

# The Mechanization of Everyday Life: How Improved Cook Stove and Gas Stove Entered in Rural Areas of Bangladesh

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## Abstract

In Bangladesh the everyday life of people is changing specially in the rural areas. The income of rural people is increasing, and this increasing income has profound effect on the rural inhabitant's lifestyles. People are getting used to new technology and ideas. The purpose of this paper is to identify the way of introduction of improved cooking stove (ICS) and gas stove in rural areas of Bangladesh. The qualitative research methodology is used to collect data. The study found the effect of modernization in the rural society.

**Keywords:** improved cooking stove (ICS), gas stove, biomass fuel, clay fixed cook stove, smoke emission, indoor air pollution, modernization.

## 1. Introduction

Bangladesh is a small land with large number of inhabitants and most of them are living in village areas. Rural households have long tradition to cook in traditional mud building cook stove. Rural peoples are using biomass as fuel for traditional clay fixed cook stove. The smoke producing from traditional cook stove directly affect the health of human body. Women and children are mostly suffered by dangerous smoke comes from open fire of traditional cooking stove. After the independence, Government of Bangladesh has taken step to reduce health hazards of women and children in rural areas. Therefore, the idea of Improved cooking stove was developed by one of most prominent government institutions which reduces smoke emission especially to the cook and some national NGO's cooperation with some International organizations started production and marketing of Improved cooking stove. At present more than one hundred NGOs are working locally with Improved cooking stove. Nowadays rural people are more conscious about health issues. Their income rate and education rate are increasing than before which helps to develop the living standard of rural peoples. Villagers, who have money build new house and replacing their traditional cook stove with gas stove. In this paper, I discuss about rural people everyday life specially in cooking. My research question is "how Improved cooking stove and gas stove entered in rural areas of Bangladesh".

### 1.1 Hypothesis:

To analyze my research topic, I was developed four potential hypotheses.

1. The necessity of health friendly improved cooking stove to reduce biomass effect on women and children's health.
2. Kitchen as a first sign of social development used to bring up individuals and collective status of each family by using innovative stuff of kitchen ranges.
3. Individuals increasing amount of income is used to buy luxury items rather than buy food. Effect of development of middle class citizens.
4. Non-Government Organizations (NGO) awareness campaign about safety of women health and environment and marketing their own development of health and environmental friendly stove and support women to use their own development and improved cooking stove from others.

## 2. Methodology of the Study

I conducted qualitative research methodology in this study. Qualitative research is effectively used to obtain a specific type of information of individuals or organizations. To get an answer to my research question in this study I must have to get a deep understanding of cook stove technology used in rural areas of Bangladesh. This is a paper based on consumer history specifically in cooking in rural areas of Bangladesh. To get possible data for my consumer history based research topic firstly, I was read out the related literature deeply. Secondly, I was gathered data from different literature published by UNICEF, USAID, GIZ, BRAC and others national and International institutions and prominent researchers. Finally, I was analyzed data through categorizing and tried to make connection with my field of study.

## 3. Historical Background

### 3.1 Cooking Practices in Rural Areas of Bangladesh

Cooking practices in Bangladesh is shaped by Bengali culture. In Bengali culture mother is considered as a key in house and she is mainly responsible to cook. Bangladeshi women spend lot of time for cooking. The most common foods in Bangladesh are rice, ruti (bread), lentils, vegetables, fish, meat, snacks, sweets, cakes, tea and

puffed rice. Cooking time varied on season in rural areas of Bangladesh. The longest cooking episode usually for lunch which takes about 3-5 hours. During rainy season rural peoples suffered a lot, they shift their cooking from outside to inside. In winter season, People usually cooked three times (morning, day, evening or night) in a day but in rainy season people used to cook two times (morning and day) in a day (Arif, T., Ashraf, A., Miller, G., Mobarak, A.M., Akter, N., Ali, ARM.M., Sarker, MA.Q., Hildemann, L., Dey, N.C., Rahman, M., Dwivedi, P. & Wise, P., 2011).

### *3.2. Traditional Cooking Stove in Rural Areas*

The type of stove going to use in rural areas depends on the types of fuel that are available, less cost and preferred. Most of rural households using biomass fuel in traditional three stone single or double cook stoves. A traditional clay fixed cook stove consists of a mud-bid cylinder, set underground or over ground with three raised points. One small hole built before three raised points used as fuel feed and spaces between three raised points used as fuel-gas exits. Muddy designated three stone cook stoves are varying in size, number of burners, whether it is fixed on the ground or portable, whether it is placed indoor or outdoor. Three different kind of cooking stove normally used in rural areas which are named as single mouth, double and triple mouth. Clay, sand, cow dung, rice husk and saw dust were mainly used to build those kind of traditional cooking stoves in rural areas (Akhter, S., Miah, MD. & Koike, M., 2010).

### *3.3 Fuel Use in Traditional Cooking Stove*

Rural households using straw, twigs and leaves, cow dung, agricultural residues as fuels in their traditional clay fixed with three raised points cooking stove. Majority number of peoples in Bangladesh lives in rural areas and using biomass fuel for cooking. Woody biomass fuels including dry leaves, wood branches, smashed wood, bamboo, straw, wood dust, husk, jute stick and animal wastes biomass fuel including dried cow dung. Using of non-biomass fuels is relatively rare in rural households for cooking. Which are including kerosene oil, electricity etc. Use of fuel also varies across seasons. In winter or summer term rural peoples use mostly agricultural residue for cooking which includes straw, dry twigs and leaves, rice husk, jute stick, etc. But, before the monsoon period they stored biomass such as wood, wood branches, bamboo pieces, dried cow dung etc. and during the rainy period they use their stored biomass (Arif, T., Ashraf, A., Miller, G., Mobarak, A.M., Akter, N., Ali, ARM.M., Sarker, MA.Q., Hildemann, L., Dey, N.C., Rahman, M., Dwivedi, P. & Wise, P., 2011).

### *3.4 Health Effect from Traditional Cooking Stove*

Due to low income and lack of knowledge women are continuously using biomass fuel for cooking in rural areas. But women, who tend to be primarily responsible for cooking, and the children they care for, are mostly affected. Cooking with solid fuel such as straw, jute stick, wood branches, leaves are the major source of indoor air pollution. World Health Organization's reported that biomass fuel is emerged as one of the top ten global threats to public health (Alim, M.A., Sarker, M.A.B., Selim, S., Karim, M.R., Yoshida, Y. & Hamajima, N., 2014). Recent epidemiological study reported that biomass cooking stove derived indoor air pollution which is caused for at least four types of diseases: Acute respiratory diseases, lung cancer, chronic obstructive lung disease such as asthma and birth defects. World Health Organization also reported that indoor air pollution is the single largest environmental risk factor for female mortality and the leading killer of children under the age of 5 worldwide. The use of hazardous cooking fuel contributes to over 49,000 premature deaths per year in Bangladesh, all caused by indoor air pollution (unicef, 2014).

### *3.5 Others Effect from Traditional Cooking Stove*

Bangladesh has only 9-14% of land with covering forest. To make ecological balance 25% of total land with covering forest is necessary. Wood fuel used as a fuel in traditional clay fixed three raised points one mouth or two mouth cook stove, which leads in deforestation. As a result deforestation leads to change in the ecosystem which in turn leading to climate change and increasing the frequency of cyclone and monsoon storm (Sarker, MA.Q., Akter, N. & Rahman, M., 2006).

## **4. Introducing of Improved Cooking Stove in Rural Areas of Bangladesh**

The development and promotion of improved cooking stoves in Bangladesh can be divided into 3 stages (Global Alliance for Clean Cookstoves, WASH plus, USAID & iDE, 2016).

Which are:

1. 1970 to 1980: The Bangladesh Council of Scientific and Industrial Research (BCSIR) developed different kinds of improved cooking stoves through conducting research.
2. 1980 to 1990: Government organizations and NGOs focused on improving health and welfare of people. They disseminate BCSIR developed improved cooking stoves to thousand of households.
3. Several NGOs and private entrepreneurs commercially manufactured, marketing and selling improved

cooking stoves to rural households.

#### *4.1 Development of improved cooking stoves (ICS)*

Dr. AM Hasan Rashid Khan, leader of group of scientists at the Institute of Fuel Research and Development (IFRD) of the Bangladesh Council of Scientific and Industrial Research (BCSIR) is considered as pioneer to develop improved cooking stove. In the early 1980s, he started working with rural women to develop a health friendly and environment friendly cooking stove that can save up to 50% of the wood used for cooking and thus about one tone of carbon dioxide each year. The addition of a chimney with redesigned traditional cooking stove significantly helps to reduce household members' exposure to hazardous smoke and particles (Ahmed, J. & Sohlemann, S.H., 2016).

#### *4.2 Government organizations efforts: Ministry of Power, Energy and Mineral Resources:*

Bangladesh Country Action Plan (CAP) for clean cook stoves defines what is needed to kick-start and develop the Bangladesh clean cook stove market. The CAP makes the case for taking immediate action towards achieving the goal of 100% clean cooking solutions by 2030. The target of this CAP is to disseminate cook stoves to over 30 million households in Bangladesh by 2030.

Ten priority interventions outlined in the Bangladesh CAP, which is primarily designated to cover the period between 2013-2018 (Ministry of Power, Energy and Mineral Resources. Government of People's Republic of Bangladesh, 2013). Top five of them are:

1. Develop a coordination mechanism, the Household Energy Platform, to ensure sector players and facilitators are working towards a cohesive coordinated strategy and are learning from each other, leveraging each other's work, not duplicating efforts, and are able to advocate for the sector with one unified voice.
2. Utilize local institutions, conduct R&D to improve the existing local models and potentially create new cook stove models in order to increase the quality of products available and offer a variety of technologies to consumers.
3. Develop a national network of suppliers that are able to widely produce and/or disseminate locally produced or imported technologies, increasing the quality and distribution of available technologies over time.
4. Identify strong non-cooking product distribution channels and add improved cooking solutions into the already successful, wide-reaching distribution chains.
5. Increase awareness of clean cooking solutions among consumers through a national awareness campaign.

These approved national action plan is a key step to serve the ultimate goal to create a sustainable market for cooking stove.

#### *4.3 NGO's effort*

Lot of national and International NGO's are working with improved cooking stove in rural areas of Bangladesh. Most of NGO's are working with the idea of improved cooking stove of the Bangladesh Council of Scientific and Industrial Research (BCSIR) and NGO's have significant contribution to disseminate this idea among rural peoples. Some NGO's like, Village Education Resource Centre (VERC), Practical Action, Grameen shakti, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH are playing important role in creating awareness among the rural households, manufacturing improved cooking stove (ICS), developing local entrepreneurship, implementation of Improve Cook Stove technology and providing training on how to build ICS. NGO's are also providing logistical support to rural households to construct ICS and monitoring the usage of ICS in rural areas (Sarker, MA.Q., Akter, N. & Rahman, M., 2006).

##### *4.3.1 Modern Chula:*

WASHplus, with support from USAID/Bangladesh has taken an initiative to market and sell improved cook stoves in rural areas in Bangladesh. They develop 4Ps marketing strategy to promote of those stoves in rural areas in Bangladesh. They named their improved cook stoves as "Modern Chula". They persuade rural peoples in against of their "modern Chula" by saying that their newly developed improved cooking stove "modern Chula" can be worked as a form of "fire insurance" (Global Alliance for Clean Cookstoves, WASH plus, USAID & iDE, 2016).

##### *4.3.2 Bondhu Chula*

The model of improved cooking stoves developed by group of researcher's of BCSIR have are promoted by different NGO's in different names. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH with others national and international organizations has been promoting this locally designated stove from the year 2006. And they branded it as "Bondhu Chula" the Bengali translation of "friendly stove". In the year 2012 and 2013, the project named "Market Development Initiative for Bondhu Chula" was launched jointly by GIZ and

the Bangladesh Department of Environment (DoE) with financial assistance from the Bangladesh Climate Change Trust (BCCT) Fund and Energising Development (EnDev). They utilize this fund to cut the price and make “Bondhu Chula” more affordable to rural peoples. The large number of volunteers around 500 promoters and over 1,200 female promotional volunteers were engaged with this project. Volunteers were held meetings with rural peoples, engaged in promotional activities and providing trainings in their communities. This project has noticeable contribution to disseminate the improved cooking stoves in rural areas of Bangladesh. About 265,000 mud stoves were sold under this project and since 2010 more than 1.8 million concrete structured “Bondhu Chula” have been installed in rural areas of Bangladesh (Ahmed, J. & Sohlmann, S.H., 2016).

#### 4.3.3 UNICEF

The first UNICEF carbon finance project was launched in Bangladesh by the UK committee for UNICEF and UNICEF Bangladesh, in partnership with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). One private company named, Marks & Spencer (M&S) is the pioneering major company to sign up and will be encouraging other corporations to support the project. Under this project, UNICEF provides 40,000 low-income families from over 2,000 villages across Bangladesh with more efficient and lower pollution locally designed improved cooking stoves. The new stoves will be manufactured, sold, and maintained by local enterprise. The newly designed more efficient improved cook stoves are health friendly and environment friendly (unicef, 2014).

#### 4.3.4 USAID

The United States Agency for International Development (USAID) conducted a pilot project to design and implement improved cooking technologies in Bangladesh to reduce the indoor air pollution (IAP) resulting from burned biomass in traditional cooking stove. USAID appointed Winrock International to operate this project. By considering IAP as the biggest threat for human body they set the objectives of this pilot project were to reduce indoor air pollution by promoting improved cooking technologies and behaviors through product-based social marketing, and to support for the commercial development of improved cooking stoves and promoting local micro-enterprises for improved cooking stove dissemination. This project was began in 2005 and ended in 2007 partnered with two local organizations, Concern Worldwide Bangladesh and Village Education Resource Centre-VERC (USAID & Winrock International, 2009). USAID also has run a program named “Catalyzing Clean Energy in Bangladesh” to promote clean energy through implementing project, analyzing market, adopting new policy and arranging exhibition in different region of Bangladesh (USAID, 2014).

#### 4.3.5 Grameen Shakti:

Grameen Shakti has launched a program to promote improved cook stoves in Bangladesh to address the high demand for biomass fuels and indoor air pollution caused by cooking on polluting, traditional stoves. They set a motto for their improved cooking stoves program is “Bringing Green Energy, Health, Income and Green jobs in Bangladesh”. Grameen Shakti has become interested in ICS because it helps women and makes their lives easier. They see a potential market of at least 2 million ICSs in the first three years of their program. Grameen Shakti plans to train two types of local players- local technicians and local manufacturers to promote improved cooking stoves in rural areas of Bangladesh. They trained 1000 local youth especially women to make, sale and repair ICSs under their improved cooking stoves program. They also set up 10 manufacturing units in rural areas for constructing ICS accessories such as metal grates and chimneys (Grameen Shakti, 2011).

## 5. Backdrop of introducing Gas Stove in rural areas in Bangladesh:

### 5.1 Income effect:

Since the last 10 years income of general people is increasing because of infrastructural development, establishment of new industry and spread over of universal education in rural areas. There are some fastest improvements in basic living condition. A Large number of rural people are going abroad as a skilled labor to work and to earn money. Household members get money from relatives who are living in abroad which contributes to change the lifestyle of rural households. Rural individuals who were gone abroad try to adopt modern lifestyle which was he/she was experienced. Without feeding with more foods they are engaging to spend money to build new home to buy luxury home appliances to set modern kitchen in home including gas stove or modern stove.

### 5.2 Social effect:

Bangladesh has not only remarkable improvement on income but also noticeable improvement on health and education. Which have profound effect on rural people’s lifestyles. Nowadays, rural households are so much concern about health issues than past. When rural households visited relatives houses in city and urban areas, they see modern kitchen with gas stove. The design of modern kitchen with gas stove motivated them to buy gas stove and to make life easier like city dwellers.

## 6. Results: Modernization

Improved cooking stove (ICS) and gas stove are the most important elements of the modernization of the rural

society of Bangladesh. Which have the direct influence on the living standard of rural peoples, affect their health, education and gender related matters. This is one of the biggest success of the Government, national NGO's and International institutions. Rural women are now able to cook in clean environment, safer and faster way with ICS. These ICS, in the near future able to be part of the International climate policy framework. The Clean Development Mechanism(CDM) is a market-based mechanism of the Kyoto Protocol under the United Nations Framework convention on Climate Change (UNFCCC, 2009). Some of National NGO's and International Institutions have submitted a methodology proposal to UNFCCC to implement ICS in the CDM. After all, cooking stove is one of the most important artifacts of modern kitchen and ICS is one of the modern product which developed technologically and after research work of few numbers of scientists. Replacing the unhealthy and dirty cooking stove with ICS is the biggest sign that rural society is running towards modernization (Kürschner, E., Diehl, E., Hermann-Friede, J., Hornikel, C., Rosenbusch, J. & Sagmeister, E., 2009).

## 7. Conclusion

Cook stove is the focal point in the kitchen. Clean and health friendly cook stove technology is necessary for socio-economic development of a country. Non clean and unhealthy traditional cook stove have direct effect on health issues of rural peoples in Bangladesh. In the decade of 1980 Bangladesh Council for Scientific and Industrial Research (BCSIR) developed improved and health friendly version of traditional cook stoves called improved cook stoves (ICS). The promotion of ICS is found to be characterized by a very large network of Government, national NGO's and International organizations. As a developing countries Bangladesh achieved most of the millennium development goals. Now, there is a growing number of middle class citizens in Bangladesh. Rural peoples who able to afford it also using gas stove and liquefied petroleum fuel (LPG) as a fuel.

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