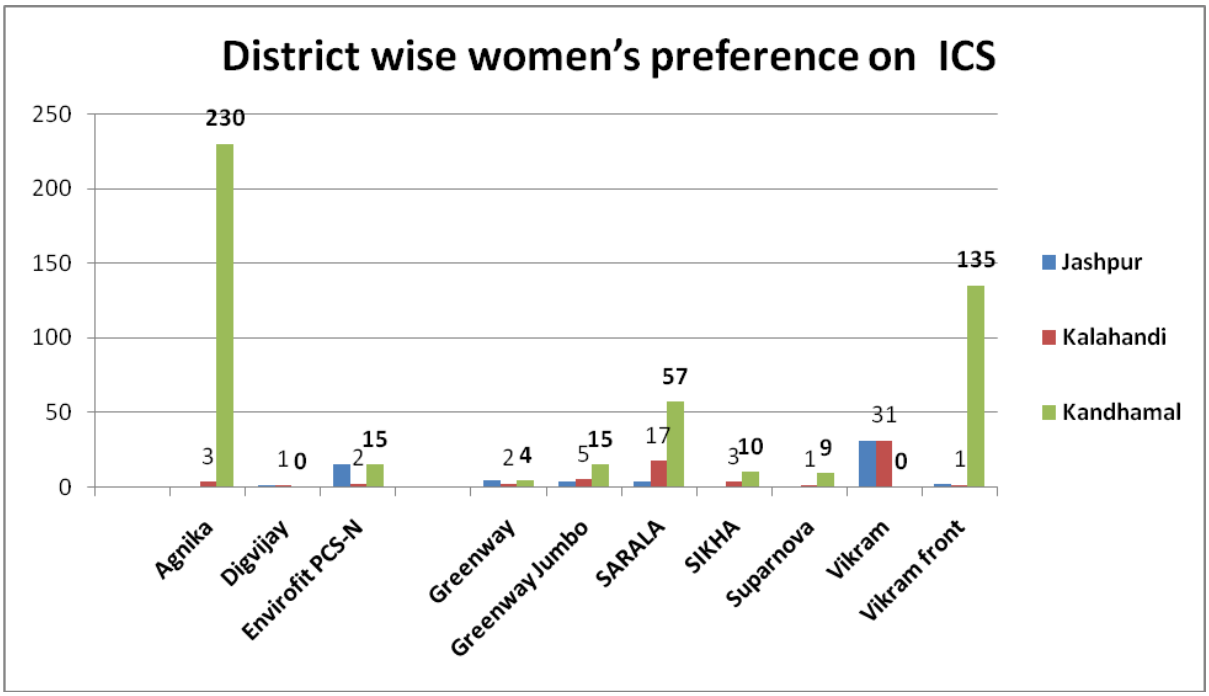
Women's preferrence on ICS

The women's preference on ICS is shown in the following table and graph.

Table-4.2.6 :- District wise women's preference on ICS

ICS Models	**Jashpur**	**Kalahandi**	**Kandhamal**
Agnika	0	3	230
Digvijay	1	1	0
Envirofit PCS-N	15	2	15
Greenway	4	2	4
Greenway Jumbo	3	5	15
SARALA	3	17	57
SIKHA	0	3	10
Suparnova	0	1	9
Vikram	31	31	0
Vikram front	2	1	135

In Jashpur district women respondents mostly preferred Vikram model and their next preference is Envirofit PCS-N.But in Kalahandi district, women respondents also mostly preferred Vikram model and their next preference is Sarala.



Women's agency with ICS VC actors

Table 4.2.7 :- Evolution of women's agency with Value Chain Actors (district-wise)

Value Chain Actors	Actions	Jashpur		Kalahandi		Kandhamal	
		Year 1	Year 2	Year 1	Year 2	Year-1	Year-2
Manufacturers	Interaction	1 *(0.6%)*	0	0	1(0.6%)	0	5(0.99%)
	Negotiation	3 *(1.8%)*	0	0	11(0.6%)	0	0
Suppliers	Interaction	12*(7.1%)*	73*(42.94%)*	6*(3.6%)*	64(38%)	2(1.2%)	12(2.4%)
	Negotiation	14 *(8.3%)*	70(41.18%)	1*(0.6%)*	60(35.7%)	2(1.2%)	12(2.4%)
Financial institutions	Interaction	63*(37.5%)*	0	0	3(1.8%)	0	0
	Negotiation	60*(35.7%)*	0	1*(0.6%)*	3(1.8%)	0	0
Others *(*Ever Negotiated with ICS VC actors *)*	Interaction	0	0	9*(5.4%)*	0	0	7(1.39%)
	Negotiation	82*(48.8%)*	66*(38.82%)*	0	0	0	0

The table shows that in which way the women respondents have interacted and negotiated with the value chain actors like; manufacturers, suppliers and financial institutions. About 43% women respondents have interacted and negotiated with the suppliers, a value chain actor. It has represented through the above table and below displayed graph.

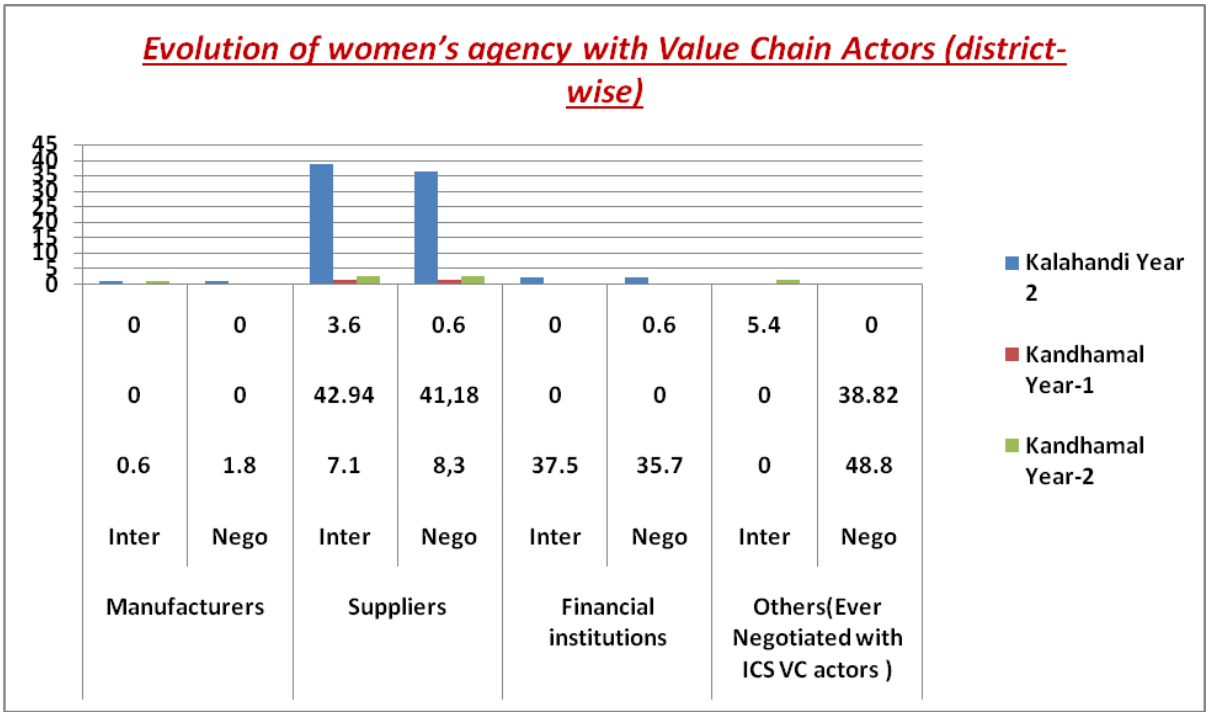
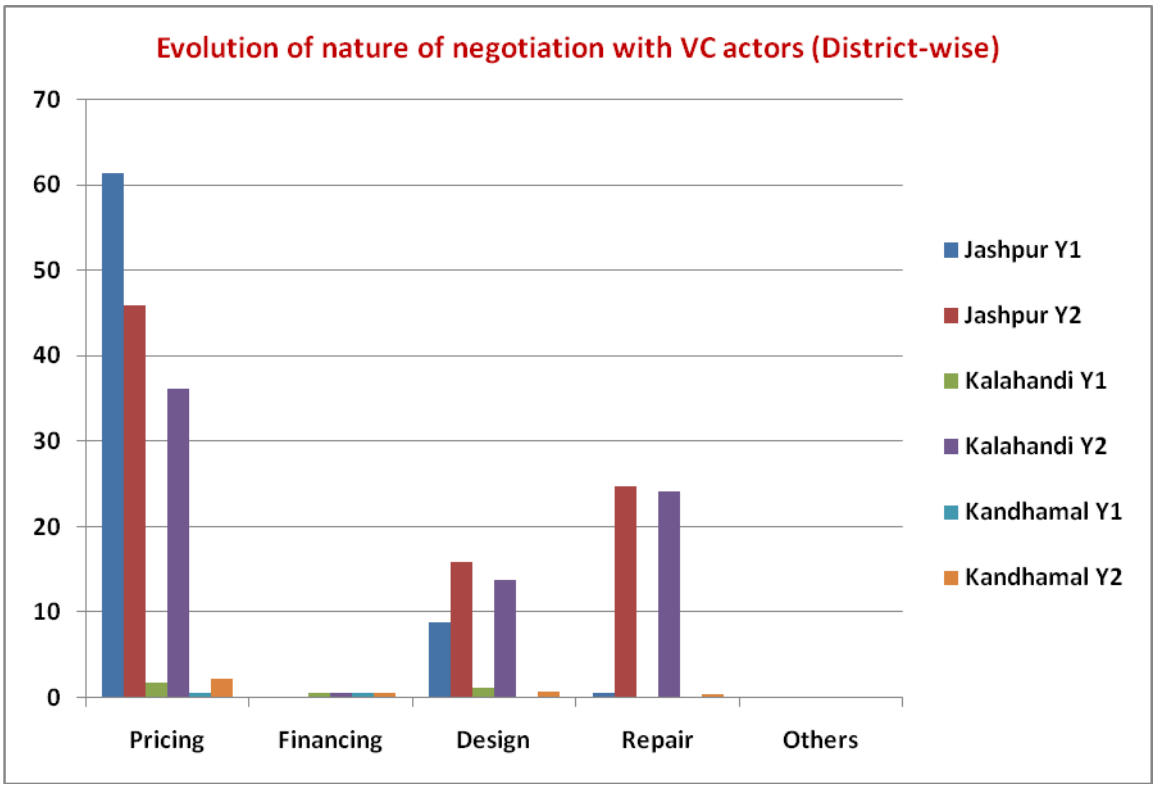


Table 4.2.8 :- Evolution of nature of negotiation with VC actors (District-wise)

Nature of negotiation	**Jashpur**		**Kalahandi**		**Kandhamal**	
	Year 1	Year 2	Year 1	Year 2	**Year 1**	**Year 2**
Pricing	103 *(61.3%)*	78 *(45.88 %)*	3 *(1.8%)*	60 (36.14%)	1*(0.6%)*	11(2.19%)
Financing	0	0	1 *(0.6%)*	1(0.6%)	1*(0.6%)*	3(0.59%)
Design	15 *(8.9%)*	27 *(15.88%)*	2 *(1.2%)*	23 (13.86%	0	4(0.79%)
Repair	1 *(0.6%)*	42 *(24.71%)*	0	40 (24.10%)	0	2(0.39%)
Others	0	0	0	0	0	0

The above table shows the nature of negotiation with VC actors for three districts. In Jashpur district about average 53% respondents in both the years have made negotiation with the pricing part.

Graph:-: Women negotiating with ICS VC actors

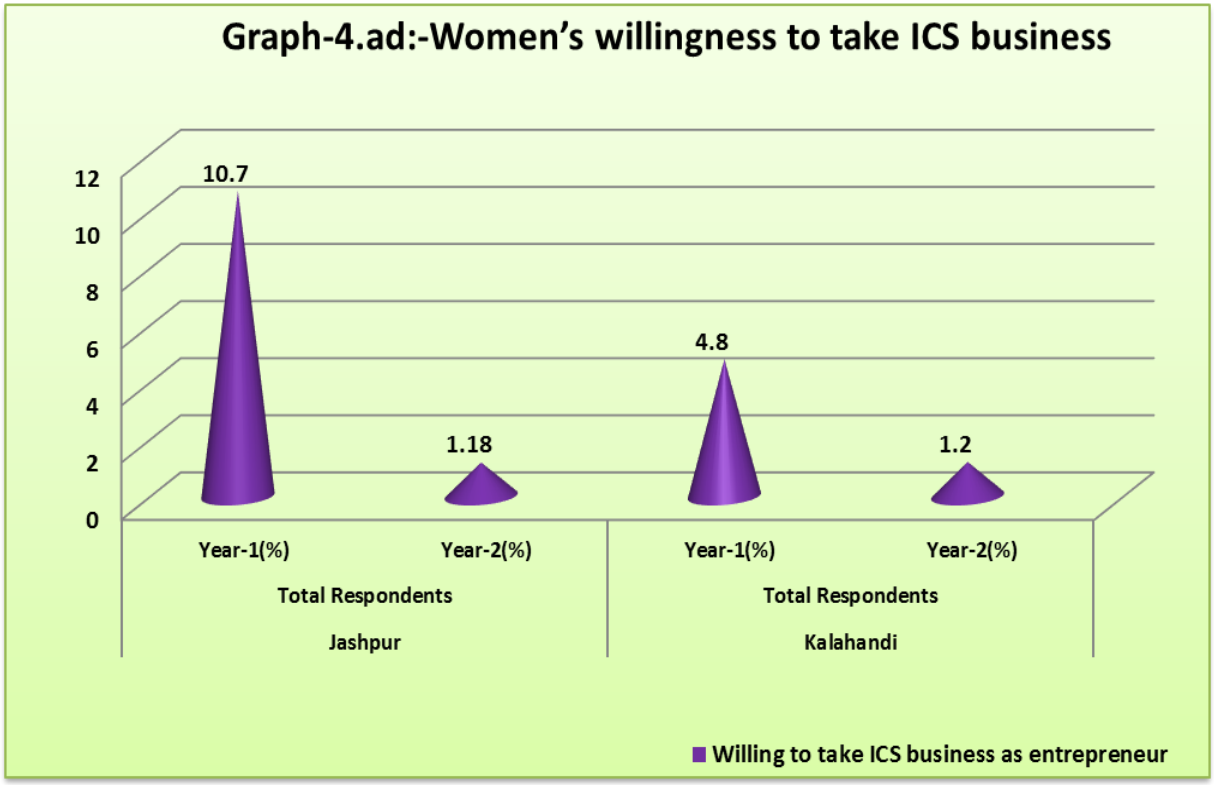


Interest in ICS business

Table 4.2.9 :- Evolution of women's willingness to take ICS business vs. Bachat project involvement status (District-wise)

	Jashpur						**Kalahandi**					
	SHE Champion		SHE member/ ICS tester		Total Respondents		SHE Champion		SHE member /ICS tester		Total	
	Y1	Y2	Y1	Y2	**Year-1**	**Year-2**	Y1	Y2	Y1	Y2	**Year-1**	**Year-2**
Willing to take ICS business as entrepreneur					18 *(10.7%)*	2 (1.18%)					8 *(4.8%)*	2 (1.20%)

This table shows that very less respondents are willing to take ICS business as entrepreneur. This thing is very same for both the districts in both the years, which gas shown in the table and graph.



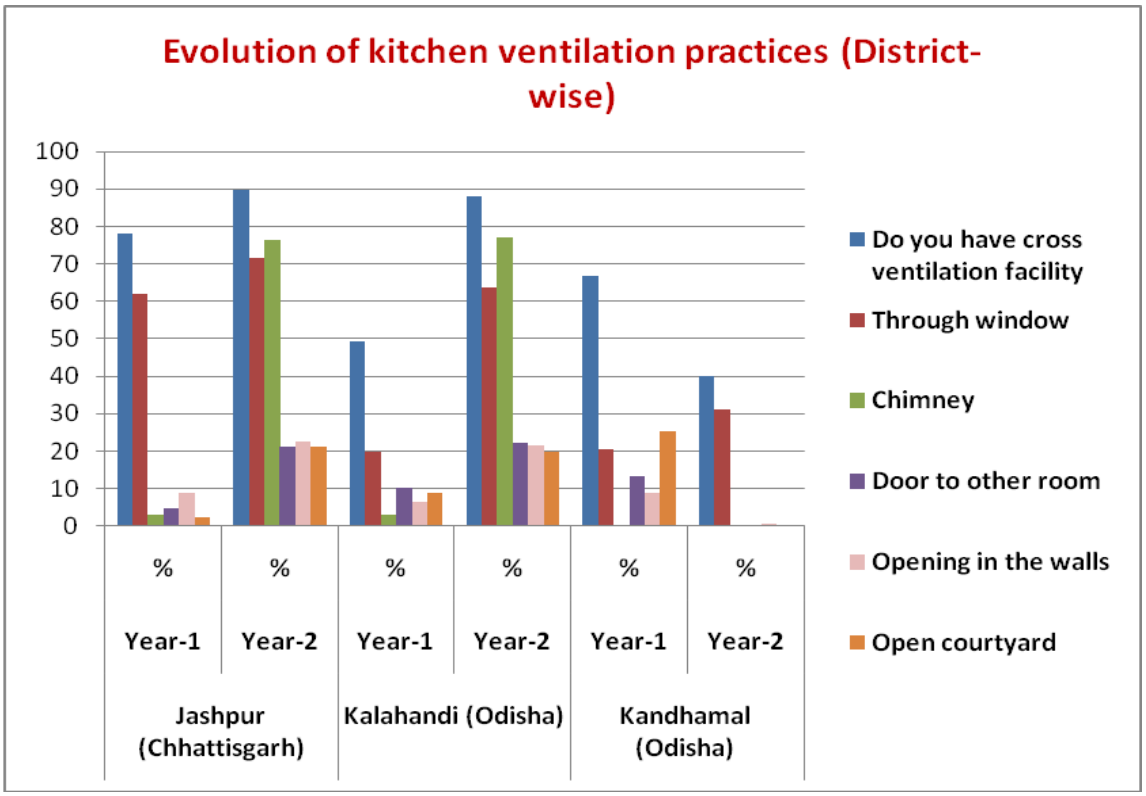
Kitchen ventilation practices

Table 4.2.10 :- Evolution of kitchen ventilation practices (District-wise)

Cross ventilation facility	Jashpur (Chhattisgarh)				Kalahandi (Odisha)				Kandhamal (Odisha)			
	Year-1		Year-2		Year-1		Year-2		Year-1		Year-2	
	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%	Frequency of "yes" response	%
Do you have cross ventilation facility	133	78.2	155	89.60	82	49.4	146	87.95	111	66.9	202	40.23
Through windo	105	62.1	124	71.68	33	19.9	106	63.86	34	20.5	156	31.07

w												
Chimney	5	3	132	76.30	5	3	128	77.11	0	0	1	0.19
Door to other room	8	4.7	37	21.39	17	10.2	37	22.29	22	13.3	0	0
Opening in the walls	15	8.9	39	22.54	11	6.6	36	21.69	15	9	3	0.59
Open courtyard	4	2.4	37	21.39	15	9	33	19.88	42	25.3	0	0

So far as the kitchen ventilation practices are concerned the table shows that about 85% respondents have cross ventilation facility in their kitchen in Jashpur distict in both the years. It is about 70% in the Kalahandi district and 53% in Kandhamal. But other respondents also told that the ventilation practices they have been adopted through window, chimney, door to other room and through open courtyard. The details are explained in the table and graph simultaneously.



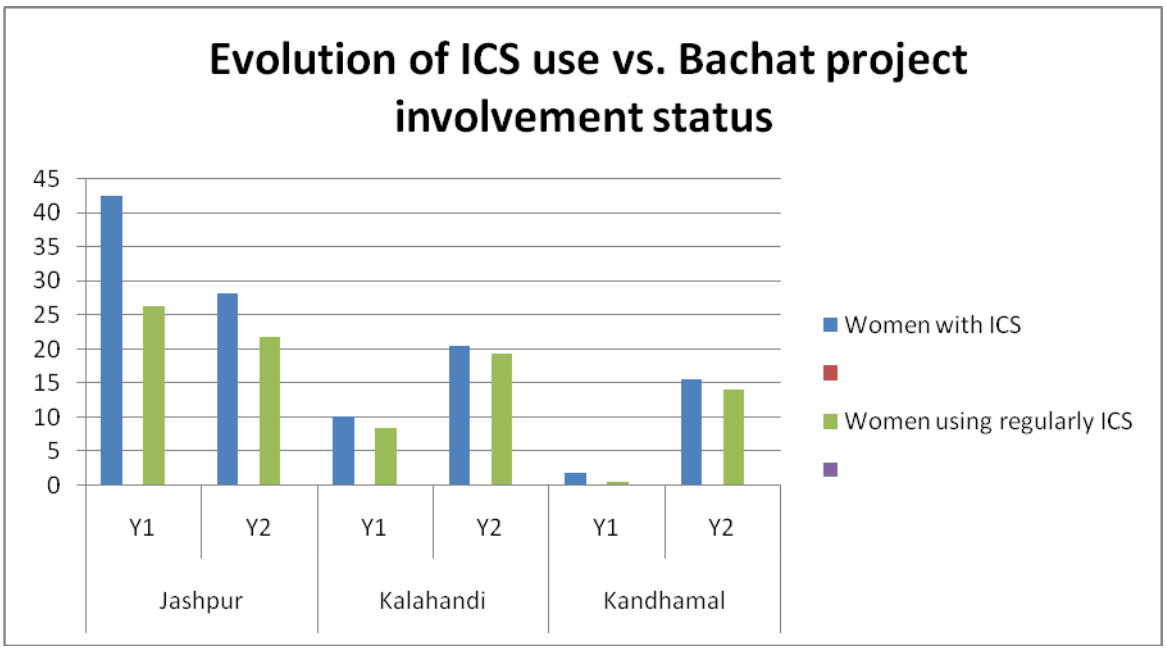
ICS USE

Table 4.2.11:- Evolution of ICS use vs. Bachat project involvement status

	Jashpur		Kalahandi		Kandhamal	
	Total Respondents					
	Y1	Y2	Y1	Y2	Y1	Y2

Women with ICS	71 *(42.3%)*	48(28.24)	17 (10.2%)	34 (20.48%)	3 (1.8%)	78 (15.53%)
Women using regularly ICS	44 *(26.2%)*	37(21.76)	14 (8.4%)	32 (19.28%)	1 (0.6%)	71 (14.14%)

The above table shows that in Jashpur 1st year only about 42% women have ICS and about 26% women are using ICS regularly. But in Kalahandi district for both the cases and in both the year the women having ICS is ranging from 10-20% and 8 to 19% respondents are using the ICS regularly. But in Kandhamal district 2nd year about 15.53% women have ICS and 14.14% women are using ICS regularly.



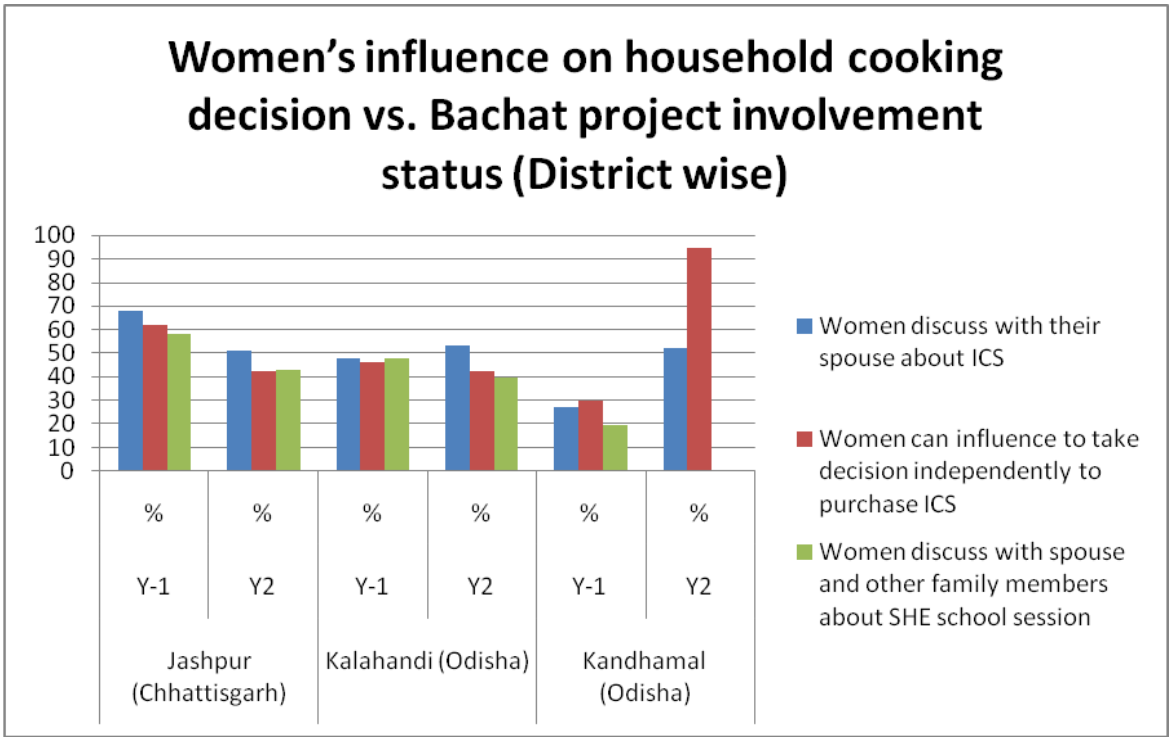
4.3:- Practice related indicators

Decision power trends within households

Table 4.3.1 :- Women's influence on household cooking decision vs. Bachat project involvement status (District wise)

Influence on household cooking decision	**Jashpur (Chhattisgarh)**				**Kalahandi (Odisha)**				**Kandhamal (Odisha)**			
	Y-1		**Y2**		**Y-1**		**Y2**		**Y-1**		**Y2**	
	"yes" response	**%**	**"yes" response**	**%**	**"yes" response**	**%**	**"yes" response**	**%**	**"yes" response**	**%**	**"yes" response**	**%**
Women discuss with their spouse about ICS	114	67.9	87	51.18	79	47.6	88	53.01	45	27.1	262	52.19

Women can influence to take decision independently to purchase ICS	104	61.9	72	42.35	77	46.4	70	42.17	50	30.1	474	94.42
Women discuss with spouse and other family members about SHE school session	98	58.3	73	42.94	79	47.6	66	39.76	32	19.3	NA	NA



The above table and graph shows that out of three districts women's influence on household cooking decision is highest in Kandhamal district in year-2 and lowest in all respect in others two districts.

More specifically, in Kandhamal district 94.42% women influencing to take decision independently to purchase ICS. But in case of Kalahandi and Jashpur districts it is 42.35% and 42.17% respectively.

Further, 58.3% women in Jashpur district in Year-1 discussed with their spouses and other family members about SHE school session, whereas, in Kalahandi and Kandhamal districts it is 47.6% and 19.3% respectively

Table-4.3.2 - Men taking decision regarding purchase of ICS (District-wise)

Regarding purchase of ICS	**Jashpur (Chhattisgarh)**				**Kalahandi (Odisha)**				**Kandhamal (Odisha)**			
	Y-1		**Y2**		**Y-1**		**Y2**		**Y1**		**Y2**	
	"yes" response	**%**	**"yes" response**	**%**	**"yes" response**	**%**	**"yes" response**	**%**	**"yes" response**	**%**	**"yes" response**	**%**
Male persons of the family	9	5.3	3	1.73	4	2.4	4	2.41	1	0.6	24	4.78
Female persons of the family	11	6.5	20	11.56	15	9	20	12.05	8	4.8	211	42.03
Jointly take the decision	142	84	126	72.83	148	89.2	119	71.69	157	94.6	262	52.19
Involve their spouse	156	92.3	137	79.19	132	79.5	129	77.71	131	78.9	NA	NA

The above table and below graph reveals that how male respond are taking decision regarding purchase of ICS in these three districts. In Jashpur district only 5.3% male persons of the family are taking decision regarding purchase of ICS in year-1.Even it is less than 5% in all the three districts. But when joint decision in this regard is analyzing, it is 84% in Jashpur district and 89.2% & 94.6% in Kalahandi and Kandhamal districts respectively

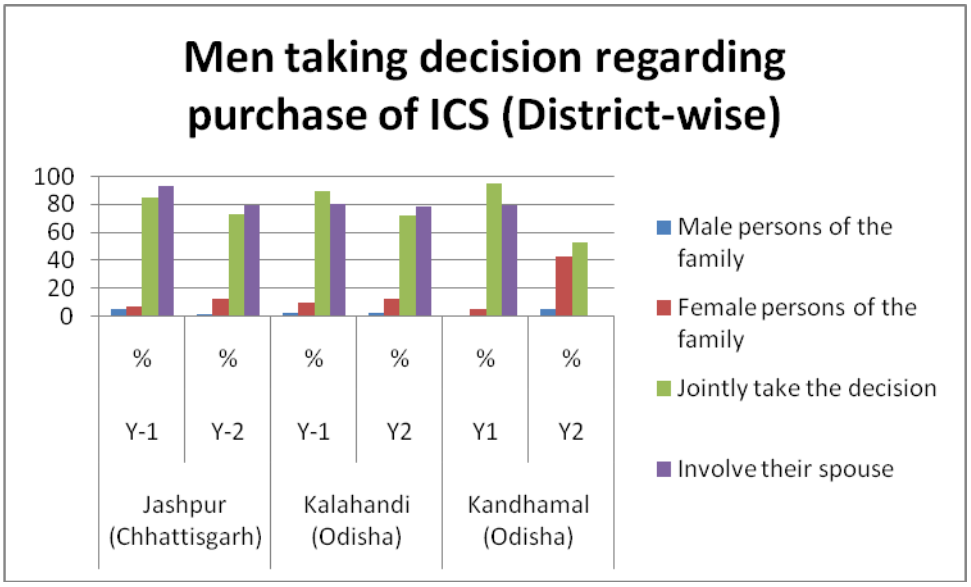
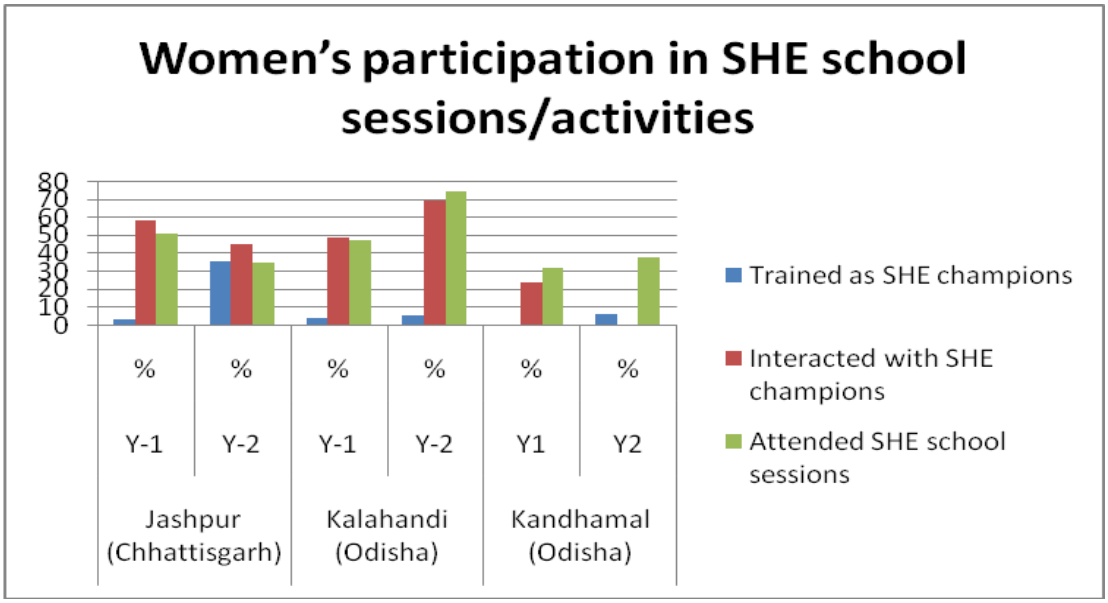


Table-4.4.3 Women's participation in SHE school sessions/activities

Women's participation in SHE school	Jashpur (Chhattisgarh)				Kalahandi (Odisha)				Kandhamal (Odisha)			
	Y-1		Y-2		Y-1		Y-2		Y1		Y2	
	"yes" response	%	"yes" response	%	"yes" response	%	"yes" response	%	"yes" response	%	"yes" response	%
Trained as SHE champions	5	3	60	35.29	6	3.6	8	4.82	0	0	31	6.17
Interacted with SHE champions	98	58.3	76	44.71	81	48.8	114	68.67	39	23.5	NA	NA
Attended SHE school sessions	85	50.6	59	34.71	78	47	123	74.10	52	31.3	189	37.64

The above table and following graph shows the comparative status of women in the three districts regarding the women's participation in SHE school. In Kalahandi Kandhamal and Jashpur districts 74.10%, 50.6% and 31.3% women attended SHE school sessions respectively. But only 35.29% women in Jashpur district have trained as SHE champions. But there is no such SHE champion in Kandhamal district.



4.4 KEY HIGHLIGHTS OF FINDINGS

Knowledge Related Indicators

- In the Jashpur district the majority women (164 nos) i.e 97.6% are aware about the traditional cook stove. Similarly, the other types of stoves like LPG and Kerosene Stove the nos of women aware about these types of stove are 159 and 157 which is 94.6 % and 93.5% respectively. But, in year-1,very few women are aware about the Solar Stove and Charcoal Stove. It is only 6.5% and 21.4% respectively.
- In the same district, in year-2, the situation of awareness has been improved a lot due to the active intervention. The awareness of women in this district on Traditional Cook Stove has been improved to 100%.That is, all the respondents in the study are aware about the traditional cook stove. Also in case of Solar Stove and Charcoal Stove the level of awareness has been improved considerably.
- But in case of Kalahandi district, which is a tribal district of Odisha, all the women respondents of the study areas are aware about the traditional Cook Stove. The awareness level about the other types of stoves in the district is very less
- The awareness level of men on different types of stoves in both the districts is not symmetric. Except traditional cook stove in both the districts and in both the years, the level of awareness is more in Jashpur district than that of the Kalahandi district. But in case of Kalahandi district the level of awareness on the knowledge of different types of stoves has been increased in year-2 than year-1.
- In year-2, the woman have a sound knowledge on different types of stoves in Jashpur district, but the status of knowledge of women in Kalahandi district is slightly improved than what it was in the year-1 .
- But so far as the knowledge of men on different types of stoves in both the districts in year-1 is concerned, it has seen that in the 1st year the level of knowledge is more in the district Jashpur than Kalahandi district. The knowledge level of women for the purpose in Kalahandi district is very dismal.
- The respondents of both the districts in two states have heard about ICS but the degree of responses is different in both the districts. In Jashpur district in first and second year average 72.56% women respondents have heard about ICS and average 78% men respondents in the district have given their views that they heard about ICS.

- In Kalahandi district in first and second year average 88.55% women respondents have heard about ICS and average 81.95% men respondents in the district have given their views that they heard about ICS . But in year-2 in Kalahandi district 100% male respondents have given their views that they have heard about the ICS and in the same year the 99.4% women respondents have given their views that they have heard about the ICS. It indicates that the level of awareness in the Kalahandi district in year-2 is very praiseworthy.
- In Jashpur and Kalahandi districts the respondents have given their views that they have seen an ICS but in Jashpur district in first and second year about 87% women respondents have seen an ICS and about 76% men respondents have seen an ICS. Similarly,in Kandhamal district in year-2 93.7% of women respondents have seen an ICS
- In both the districts respondents are better acquainted with the use of firewood. 95.18 % women respondents in Kalahandi district and 84.12% women respondents in Jashpur have been used only firewood as biomass ICS. But so far as the use of only the Agricultural residues as biomass ICS is concerned, in Jashpur district only 15.29 % women respondents told in favour of it. In Kalahandi district the response of zero.
- With respect to the women's knowledge on fuel characteristics requirements for proper ICS functioning, it has been seen from the above table that 64.11% and 70.48 % women respondent told to ensure only fuel dryness as a requirement of fuel characteristics in Jashpur and Kalahandi districts respectively. But in case of the fuel characteristic i.e adjust size to smaller pieces only the responses of women respondents in Jashpur and Kalahandi districts were *25.88 % and 27.10%* respectively. In Kandhamal district, 73.90% women respondents said to adjust size to smaller pieces
- In case of better forest and resource management, all the respondents from Kalahandi district i.e166 (100%),*52.94%* respondents from Jashpur district and 16.87% from Kandhamal district said in favour of the fact that the optimal use of firewood can contribute to better forest management
- likewise, all the respondents from Kalahandi district i.e166 (100%) and 88.24% respondents from Jashpur district and 91.97% from Kandhamal district told in favour of the fact that the ICS use can contribute to better forest resource management.
- Similarly, 86.14% respondents from Kalahandi district and 87.06% respondents from Jashpur district and 91.97% from Kandhamal district told in favour of the fact that the fuel saving leads to better forest resource management.
- In Jashpur district 42.35 % respondents said the use of dry fuel is the best method for optimize use of fuel while cooking. But In Kalahandi district 37.35% and in Kandhamal 81.93% respondents favored this method.
- Further, Jashpur district 34.11% respondents said to turn off fire after use is the best method for optimize use of fuel while cooking. But In Kalahandi district 34.94% respondents favored this method.
- In Jashpur district more than 90% of both men and women respondents said the different types of issues related to smoke. In year-1 more than 91% women told due to cooking smoke some problems like tearing and burning of eyes has been occurring. Again it affects the kitchen infrastructure like blackening of pots/wall/roofs as well. Further, 83.9% women are of the opinion that on account of smoke the problems like coughing and breathing.
- In year-2, 100% women respondents told that eyes problems and coughing are their problems due to smoke. Further, about 90 to 98% women respondents told that they have been facing some acute problems like air pollution, headache, breathing problem, blackening of pots/wall/roofs. In the same year, more than 99% male respondents told the problems like air pollution, eyes problems and coughing on account of kitchen smoke. Again, about 85% male respondents told that due to kitchen smoke the problems like tearing and burning of eyes and blackening of pots/wall/roofs has been occurring which are affecting their life adversely.

- The women's knowledge on the nos of ICS models is that in Kalahandi and Jashpur districts, 99 and 52 nos of women respondents respectively could not quote any model. In Kalahandi district 57 women respondents quoted only one model. About more than 25% women respondents quoted two or three or four models, where the nos of women respondents in Kalahandi district are very less with this effect
- In Kalahandi district in year-2 96.39% women respondents knows about how to use an ICS. In these two years more than 50% women respondents knows about how to use an ICS. But so far as the male counterparts are concerned their knowledge are not satisfactory to this effect.
- Similarly, in Kalahandi district in both the years and both men as well as women respondents have responded that the main attribute of the ICS is that it emit less smoke, though they have cited other attributes like time saving, cooks fast, low maintenance, portable, fuel saving/ reduction of fuel, reduced blackening of walls/ clean walls, easy to use, reduced blackening of vessels and so on.
- More than 60% women have the knowledge about the value chain actor i.e Market to purchase ICS. They have very least knowledge on the VC actors like Banks/ MFIs for loan, technicians who can help on technical issues and suppliers and manufacturers

Attitude related indicators

- So far as the women's confidence on household energy information is concerned, that the total 42.94% respondents in Jashpur district and 39.76% in respondents in Kalahandi district said that the SHE school sessions are discussed with spouse and other family members
- Similarly, total 51.18% respondents in Jashpur district and 53.01% in respondents in Kalahandi district said that ICS are discussed with spouse and other family members. Furthermore, the Use of ICS is recommended by more than 43% respondents in both the districts.
- Further,97% men respondents in Jashpur district in year-1 are very much interested to bring ICS to home. But in Kalahandi district 100% respondents are interested to bring ICS home and it is comfortable for cooking.
- About 62% women respondents can influence to take decision independently to purchase ICS in Jashpur district in year-1 and 92.3 % respondents told that wife will be involved in ICS purchase's decision. Similarly, in both the districts in year-2 about 12% women respondents told that female member will take decision to purchase ICS.
- So far as the kitchen ventilation practices are concerned the table shows that about 85% respondents have cross ventilation facility in their kitchen in Jashpur district in both the years. It is about 70% in the Kalahandi district. But other respondents also told that the ventilation practices they have been adopted through window, chimney, door to other room and through open courtyard. The details are explained in the table and graph simultaneously.

Practice related indicators

- Out of three districts women's influence on household cooking decision is highest in Jashpur district, Chhatishgarh in year-1 and lowest in all respect in Kandhamal district in Odisha.
- More specifically, in Jashpur district 61.9% women influencing to take decision independently to purchase ICS. But in case of Kalahandi and Kandhamal districts it is 46.4% and 30.1% respectively.
- Further, 58.3% women in Jashpur district in Year-1 discussed with their spouses and other family members about SHE school session, whereas, in Kalahandi and Kandhamal districts it is 47.6% and 19.3% respectively.
- In Jashpur district only 5.3% male persons of the family are taking decision regarding purchase of ICS in year-1.Even it is less than 5% in all the three districts. But when joint decision in this regard is analyzing, it is 84% in Jashpur district and 89.2% & 94.6% in Kalahandi and Kandhamal districts respectively

- Regarding the women's participation in SHE school, in Kalahandi , Kandhamal and Jashpur districts, 74.10%, 50.6% and 31.3% women attended SHE school sessions respectively. But only 35.29% women in Jashpur district have trained as SHE champions. But there is no such SHE champion in Kandhamal district.

CHAPTER-5

CONCLUSIONS & RECOMMENDATIONS

5.1 CONCLUSION

Energy is a vital input for economic and social development. In most of the developing countries, wood and other biomass fuels are still the primary source of energy for the majority of people, particularly the poor. In the last few decades, these developing countries have experienced a rapid depletion of natural forest resources that has resulted in hardship for the people living in rural areas, especially women and children who spend a considerable part of their time and energy in search of fuel wood and bio fuels and often have to cover long distances. Besides, deforestation has also led to many negative ecological consequences.

Developing and deploying the new generation of cook stoves at scale would cover a broad agenda, requiring cooperation among a range of diverse stakeholders on energy access. There is scope to support the technical development and innovation of all stove types under the umbrella of providing clean and affordable household energy to the poor. Today there is a renewed momentum to promote advanced biomass cook stoves that are affordable and burn fuel cleanly and efficiently. Furthermore, the provision of clean and affordable household energy is an integral part of scaling up energy access for the poor. The social and economic consequences of reducing the hour's women spend collecting biomass fuel, improving their health, and freeing up their time for more beneficial activities might well result in raising the living standards of an entire generation of children and households. Finally, at the global and regional levels, advanced cook stoves could contribute to a reduction in greenhouse gases and other climate forcers attributed to biomass burning.

Over half the world still uses solid biomass or coal fuels for basic cooking and heating. Increasing attention is being paid to the consumption of such fuels because of their role in producing damages at three distinct scales. At the household and village level, combustion of solid fuels produces pollution that is damaging to health and a large contributor to the global burden of disease and imposes a high time burden on those collecting fuel wood, typically women and girls. At the community and national level, when fuel wood is harvested in unsustainable ways, its consumption contributes to the loss of forest and associated ecosystem services. Finally, at the regional and global scale, the burning of biomass and coal in inefficient household stoves, which represent roughly 15% of global energy use, releases large amounts of black carbon and carbon-based greenhouse gases .Many of these gases fall into the category of products of incomplete combustion, which are more damaging in terms of global warming potential than the carbon dioxide released from more fossil fuel burning stoves. These emissions contribute to global warming, particularly where such fuels are harvested non-renewably.

With better fuels and more efficient cook stoves, such emissions could be reduced. Under conditions of sustainable production and more efficient fuel use, biomass energy is renewable. However, in many regions, little attention is paid to this issue, and scant research is undertaken to assess whether biomass energy is being produced and burned in a sustainable way. Background Though the solutions to these problems;such as replacing traditional cook stoves with improved or advanced biomass cook stoves or switching to liquefied petroleum gas (LPG) or other cleaner fuels are straightforward, most studies indicate households will depend on biomass energy or solid fuels for decades to come.

Context Indoor biomass cooking smoke is associated with a number of diseases, including acute respiratory illnesses and even cancer, with women and young children affected disproportionately. They are exposed to levels of indoor cooking smoke, in the form of small particulates, up to 20 times higher than the maximum recommended levels of the World Health Organization in 2005. It is estimated that smoke from cooking fuels accounts for nearly 2 million deaths annually (WHO and UNDP 2009), which is more than the deaths from malaria or tuberculosis; by 2030 over 4,000 people will die prematurely each day from household air pollution (IEA 2010). Using traditional biomass stoves for household cooking in developing countries requires extensive local fuel collection and is linked to local environmental problems. Open fires and primitive stoves are inefficient at converting energy into heat for cooking; the amount of biomass cooking fuel required each year can reach up to 2 tons per family. Where demand for local biomass outstrips the natural re-growth of resources, local environmental problems can result.

ICS must meet consumer needs and preferences if they are to lead to correct and consistent use and to successfully displace traditional stoves. This is also necessary for reducing household air pollution and fuel consumption, and therefore providing maximum health and environmental benefits. However, consumer needs and preferences are complex and are influenced by many contextual and social factors that require a deep understanding of culture, going beyond technology and economics. Successful ICS business models will need to be sensitive to cultural practices in both the design of the product and marketing strategies.

Current attention to improved cook stoves (ICS) focuses on the “triple benefits” they provide, in improved health and time savings for households, in preservation of forests and associated ecosystem services, and in reducing emissions that contribute to global climate change. Despite the purported economic benefits of such technologies, however, progress in achieving large-scale adoption and use has been remarkably slow. Moreover, carbon financing and social subsidies may help enhance incentives to adopt, but will not always be appropriate. The costs and benefits of these technologies are most affected by their relative fuel costs, time and fuel use efficiencies, the incidence and cost-of-illness of acute respiratory illness, and the cost of household cooking time.

The evidence shows that either advanced biomass cook stoves or clean fuels are required to achieve the desired health benefits, to conserve and optimize the use of fuel wood, especially in the rural and semi-urban areas, to help alleviate deforestation, to reduce the drudgery associated with cooking, especially on women, and the health hazards caused by smoke and heat exposure in the kitchen and to bring about improvements in household sanitation and general living conditions.

RECOMMENDATIONS

- The demand for ICS must be built in the project areas in both the states. Presently the acquired of ICS may be considered as its adoption. The system will not displace traditional technology without correct and consistent use. It calls for that consumers know about and have access to ICS and are motivated to buy one. It also requires that consumers have the decision-making power and the economic resources to make the purchase.
- Marketing Campaigns may play a powerful role in demand creation and to promote cook stoves. The product marketing technique i.e focused approaches to engage households deeply and consistently through locally appropriate product demonstrations and follow-up visits may be used to boost its adaptability in these areas.
- In developing countries like us, about 730 million tons of biomass are burned in each year, amounting to more than 1 billion tons of carbon dioxide (CO2) emitted into the atmosphere. There is mounting evidence that biomass burned inefficiently that contributes to climate change at regional as well as global levels. In this backdrop, the debate on climate change needs to be undertaken household energy issues that in turns will solve the problems lies within.

- For the switch from traditional wood burning stoves to ICS, just about half of the simulations result in positive net benefits. The former categories of stoves appear least beneficial. This knowledge should be disseminating among the respondents of the study areas.
- The most important factors influencing the net benefits of the switch to this stove are the use of the stove and its relative time efficiency as compared to the traditional stove. These parameters are important because a large proportion of the benefits of this stove come from time savings. But these things can be captured only if it is used often and efficiently as the inefficient stove use imposes a net time cost on users.
- Other important parameters for this stove are the incidence of ARI and the cost of illness of ARI, which determine health benefits, and the relative energy efficiencies of the traditional versus improved stoves. To prevent these types of health related disadvantages, the use of ICS in these areas are strongly recommended which in turn determines the ability to work of those people.
- Effect of different emissions accounting on household net benefits and implications for carbon finance-It is often claimed that one of the major barriers to adoption of some of the more advanced stoves and fuels (e.g. LPG and electric) is the investment finance needed to support household adoption of new stoves.
- More specifically, the cost benefit analysis is a must to scaled-up cook stove interventions and a need base and area specific research is required to better understand these. This should be troubling considering the extent of investment that is likely to occur in this domain in the near future due to growing concerns over climate change,
- Furthermore, as the women are doing much of the household cooking in these areas and at the time of cooking young children is usually staying closer to their mothers. So the design of these ICS should be in line with the aesthetic as well as the health and sanitation point of view.
- Indeed, the model developed and transacted in the market are not an attempt to explain the adoption problem because it is parameterized with real site-specific evidence rather than data that reflects the full range of household perceptions of impacts.
- ICS is a new product category for many households. For ICS to be adopted, retailers need to engage with users directly. In addition to this, let the customers to see and use the stove and the proper demonstrations will also help to address product perception issues.
- The extent of behavior change required on the part of the user affects consumer demand. In the case of cook stoves, the behavioral shift required for ICS use is significant, particularly when compared with the behavior shift required for health programs such as vaccines or vitamin distribution.
- ICS use requires numerous changes on a daily basis that are often associated with a financial cost and that break with long-standing family cooking tradition.
- Therefore, it is important that manufacturers design products that are more consistent with local practices rather than trying to substantially change cooking practices and fuels.
- The correct and consistent use of ICS requires that the consumers are engaged as full partners in the move toward clean and efficient fuel and technologies and that they clearly understand the ICS value proposition.
- A prime key to moving forward will be to effectively engage women in ways that accommodate or help overcome existing constraints while building intrinsic and extrinsic supports for their successful involvement.
- Religious and cultural beliefs can also be an important consideration in ICS uptake and usage. According to many households in rural areas, the open fire is not just a cooking appliance, but the spiritual centre of the home. Families saw the fire in their kitchen as a domestic god, a deity, and the smoke as a link between the earth and heaven. The religious significance of the open fire, as an obstacle to uptake of so-called “smokeless” cook stoves, is relevant in these areas. These gender and cultural considerations may be well understood and women should be oriented about those believes .The community should be engaged to understand the new concept and motivate to adopt it.

- The extent to which the new stoves are beneficial is influenced by how correctly and consistently they are used as well as by how much they displace traditional stoves. Correct use includes both operation and maintenance requirements, and it is influenced by a host of factors, including ease of use, consumer education received at the point-of-purchase, formal and informal input and advice offered to the user, compliance with proper use instructions, and how well cooking with the stove meets consumer needs and expectations. Therefore, for the acceleration of the programme the above things must be carefully taken care of.
- From a fuel efficiency perspective, to achieve a 50% fuel savings. it is important to acknowledge the value of incremental progress in areas of technology, demand creation, and consumer support that is advancing us toward this goal.
- Ultimately, protecting health and the environment will depend on whether the household energy sector can provide cook stoves with low pollutant emissions while also meeting consumer needs. Thus, addressing those needs will be fundamental to achieving health and environmental goals.
- India is the second largest country to use improved cook stoves. Subsidies were provided for the installation of improved cook stoves and technical backup centres were established in many States. Here the government should decentralize the ICS programme and to encourage commercialization for the better, the present document will be also extremely useful within India.
- Recognizing that stove adoption does not equate with stove acquisition and that long-term consistent and continuous use requires consumer buy-in and understanding of the value proposition that ICS can provide.
- Designing marketing campaigns that engage the consumer by identifying key attributes of importance to the consumer, rather than long lists of attributes that do not necessarily influence the consumer's decision
- Ensuring effective user engagement by including demonstrations, training, and post-sales support
- Addressing intra-household gender dynamics to enhance equity in purchasing decisions
- Including women more effectively throughout the cook stove value chain by improving both resources and agency-based support
- Identifying and respecting the cultural significance of cooking food
- Understanding the actual-use scenarios of the stove (for example, boiling water for tea versus frying flat breads)
- To improve the functionality of improved chulhas installed or purchased and the programme's speedier extension, the government should placed new strategy for:
  - Greater financial participation of users,
  - Participations of beneficiaries in selection of the models,
  - Modification of the principal designs to suit user's local needs,
  - More campaigns on users' education, - Introduction of incentive schemes for field level functionaries, based on the percentage of functional stoves,
  - Wider publicity through radio, TV, and other local media/modes,
  - Easy access to various models of improved chulhas, and marketing liberalization, including decentralized registration of models etc.,
  - Introduction of "ISI" mark on improved stoves.
- There are still a number of areas which could be improved and clarified its approach to ICS market transformation: A more nuanced understanding of “user needs” (beyond market research)
- Socio-cultural drivers of behavior should be integrated into the theory of change and incorporated at every step along the value chain. A mixed-methods approach should be taken to understand household adoption of improved cook stoves. This information could also be fed

back to stove designers and producers, allowing for an iterative design process that allows for continuously adapting the stove to match user preferences.

- There is a need for clarity regarding the criteria used for selecting the type of technology and fuel at each project location, and also for streamlining these criteria with the stated main goal of the intervention.