Cooking Practices in Rural Bangladesh: A Comparative Study between Traditional and Improved Cook Stove Users

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ABSTRACT: *The rural people of Bangladesh depend both on traditional and improved stoves for cooking. In this purpose they mainly use wood, leave, cow dung, crop's residue, coconut husk etc. The objectives of the study are to explore the cooking practices by rural households in the study area, to identify the determinants of stove choice by rural households and to compare the cost and benefit between using traditional and improved cook stoves. Tala upazila of Satkhira district has been selected as the study area. To address the objectives, a total of 120 samples are collected from two villages where 60 are traditional and 60 are improved cook stove users. Simple random sampling technique has been used to select respondents. As analytical tools, hypothesis testing, multiple regression model, and logit model have been used. The study shows that if we compare the hour of using stove, improved stove users are using stove for larger hours than the traditional users. Hours of using stove mainly depends on household expenditure, frequency of cooking, household size, fuel cost etc. On the other hand cost of fuel on using traditional stove is higher than the improved ones. In addition, emitting huge smoke, traditional stove creates indoor air pollution and various health problems which is less in case of improved stove. Stove choice mainly depends on household income, households size. Thus the benefits of using improved stove are more than that of traditional one. The households of rural Bangladesh should use improved stove for the greater benefits of it in perspective of saving fuel cost, and escaping from indoor air pollution. In this regard, awareness should be created among the households about the use of improved stove for getting greater benefit from it.*

KEYWORDS -*Indoor Air Pollution, Fuel Cost, Hour of Using Stove, Cooking Practice, Stove Choice*

I.   INTRODUCTION

As a cooking media, both traditional and improved cook stoves are used by the rural people in Bangladesh. Though the rural people of Bangladesh mostly depend on traditional cook stoves for cooking, they also use improved cook stoves and its use is increasing in recent time than before. Like Bangladesh, most of the developing countries of the world depend on wood and biomass fuel as their main source of energy. Though a notable portion is using the improved stove but compared to traditional stove, the frequency is lower. *Bondhu Chula*[1](friend stove)*,* and biogas based *Chula* (stove) has been considered as improved stove in the study where wood and biomass fuel are used as energy. The differentiating factors between these two types of stove, *bondhu Chula* and the traditional one are combustion capacity, fuel consumption, time need for cooking meal and collecting fuel, cost of fuel, health impact etc. The use of solid biomass fuel has negative impact on health and on the environment. Generally the rural people depend on solid fuel for cooking purposes and indoor smoke or air pollution occur from burning this fuel in small, confined and unventilated kitchen or homes. In addition, pollutants such as black carbon, methane and ozone emitted when burning inefficient fuels are responsible for a fraction of the climate change and air pollution (Pinto, 2016). In spite of the negative side of this biomass fuel, people use those because of their availability and lower cost. In case of improved stove, combustion of fuel is efficient that is why less fuel is consumed than the traditional stove. As fuel consumption is lower, lesser smoke is emitted and thus improved stove helps to keep environment clean through efficient fuel combustion.

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[1] Cook stove made of mud and pipe following a scientific design which is also known as scientific Chula. The stove is connected to a long vent pipe for the smoke produced to be passed in the air outside in such a way that anyone in or outside the kitchen would not be affected by the smoke.

The main objectives of the study are to explore the cooking practices of rural households in the study area, to identify the determinants of stove choice by rural households and to compare the cost and benefit between using traditional and improved cook stoves.

II.   LITERATURE REVIEW

Hude (2014) has reported that improved stoves can be designed to improve energy efficiency, remove smoke from the indoor living place, or lessen the drudgery of cooking duties modified to suit the cooking traditions and type of food to be cooked.

Hazra et al. (2014) have found that improved cook stove is beneficial for improved health and time saving for household. It has also been noted earlier that improved stove consumes relatively lesser fuel like wood and thus helps in preservation of forests and reducing emissions that contribute to global climate change. But smock emission from cooking stove is the main cause of indoor air pollution which severely affects the cook as well as the residents specially the children who normally remain close to their mother, usually the cook. Shrimali et al. (2011) have found that improved cook stoves can burn biomass more cleanly and efficiently and could thus help to mitigate various type of health problems. Kumar et al. (2013) have found that traditional stove are those where produced smoke stays in the kitchen due to the absence of vent pipe and poor ventilation of housing, which is harmful to the health of the users and their families. In traditional stoves, open fire results in risk of accidents with children burn or household fire. Firewood is the main source of cooking fuel across India which is as high as 75 percent of the total rural household population. The main reasons behind this are the free availability of firewood across India (Dhoble and Bairiganjan, 2009). Kerosene is normally used as a traditional or back – up fuel and firewood is still the choice of fuel among poorer households (Farsi et al., 2005). Hude (2014) has reported that biomass is used as primary fuel source in most of the developing countries and it is 58.68 percent of the total households. The important sources of used fuels are shrubs, bushes, cow dung cakes, agricultural residues, charcoal, and coal. Dhoble and Bairiganjan (2009) have described that the use of traditional stove provide the opportunity to use the fuel available in nature like firewood, cow dung, leaves, twigs etc. Moreover, some people consider food made by traditional stove is tastier and hence prefer traditional stove for cooking.

Elhadi et al. (2009) have described that improved stoves are efficiently meeting the needs of the households. The users of it have gained several advantages over traditional one such as fuel saving, lower smoke emitter, fire longer time, sturdy and stable. In addition to that, heat could be controlled, the fire risk is reduced and they cook better food. Alam et al.(2003) have found that cost of stoves is one of the influential determinants of stove choice and it includes manufacturing cost, training cost, chimney's cost, fuel wood cost etc. Besides, stove choice is also highly influenced by fuel choice. Nlom and Karmov (2015) have found that income plays an important role in choosing fuels. Cost and affordability of energy service determine fuel choice. Besides this culture, educational level of the household head, age of the household head and individual preferences also influence fuel choice. Farsi et al. (2005) have found that there remain various factors for choosing fuel such as cost of fuel, availability of fuel, opportunity costs, transaction cost etc. Duflo et al. (2008) have found that effect of air pollution mainly fall on child health such as mortality of the child. Higher rate of total suspended particulate is responsible for child mortality. Achmadi (1992) has described that the main health effects of indoor air pollution are acute respiratory tract infection, dental, oral, Gi tract, bronchitis, asthma, skin infection, diarrhea, neurologic disorder, musculoskeletal disorder, tuberculosis, cardiovascular disease and other infections. Pinto (2016) has explained that social implementers can contribute by considering the role of cleaner and more modern stove options.

Cook stove is necessary for all households. Many studies have been done on cook stoves such as pollution generated from it, household cooking fuel choice, socio – economic impact of switching from one fuel to other, determination of household fuel choice. But very few have concentrated on cooking practices and on comparing the cost and benefits of traditional and improved cook stove.

III. DATA AND METHODS

This study is based on primary data. For collecting primary data, a well structured interview schedule has been used in field survey. For the study purpose, two villages (*Jeala Nalta and Jeala*) under *6 no. Tala* union of *Tala* upazila of *Satkhira* district have been selected as the study area. Many people of these areas use both traditional and improved stove. Besides, easier access to the study area, lower travel cost both in terms of time and money, having personal local affiliations are the main reasons in selecting these two villages as the study area. The sample size was restricted to 120 households where 60 are traditional and other 60 are improved cook stove users. Respondents are selected following simple random sampling technique.

Data were analyzed by using both descriptive and inferential statistics. In case of inferential analysis, hypothesis testing were done to show whether there is any difference in hour of using stove, amount of using fuel and fuel collection time between traditional and improved cook stove users. A logit regression model was estimated to show the effect of the factors which influence stove choice. In addition, multiple regression model

was used for estimating the factors which affect the amount of using fuel and hour of using stove. Costs and benefits have been measured by using model, figure and verbal description.

IV. RESULTS AND DISCUSSION

The study considers two villages of one union of *Tala upazila* of *Satkhira* district to analyze cooking practices in rural Bangladesh. It also made a comparison between traditional and improved cook stove users**.** In the study area, the villagers use both traditional and improved stove for cooking purpose. Though the number of traditional stove using households is higher, many of them also use improved stove along with traditional stove but their frequency is lower. Cooking practices of the households depends on duration of using stove, cost of stove, fuel using pattern, types of fuel use, ways of collecting fuel, amount of fuel need for cooking, types of kitchen used, kitchen environment, hours of using stove, frequency of cooking etc. The study shows that the cooking practice differs depending on the nature of stove used.

The study also concentrates on comparative cost and benefit between traditional and improved cook stove. In comparing the cost and benefits, the study considered several factors like amount of fuel consumption, cost of fuel, collection time of fuel and hours of using stove. The study found that, in case of traditional stove, fuel cost, fuel collection time, cost of stove are higher than that of improved stove but required hours spent for cooking is higher for improved stove than traditional one.

The study tries to show which factors influence the amount of fuel consumption, time required for cooking stove choice and cost of fuel. The study also tries to show the socio-economic condition of the households which also have influence on cooking practices. Besides these, it also shows the effect of socio-economic factors on cost and benefit issues on traditional and improved stove.

Households' Socio-economic Profile

Age of household head, Age of cook, education of household head, education of cook, sex, housing type, family structure, income, expenditure, savings pattern, number of child, occupation of household head are some parameters that have been used to describe socio – economic profile of the households. It is noticeable from the study that age of the cook of traditional stove user is relatively higher than that of improved stove user. Normally the cooks in the rural areas are female and the study found that aged women preferred traditional stove than the improved one. The cause of such preference might be the habit that they are used to with these traditional cooking materials. It is seen that the age of the household heads of traditional stove user is higher than that of improved stove user and the causation might be the habit, as they are used to with traditional stove. Deshmukh et.al (2014) have also found that older household heads prefer traditional stove more than improved stove. Again if we compare between the groups, improved stove users have higher schooling years than traditional stove users on an average. Comparing the educational status of the household heads, we also found that, household heads of the improved stove user have higher schooling years than the traditional stove users. Concentrating on those two aspects, the study concludes that there might be a positive relation between education and improved stove use. It indicates that education of the household heads or the cook make them aware about the benefits of improved stove, they become conscious and are inspired to use improved stove. Owning some cattle have strong influence on stove choice as cow dung which is the main alternative fuel used in traditional stoves are available when a family have some cattle. On average, families using improved stove have 1-2 cows whereas families having 7-8 cows are mostly traditional stove user and this finding clearly depicts the positive relation between having cattle and traditional stove use. In the study area, it has been seen that traditional stove users burn more fuel than improved stove users.

Households' Cooking Practice

The study found that, most of the improved stove user shifted to improved stove from traditional stove to avoid the negative impact of traditional stoves. They have identified that traditional stove consumes larger amount of fuel and thus emits heavier smoke than improved one which is the main source of indoor air pollution and the cook as well as the children are the poor hunt who faced different health related problems. Different types of fuel are used by the households in the study area. The major types of fuel used by the households are wood, leaf, coconut husk, cow dung cake, crop residue. The households mainly use cow dung as fuel which they get from gathering, buying and rearing cow. Some of the household use crop residue as fuel and household who do not have any option of cow dung or crop residue mostly use wood as fuel. Fuel consumption depends on the need of the households.

The average amount of fuel for improved and traditional stove user groups is 139.83 kg and 169.78 kg. respectively per month. The amount of using fuel is more for traditional users than improved one. Elhadi et al. (2009) also agreed that traditional stove consumes more fuel than improved stove. The average fuel costs of the two groups are BDT 381.92 and BDT 514.83 per month respectively. The study shows that the households of traditional stove users have to bear more fuel cost than improved stove using households. Elhadi et al. (2009) have also found that fuel cost is more for traditional stove users than improved stove users. Fuel collection cost

varies from household to household. The households, who have their own sources of collecting fuel, have not to bear fuel cost. On the other hand, the households who have not their own sources of fuel have to bear fuel cost. In total 39.17 percent users have not to bear any fuel cost whereas 29.17 percent stove users of the total have to bear fuel cost ranging from BDT 11-20 per month where the majority of that group is improved stove user. The average stove maintenance cost is BDT 13.87 for improved user whereas for traditional stove user, it is BDT 0.25. As traditional stove or *Chula* can be made at home with less or no cost, the users of it have to bear less or no cost On the other hand, improved stove or its element has to be bought from market and for this reason, the users of it has to bear additional cost.

Most of the kitchen in the area is *kancha (Structure made up of materials other than brick)* who are using traditional stove On the other hand, most of the kitchen is *pacca (Structure made up of brick)* for improved stove users. *Pacca* kitchen is more suitable for using improved stove. The survey study shows that semi-open (roofed with traditional building materials like bamboo, crop residue or *goalpata*) and open kitchen are not suitable for installing improved stove as the installation is costly, the materials may be impaired by rain or wind. On the other hand, all types of kitchen are suitable for establishing traditional stove. Some kitchens are in separate building, some are in separate room attach to main building, some are part of main living room and some are away from the main residential unit. The study shows that 67.5 percent of the total households' kitchen is situated in separate place from the residential unit to escape from smoke. The average hour of using stove for improved stove is 3.04 and it is 2.68 hours for traditional stove. Households of improved stove users use them for longer hours than the traditional users. Because it takes more time for improved stove to burn the fuel properly.

Frequency of cooking depends on the demand of food. Most of the users from both improved and traditional stove user groups cook food two times a day. On the other hand a few of them cook one time a day. Smoke from burning fuel creates hazardous effect on health during cooking hours thereby creating the severe indoor air pollution. The surveyed households reported different health related problems caused by smoke. A total of 43 out of 120 respondents respond that improved stove emits lesser smoke than traditional stove. The stove users of both improved and traditional groups suffer from various types of diseases related with smoke. They mainly suffer from cough, asthma, head ache, eye irritation and skin diseases. Traditional users suffer from coughing, asthma, skin diseases but eye irritation has been found to be the most prevalent problem for them. Compared to traditional stove, health related problems caused from smoke are lower for improved stove user but a few of them reported that they suffered from coughing. It could be noted that, smoke emitted from cooking stove is a strong source of indoor air pollution. But improved stove does not emit smoke in indoor rather drain up through a long vent pipe in the outer atmosphere. So, though a few of the respondents reported to face coughing, but indoor smoke might not be the single agent to cause coughing.

Estimated Result and Discussion on Cooking Practice
Hypothesis Testing:
Hypothesis testing is done to check the validity of the statement.
Null Hypothesis, $H_0 = 0$. There are no statistically significant differences in fuel cost, fuel amount, fuel collection time and hour of using stove.
Alternative Hypothesis, $H_A \neq 0$. There are statistically significant differences in fuel cost, fuel amount, fuel collection time and hour of using stove.

Table I: Hypothesis Testing

Variable (Measurement Unit)	Types of Stove		Mean Diff.	Std. Error	t value
	Traditional	Improved			
Hours of using stove (Hour/Day)	2.68	3.04	-.3583	.069	-5.15***
Amount of fuel use (Kg/Month)	169.78	139.83	29.95	5.660	5.29***
Fuel collection time (Hour/Month)	4.35	3.37	.98	.528	1.85*
Fuel cost (BDT/Month)	521.30	380.25	141.05	23.154	6.09***

N.B.:* -2.32>t>2.32, ** -1.96t >t>1.96, * -1.68>t>1.68
Difference = Difference of mean values between the two types of stove using households.

The Table I shows that mean hours of using stove of traditional household group is 2.68 hours per day and it is 3.04 hours for improved stove using households. The mean difference between the types of stove is -.35 hour which is statistically significant at 1 % level. Mean amount of fuel use of traditional stove using households is 169.78 kg per month and it is 139.83 kg for improved stove using households. The mean difference is 29.95 kg. which is statistically significant at 1 % level. Average fuel collection time of traditional stove using households is 4.35 hours per month and it is 3.37 hours for improved stove using households. The mean difference between the types of stove is 0.98 hour which is statistically significant at 10 % level. The mean difference between fuel costs of these two types of stove is 141.05 which are statistically significant at 1 % significance level. The hypotheses result shows that hours of using stove is longer for improved stove than

traditional one. On the other hand fuel amount, fuel collection time and cost of fuel are higher in case traditional stove than improved one.

Multiple Regression Analysis on Amount of Fuel:
Here multiple regression analysis has been used to find out the factors which influence the hours of using stove. In this multiple regression model, amount of fuel has been considered as the dependent variable which has been measured in kg. Here authors have considered 6 independent variables these are household (HH) size, HH Income, hours of using stove, fuel collection time, smoking severity, and   type of stove. These independent variables are termed as beta coefficients.

Table II: Multiple Regression Analysis on Amount of Fuel

Y(Amount of Fuel)	Coefficient	Standard Error	t value	P>|t|
X_1(HH Size)	13.68***	2.10	6.50	0.00
X_2(HH Income)	- .42	.47	-0.90	0.37
X_3(Hours of using stove)	20.15***	6.71	3.00	0.00
X_4 (Fuel collection time)	.57	.79	0.72	0.47
X_5(Smoking Severity)	3.49	2.88	-5.76	0.23
D(Type of stove)	-31 .64***	-5.76	`1.21	0.00
Constant	50.98	16.78	3.04	0.00
Number of observation = 120, R-squared = 0.5524, Adj R-squared = 0.5286				

Source: Authors' Estimation Based on Field Survey, 2017
N.B.: ***P < 0.01, ** P < 0.05, *P < 0.1

The study found a positive relation between household (HH) size and amount of fuel. The result is significant. It is possible because with the increase of household member, portion of meal increases which increases cost of fuel Hazra et.al (2014) have also found a positive relation with household size and amount of fuel. HH income is negatively related with amount of fuel though the result is not significant. Amount of fuel increases with the increase of hour of using stove and the result is significant. Thus there is a positive relation between hour of using stove and amount of fuel consumed. Though the result is not significant but the study finds a positive relation with fuel collection time and amount of fuel. Hazra et.al (2014) have also found positive relation between fuel collection time and amount of fuel in their study. There is a positive relation between smoking severity and amount of fuel. Here the result is not significant. It is true that, the more fuel will be burnt, the more smoke will be emitted. It is also found that in improved stove, lesser amount of fuel is needed than traditional stove and the result is significant. Elhadi et al. (2009) have also found that improved stove consumes lesser fuel than traditional stove. Pinto (2016) has also commented that traditional stove need more fuel than improved one

Multiple Regression Analysis on Hours of Using Stove:
Here, multiple regression analysis has been used to find out the factors which influence the hours of using stove. In this multiple regression model, hours of using stove has been considered as dependent variable which has been measured in hour. Here authors have considered 9 independent variables which are HH expenditure, frequency of cooking, number of child, HH size, age of the cook, education of the cook, fuel cost, time of collecting fuel and type of stove. These independent variables are termed as beta coefficients.

Table III: Multiple Regression Analysis on Hours of Using Stove

Y(Hours of using stove)	Coefficient	Standard Error	t value	P>|t|
X_1(HH expenditure)	.014*	.805	1.82	0.07
X_2(Frequency of cooking)	.228***	.080	2.85	0.00
X_3(Number of child)	.003	.046	0.06	0.95
X_4(HH size)	.103***	.034	3.03	0.00
X_5(Age of the cook)	.012***	.003	3.66	0.00
X_6 (Education of the cook)	-.006	.005	-1.04	0.30
X_7(Fuel cost per month)	.533**	.263	2.10	0.03
X_8(Time of gathering fuel)	-.018*	.010	-1.72	0.08
D(Type of stove)	.506***	.065	7.69	0.00
Constant	.971	.246	3.94	0.00
Number of observation = 120, R-squared = 0.5411, Adj R-squared = 0.5036				

Source: Authors' Estimation Based on Field Survey, 2017
N.B.: ***P < 0.01, ** P < 0.05, *P < 0.1

Table III describes that with the increase of HH expenditure, hours of using stove increases. Thus there is a positive relation between HH expenditure and hours of using stove. The result is significant. With the increase of frequency of cooking, hours of using stove also increases. Thus there is a positive relationship with frequency of cooking and hours of using stove. Here the result is also significant. Similarly number of child and hour of using stove are positively related. That is with the increase in number of child, hour of using stove

increases. Here, the result is not significant. In spite of this, it is true that number of child contribute in increasing hours of using stove because for little child, food is prepared frequently. HH size and hour of using stove are also positively related. It indicates that with the increase of household member, the required portion of food are larger and to cook the extra food, hour of using stove increases. The result also shows that with the increase of age of the cook, hour of using stove also increases at significant level. It is possible because with the increase of age, family size tends to increase that requires larger and verity types of food. So, they spend larger time for cooking. There is a positive relation between cost of fuel and hour of using stove.

Stove using hour that is the time of cooking is more for improved stove users than the traditional one at significant level. It generally depends on fuel burning capacity which is not same for the two types of stove.

Regression Analysis on Stove Choice:

Logit regression analysis has been done for searching out the factors which influence on stove choice. In this logit regression model we consider stove choice as dependent variable which is dummy (1=Improved stove, 0=traditional stove). Here authors have considered 8 independent variables. These are income of household, age of the household head, education level of the household head, age of the cook, household size, cost of fuel, awareness about pollution, and number of cow.

Table IV: Logit Regression Analysis on Stove Choice

Y(Stove Choice)	Coefficient	Marginal Effect
X_1(Income of household)	.073	.0183
X_2(Age of household head)	-.050**	-.0126
X_3(Household education)	-.073	-.0183
X_4(Cook Age)	-.062**	-.0154
X_5 (Household size)	.738***	.1834
X_6 (Fuel cost per month)	-.014***	-.0037
X_7(Awareness)	-.075	-.0188
X_8(No. of Cow)	-.214	-.0534
Constant	7.796	-
Number of observation = 120, LR chi2(8) = 49.58, Pseudo R^2 = 0.2980		

Source: Authors' Estimation Based on Field Survey, 2017
N.B.: ***$P < 0.01$, ** $P < 0.05$, *$P < 0.1$

The table IV shows positive relation with HH income and probability of having improved stove. This implies that increasing income of the households may inspire them to use improved stove because the installation cost of this stove is more than the traditional stove. Farsi et al., 2005 have also concluded that income is an important factor for choosing stove.

Higher age of household head negatively affect the probability of having improved stove than traditional one. Here the result is statistically significant. It may be for the reason that older household heads choose traditional stove as a matter of habit. Deshmukh et.al (2014) have also found that older household heads prefer traditional stove more than improved stove. If age of the cook increases, probability of having improved stove decreases. Here the result is significant. It may be for the reason that older cook choose traditional stove as they are used to with traditional stove. With the increase in HH size, probability of having improved stove increases. It may be for the reason that larger families normally incur higher consumption expenditure per month and also have to cook larger portion of food daily. As in case of improved stove, fuel consumption is lower, fuel cost will be lower and it will be easier for the households to manage the household expenditure per month. Fuel cost (per month) and the probability of having improved stove are negatively related at 1 percent level of significance. Negative and significant result suggests that the household who have traditional stove bear more fuel cost than improved stove users. Higher fuel cost indicates households with more members are using higher amount of fuel per month. As these households need to cook more per day for their larger family and so they are less likely to choose improved cook stove because it takes longer time than traditional stoves. Number of cow and the probability of having improved stove are negatively related though the result is not significant.

Multiple Regression Analysis on Fuel Cost:

In this multiple regression model, cost of fuel has been considered as dependent variable which is measured in BDT. t 6 independent variables has been considered which includes HH size, HH Income, hours of using stove, amount of fuel, cooking frequency and type of stove.

Table V: Multiple Regression Analysis on Fuel Cost

Y(Cost of Fuel	Coefficient	Standard Error	t value	P>|t|
X_1(HH Size)	26.631***	9.474	2.81	.00
X_2(Income HH)	2.101	1.793	1.17	0.24
X_3(Hours of using Stove)	8.188	27.687	0.30	0.76
X_4(Amount Fuel	2.399***	.365	6.57	0.00
X_5(Cooking Frequency)	-29.305	24.838	-1.18	0.24
D(Type of Stove)	-61.201**	23.758	-2.58	0.01
_cons	8.656	70.014	0.12	0.90
Number of obs = 120, R-squared = 0.8598, Adj R-squared = 0.8524				

Source: Authors' Estimation Based on Field Survey, 2017
N.B.: ***P < 0.01, ** P < 0.05, *P < 0.1

The above result (table V) shows that that HH size and cost of fuel are positively related at significant level. Hazra et.al (2014) have also commented on this positive relation between the two Hour of using stove also effects on cost of fuel positively. Amount of fuel and cost of fuel are positively related at significant level. Besides these, using improved stove incurs lower fuel cost than traditional one as improved stove consumes less fuel than traditional stove.

CONCLUSION

This paper focuses on cooking practices and on the determinants of stove choice of the rural households. Besides these, it also concentrates on the comparison between the cost and benefit between improved and traditional stoves. Comparing the two alternative cooking options, several differences have been identified which is important from the policy perspective. *Bondhu Chula* which has been considered as improved stove in this study is a local invent and made up of local raw materials available in the area and installation cost is not so high. Utilization of local technology pave the way to the use of local resources and people of all classes could be easily accustomed to that. Considering those aspects, promotion of such local technology should be enhanced. Fuel combustion has been proved to be efficient in that sense, burning of fuel remains confined into the stove, burn for longer period and the internal heat is completely absorbed by the cooking pot. That is why, it consumes lesser fuel and emits lesser smoke. Apart from this, the smoke is not emitted in indoor environment rather passed through the vent pipe in the outer atmosphere which pollutes the outdoor air but the probability of being affected by such outdoor smoke is lower than indoor smoke as smoke melts in the air. So, either considering the economy in fuel use or the environmental impact, concentration should be given to introduce improved cooking stove like *Bandhu Chula.*

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