A Study on the Improved Biomass Cook Stove to Build up Sustainable Living among Rural Households of India

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Abstract

This paper depicts the need and relevance of the improved biomass cook stove in creating healthy and sustainable living among the rural families. It tries to find out various positive implications of the "Unnat Chulha Abhiyan" initiated by the ministry of new and renewable Energy of India. A particular case study for the villages of Maharashtra has been taken to study the reliability of this programme among the rural people. The data has been collected from both primary and secondary sources for this purpose. Finally, an attempt has been made to suggest some of the recommendations with regard to massive feasibility of this programme throughout India.

Keywords: Biomass, living, Rural, Stove, Sustainable
1. Introduction

Rural India epitomises the diversified group of people, culture, tradition, and ways of living. It is said, the soul of India lives in its villages which constitute about 60% of India’s total population. But, unfortunately, majority of countryside people suffer from an unhealthy and unhygienic conditions of life. Indoor air pollution is one of the key reasons for generating unsustainable living condition among the rural households. However, through the ministry of new and renewable Energy (MNRE), a noble initiative of bio-mass improved cook stove has been introduced to get out of this miserable situation. In the present research study an attempt has been made to establish a sustainable impact of “Unnat Chulah Abhiyan” in solving the socio-economic and environmental issues among rural families. Both primary and secondary data have been collected to have a knowledge on practical usability of this theme of the programme. The present research paper has tried to answer the three out of six important questions of David A. Whetten (1989) from his seminal paper “What constitutes a theoretical contribution”. Those questions of what, how and why have been met with whole of the discussion.

1.1 Sustainability

Since 1991, with the adoption of New Economic Policy, India has witnessed tremendous changes with regard to triple door policy of liberalisation, privatisation and globalization. Again the concept of sustainability has been prioritized to bring the growth and development paradigm over a long period of time. In simple words, the term sustainability refers to the situation where we will find the development in the socio-economic and environmental aspects of life. One of the popular definitions on sustainability has been given by the report on World commission of Environment and Development (WCED) in 1987; “Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The doctrine of sustainability has built up sufficient responsiveness among the people to support the ongoing and upcoming conditions of both rural and urban sector. “The 2005 world summit on social science” has identified the three of the sustainable development goals, such as economic development, social development and environmental protection.

1.2 Rural Sustainability/ Sustainable Living

The rural sustainability can be defined as, a continuous contribution towards the development of the rural sector (both rural community and rural environment) in which we can find the compatible socio-cultural, political, economic and ecological development of life. It takes into account the important driving factors like agriculture productivity, infrastructure, health benefits, education, and technological advancement, air, water, soil, energy conservation and management etc. Thus the concept of rural sustainability helps to enhance the healthy socio-
economic and biophysical environment of the rural sector. The concept of sustainable living is applicable for personal lifestyle that makes the minimal utilization of both physical and natural resources. In other words, it is defined as a way of life that helps to reduce the carbon footprint by an alternative method of energy and other choices for consumption.

According to International Energy Agency, 2012 about 40% of world’s population still rely on traditional biomass for their day to day cooking purposes. In India about 66% of people depend on traditional biomass energy for their cooking (IEA, 2012). Among them fire wood constitutes 62.5%, crop residue constitutes 12.3% and cattle dung constitutes 10.9%. In the present research article, the contribution of eco-friendly biomass cooking stove has been taken as the solution to deal with the issues like indoor air pollution, excessive fuel consumption, environmental degradation and other socio-economic and health hazards of countryside people.

An attempt has been made to have focus on various innovative and entrepreneurial set up to bring sustainability in fuel energy consumption technique for cooking. Over the past few decades this programme has been largely appreciated in ensuring an effectivity with regard to time, cost and energy consumption among rural families.

The present research paper has the following objectives.

2. Objectives of the Study

i) To study over an improved biomass cook stove for rural India.

ii) To analyse the case study of this project for the villages of Maharashtra.

iii) To find out several sustainable impacts of improved biomass cook stove in India.

2.1 Indoor Air Pollution in India

Indoor air pollution has emerged to be the primary cause of health problem among women and children in rural India. In India, about 488,200 people die due to indoor air pollution. It has attributed to the other hazards like large magnitude of carbon dioxide emission, deforestation and increasing amount of respiratory and pulmonary health issues among 400 million Indians. As per WHO Report - 2012 over 4.3 million people die prematurely from illness due to air pollution from cooking with solid fuels. More than 50% of premature deaths among children under 5 are due to pneumonia caused from household air pollution. Still about 900 million of people in India depend on the traditional biomass energy. Similarly more than 90% of people worldwide use an inefficient cook stoves which has resulted in higher consumption of biomass, over consumption of natural resources, and increasing amount of indoor as well as outdoor air pollution, (Santosh Singh 2014). In the same way in India about 87% of rural households and 26% of urban households depend on biomass for cooking. (Census of India Report-2011).

2.2 Improved Biomass Cook Stove: An Initiative to Deal with Indoor Air Pollution

The journey of improved biomass cook stove started in the year 1983 in the name of NPIC (National Programme on improved cook stoves). The entire theme was initiated with the
supportive hands of NGOs, bureaucracy, technical institutes, entrepreneurs and state level agencies. As of 2002, the about 35 million of cook stoves have been circulated throughout India. The project touched its second phase of development with the initiation of NBCI (National biomass consumption initiative) with the purpose of clean and efficient energy consumption. Then with the performance testing and technical back up units, the national programme of Unnat Chulah Abhiyan was launched in June 2014. Under this initiative, pilot scale demonstrated projects were commenced to test for the competency of community-size cook stoves in Mid-day meal schemes in government schools in states of AP, Chhattisgarh, UP, Maharashtra, MP and Haryana and individual biomass cook stoves in J&K, Bihar, Karnataka, UP and Jharkhand. The substantial decline in emissions and fuel consumption has been found with detail observation and experimentation. Thus the programme of Unnat Chulha Abhiyan has been launched for the deployment of the improved cook stoves across the country. Rs.131 crores have been allocated for the combined promotion of improved cook stoves and solar cookers in the Union Budget 2015-16. Hence this programme has been evolving over the years to meet the committed sustainable promises for the wellbeing of village community. This improved cook stove has got the high energy efficiency of range 20-35 percent as compared to traditional range of 8-12 percent. The “Unnat chulha Aviyan” has fixed the physical targets of distribution for both the family and community size cook stoves on the following basis.

Table: 1

<table>
<thead>
<tr>
<th>SI No</th>
<th>Year</th>
<th>Family type for households</th>
<th>Community type for Dhabas, Canteen and small hotels</th>
<th>Community types for Anganwadies, Schools, Forest guest house, tribal hostels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2012-13</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>2</td>
<td>2013-14</td>
<td>100,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>3</td>
<td>2014-15</td>
<td>750,000</td>
<td>25,000</td>
<td>75,000</td>
</tr>
<tr>
<td>4</td>
<td>2015-16</td>
<td>750,000</td>
<td>40,000</td>
<td>75,000</td>
</tr>
<tr>
<td>5</td>
<td>2016-17</td>
<td>800,000</td>
<td>50,000</td>
<td>75,000</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>24,00,000</td>
<td>1,20,000</td>
<td>230,000</td>
</tr>
</tbody>
</table>
2.3 The Role of Improved Biomass Stove in Bringing Energy Sustainable Living for Rural Maharashtra: A Case Study

Maharashtra is a third largest state in the western region of India. It is the nations and worlds second populous sub-national entity. 54.77% of Maharashtra’s population live in villages. The total rural population of Maharashtra has increased by 10.34% as per the last census data-2011. The state is surrounded by the Arabian Sea to the west, Madhya Pradesh to the north, Gujarat to the north-west, Telangana to the south east, Karnataka and Goa to the south. It has been shown in the following map of Maharashtra.

Figure: 1

A case of a Maharashtra based improved biomass cook stove manufacturing company named Vikram Stoves & Fabricators, has been taken for the study. This particular company which started in the year 1994, has been able to create an energy sustainable rural Maharashtra. With more than 30 distributors, the company has been able to distribute its products for about 35 districts of Maharashtra and 10 districts of J & K. Consequently about 50 lakh rural families have been immensely benefitted being a part of sustainable living. With the use of ceramic composite and industrial insulating materials the entrepreneur unit has developed the front feeding and top feeding models with an energy efficiency of 26.30% and 31.95% respectively. On the basis of their performance testing, these models have been approved by the ministry of
new and renewable industry. Recently, Odisha based NGO called STEP (Society for techno-economic progress) has taken its initiation to bring the maximum distributional coverage for rural Odisha. It has targeted to meet the sustainable energy efficiency requirements with latest form of technology and invention. The data pertaining an impact and usability of biomass cook stove for rural households have been taken for the selected villages of Maharashtra. As per the feedback of the customers, the product has been proven to be simple, portable, and sustainable to handle in everyday life. However with the recent technological invention of thermoelectric generator (TEG), people have got specific choice due to its additional features for charging cell phones and LED lights. As of now with collaborative and multidisciplinary expertise approach, a new initiation has been taken forward to bring the TEG model successful for meeting the multiple requirements of the villagers throughout India.

3. Sustainable Impacts of Improved Biomass Stoves

The present study has got the following sustainable impacts for rural households.

3.1 Environmental Impact

The traditional cook stoves are highly inefficient with the low thermal capacity of range 10% to 15% and produce harmful emission resulting in various environmental and health hazards. As per the International Energy Agency (IEA) estimation, about 632 million people in India would continue to depend on the solid unprocessed biomass even up to 2030. Thus with the prolonged approach of Unnat chulha Abhiyan an attempt have been made to mitigate the hazardous impact of indoor air pollution over the children, women and family as a whole. Under NBCI (National Biomass Cook Stove initiative -2009) the focus has been made to improve the biomass- improving technology, testing, certification, monitoring and Research and
development activities to justify the sustainable goals of the rural household sector. However this innovative cook stove has been able to meet the clean, affordable and sustainable needs of the countryside.

3.2 Economic Impact

The domestic LPG and PNG has got the accessibility to mere 20% of households in India (Jain et. al 2014). In spite of several incentives and subsidiary plans, it cannot be accepted as an economically viable option for the rural community. It aggravates the current account deficit of the country due to excessive import dependency over the OPEC and other countries. On the other hand it hardly fulfils the demand for the conservation of natural gas energy programme for which the country’s macro economy highly suffers. Thus this improved biomass cook stove would be an appropriate solution for the country like India with massive population living in the rural sector. Several small hotels, dhabas, forest guest house use this stove for their commercial purposes.

3.3 Social Impact

Rural sector is the main contributor to the national income of India. It is the responsibility of the government to take care of health and other socio-economic conditions of rural communities. In rural sector indoor air pollution is to be controlled efficiently to bring healthy and pollution free environment. As the Unnat chulha Abhiyan programme has got the target users of households, mid-day meal schemes, forest guest houses, tribal hostels and small dhabas with both family type and community size design. It helps to create accessibility of 33 models and 18 manufactures throughout India. With an extensive capacity building and technical support of the scheme an improved varieties of the model have been developed from time to time. Many national and international agencies have put forward their suggestive and innovative ideas to ensure awareness and capacity building activities among the stakeholders.

4. Conclusion and Recommendations

Rural Sustainable living can be made achievable with the proper strategy, innovation and policy implementation of the Government. Some of the suggestions have been recommended in order to achieve the reliability of the people for this programme.

- This programme is no doubt an effective way of handling the health and fuel crisis. As far as possible the design should meet the targets of village people’s needs and priorities. For example recent innovative project on TEG model would go a long way for enhancing sustainable life.
- Apart from sustainable goals, an effort must be incorporated to bring overall social mission within track. It can go a long way to generate the scope of employment opportunities with local people involvement, women empowerment, improvement in child health conditions and overall enhancement of socio-economic aspects of the rural community.
-Government is the main channel through which the absolute fruit of sustainable objectives can be made achievable. It is the responsibility of the government to do policy implications for the support of R&D activities, quality testing support, training team, operation and maintenance network, awareness and marketing campaign, so that the programme can be made successful in a massive level.

-The focus must be made for the reliability of data with respect to its collection, analysis and overall instrumentation of the project. Along with the scientific incorporation, the product has to meet the requisites of people without compromising the health and environmental implications.

-Similarly the numerous government schemes should be consolidated as per the local needs and the local bodies (Gram Panchayat). They should be empowered to decide and allocate as per the priorities of the people. Various innovative and new techniques can be adopted to ensure fuel efficiency and energy conservation.

-The corporate sector should be encouraged to participate in rural entrepreneurship and government should motivate them through different measures (tax benefit schemes). Thus the policy of public private partnership can go a long way to bring the true implementation of the programme.

-Public awareness programmes should be undertaken to ensure that this initiative reach the stake holders and corruptions can be minimized to a larger extent for achieving growth and sustainability measures.

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