

Energy Use Pattern in the Poor Households and Its Impact on Women's Empowerment: a Study in the Urban Slums of Bhubaneswar

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Abstract: *The United Nations launched its Sustainable Energy for All (SE4A) initiative and declared 2014–2024 the Sustainable Energy for All Decade. But in the mid of 2016, millions of poor throughout the world suffer from energy divide. Poor households are not only economically impoverished, but suffer from energy deficit. Women are the key users and collectors of household energy. They face uneven incidence of energy deficit. Their human energy gets drained when they collect household energy. This results in the virtual disempowerment of women. So today empowerment strategies have to take into consideration the availability of, accessibility to and affordability for easy and safe energy sources for the women. This will liberate them from household drudgery, physical strains and mental tensions. The present paper is the outcome of a micro study conducted in the slum pockets of the city of Bhubaneswar to note the existing energy use pattern and its gender repercussions. The paper has tried to shed light on the current energy use practice and its impact on women and the interventions needed to make energy use better, healthier and delivering for women.*

Key words: *Energy, Empowerment, Energy deficit, Care economy, Green economy, Green capitalism.*

Two major issues encounter the world today. They are energy crisis and disempowerment of women. The first is an ecological challenge perplexing the green economists while the latter is a human rights problem becoming the core target of the feminist activists. The link between energy and empowerment remains hidden and untapped. Seldom women's empowerment is seen through the lens of energy use. But the world admits women are the largest user of energy (Köhlin, 2001¹, Molyneux 1985²). So, it can be admitted that if women can be trained with the efficient use of energy, the world can get over the crisis of rapid depletion of the sources of energy and empower its women population for a better productive life. Efficient use of energy is a lever to women's empowerment.

I. RESEARCH PRELUDE

Women empowerment is a cry of the world since decades past. To give a shape to this, high sounding plans and programmes are designed. They encompass a wide range of objectives like placing the women in the political decision-making forum to developing capacity among them, increasing their access to credit to providing them property rights and other entitlements, ensuring employment, and making them key role players in the institution of market. But practically speaking, all these are secondary attempts. To make these objectives feasible, the basic needs of women are to be fulfilled, the women are to be liberated from the bondage and the drudgery of the care economy.

Energy is a basic household need. It is needed to satisfy the food needs, educational practices, recreational requirements. Women in poor households take the real burden of making energy arrangements. This consumes a major chunk of their time, brings them physical exertions, health hazards and apprehensions of a deep magnitude. In the process of arranging the energy sources, they drain their productive energy. This brings a tussle between women's traditional role of home management and the new role the society has started according to her in the production economy.

Studies have established that without access to modern energy services, women and girls spend most of their day performing basic subsistence tasks, including time-consuming and physically draining tasks of collecting biomass fuels, which constrains them from accessing decent wage employment, educational opportunities and livelihood enhancing options, as well as limits their options for social and political interaction outside the household (Danielsen, 2012³). Thus engagement in arranging traditional sources of energy prevents women's skill development and capacity building and deny them wellness and a good quality of life.

Traditional and unthought-of use of energy is detrimental to environment and depletion of green resources. Energy divide: between rich and poor countries is a marked world phenomenon today. More than 95% of the

world's population without access to electricity and clean cooking facilities live in sub-Saharan Africa and developing Asia. Within countries, urban and rural areas, it is estimated that 1.3 billion people do not have electricity in their homes living in rural areas (IEA, 2011⁴). Thus, 2.7 billion people still rely on open fires and traditional use of biomass for cooking and almost half of the world's population depends on solid fuels such as wood, dung, crop waste, coal and charcoal (IEA, 2011⁵). All these deny a safe environment. Against the background of these observations, the present study was taken up in a city of Odisha, India to make a reality check of the situation.

II. RESEARCH REFLECTIONS

In India, millions of women are afflicted by energy poverty. Women gathering firewood, crop waste and cattle dung fulfil 92 percent of rural domestic energy needs. They gather 85 percent of their cooking fuel from forests, village commons and fields. ESMAP Energy Survey (1996⁶) in six states indicates that low cash flows to the households, lack of proper distribution of energy keep women stick to the traditional mode of energy use. In India, gender mainstreaming in energy policies is still missing.

Bina Agarwal (1986⁷) reports that in the severely depleted forest areas of Gujarat, women and children spend as much as five hours a day collecting fuel. To the author in forested areas, the collection may have been done once in four days, while in depleted areas it was a daily activity. Since wood is the predominant fuel used for cooking and fuel collection is a woman's responsibility in most of the developing world, the implications for their well-being are serious. Apart from the drudgery, the time and effort spent collecting fuel limits women's opportunity to spend time on income-generating activities or educational and leisure pursuit.

NCEAR (1998⁸) survey records traditional biomass fuels continue to be widely used for cooking in rural India. The World Health Organization⁹ explains the multiple health damages and risks encountered by women due to inefficient use of energy. In this context, the WHO estimates that exposure to smoke from cooking is the fifth largest risk factor for disease in developing countries, and causes almost two million premature deaths per year. Women in developing countries are also at risk for head and spinal injuries, pregnancy complications, and maternal mortality from the strenuous task of carrying heavy loads of firewood and other fuels. Additionally, women face increased threats to their physical safety, including sexual exploitation and assault, in the often-long journeys to fetch firewood and water.

The United Nations¹⁰ proposes the large amount of time women spend collecting fuel wood (and carrying water) deprives them of educational and economic opportunities. Improved fuels and equipment and access to electricity provide new opportunities for income generation, positively affecting a woman and her family, as well as national economic growth.

III. RESEARCH OBJECTIVES

The research was moved by the following objectives.

- To locate the type of energy available to the slum women and the pattern of their use.
- To assess the impact of current use of energy on them.
- To develop an action plan that can make energy use pattern better, collection process easier and women friendly in character.

IV. RESEARCH SETTING

The present paper is an outcome of a micro research conducted by the author in three urban slums of Bhubaneswar city of Odisha, an eastern state of India. The three slums are densely populated by the in state and out of state migrants. The three slums are the Santipalli slum, Patharabandh slum and the Telgu sahi slum of Bhubaneswar. The city of Bhubaneswar which has recently topped the list of becoming a smart city of India is taken for the study. A smart city is a green city, a clean city, where people can have a good quality of life with all their basics easily satisfied. Keeping the prospects of living in a smart city, this study was launched to identify to what extent a key requirement "energy" of the households is met in the urban slums and how it impacts the lives of women.

V. RESEARCH COVERAGE

As women are the chief and massive user of energy, the study collected information from the adult women of the selected households. Care was taken to interrogate from a single woman of the household. The samples taken for the purpose of this study is presented in the Table no. 1.

Table no. 1 Study Universe and Sample Covered

Sl. No.	Name of the Slum	Total number of Households	Households selected
1	Santipalli	1167	116
2	Patharbandh	965	96
3	Telgu sahi	898	88
Total	03	3030	300

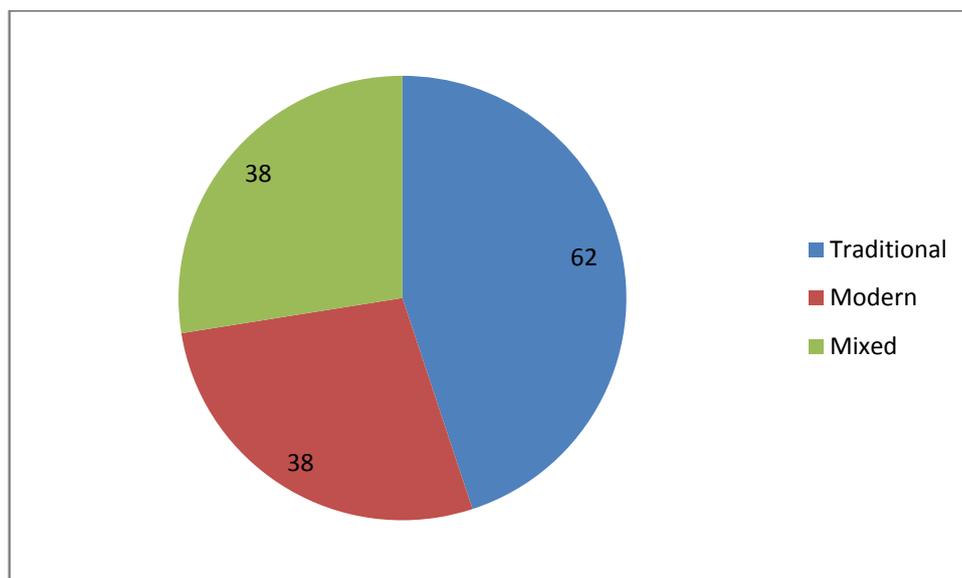
Due to the uneven number of households found in the slums, proportionate random sampling method was adopted to make the sample better representative in character. A total number of 300 women were selected from 300 households. 9.9 percent of households were selected from each slum.

VI. RESEARCH TOOLS USED

Observation, personal interaction and a small interview tools were used to capture data from the sample women. Observation tool was used to judge the situation and to match it with the versions of the respondents. Personal interaction method was used to collect qualitative data from the sample population.

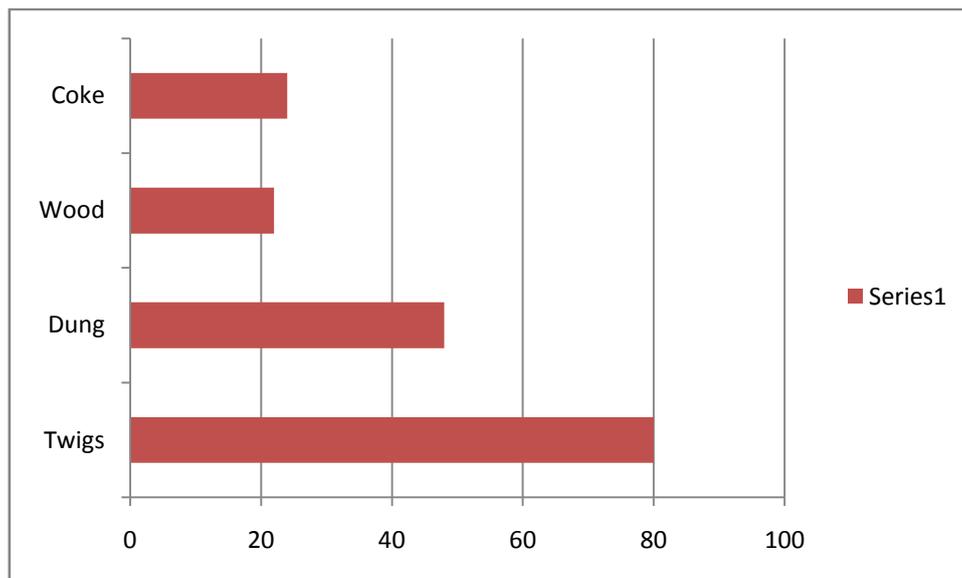
VII. RESEARCH OUTCOMES

Unavailability of, inaccessibility to and unaffordability for cheap modern means of energy compel women to stick to traditional means of energy: The study tried to identify the nature and sources of energy used. In this context, three types of energy use came to the forefront. They are traditional, modern and mixed mode. It was noted that women in the slums are still used to the traditional sources of energy which include twigs, wood, dung, coal or soft cokes, wood powders and pieces from mills etc.62 percent of women completely rely on the traditional sources having no other alternative. Modern sources of energy include kerosene, LPG. It was noted that in 38 percent households have access to modern energy sources. But, complete dependence on it was not detected. They practise a mixed mode of energy use. Traditional energy sources still continue to be used by women and complete transit to modern modes is yet to come.

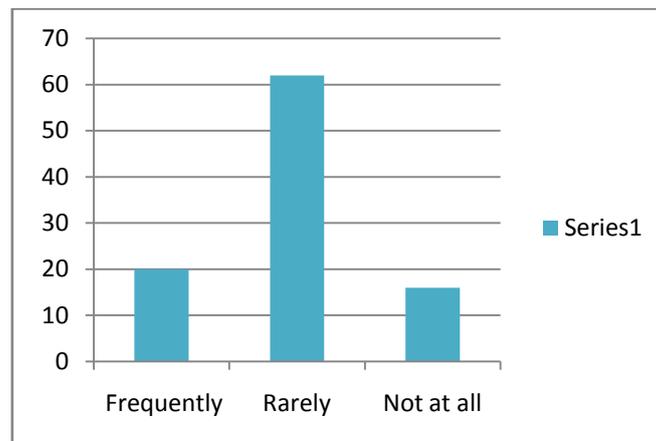


Free energy is preferred over paid energy

Traditional sources of energy are differentially used by women in the slum depending on their availability and price. Twigs and biomass fuel is commonly used by 80 percent women due to their easy access to them. Dungs are used by 48 percent women, those who are able to collect and bring it to cake form at home. Wood dusts and wood pieces are used by 22 percent women who have husbands into carpentry profession either at their households or Shaw mills. Coal and soft cokes are used by 24 percent women who can afford to buy them. As per the versions of the sample women, there is a three times rise in coke price(per k.g. rate) and four times rise in wood powder and wood pieces rate(Sack rate) . When the question of purchase comes, women back out to purchase even these traditional sources of energy because of restricted purchasing power. The differential use of traditional sources of energy is reflected below.



Access to modern means of energy does not entail its frequent use: When asked about the frequency of use of kerosene, LPG, the households having access to modern sources of energy, reported about their restricted use. High price of LPG and kerosene in open markets and limited supply of kerosene (1 lt. per head through BPL cards) do not allow BPL households to make substantial use of it. Frequent use of Kerosene and LPG was reported by 20 percent, rarely by 62 percent and 18 percent reported about non use. This is reflected graphically below.



Psyche of zero or minimum expenditure on energy challenges human productivity: Heavy investment on energy is not accepted by the slum households. Till now the low cash flows to the households put expenditure on energy as the last prioritized item in the household expenditure list. Women till now fail to compare the time investment and loss of productive capacity due to fuel collection.

An important revelation that was made through the study was that women households in poor slum pockets feel investment on modern sources of energy as extravagance. Secondly, urban markets are flushed off with the sale of fuels. So, non availability compels women to devote productive hours for fuel procurement. Thirdly, non collection of energy generating resources spells out their incompetency in the care economy. So they make it a daily routine affair.

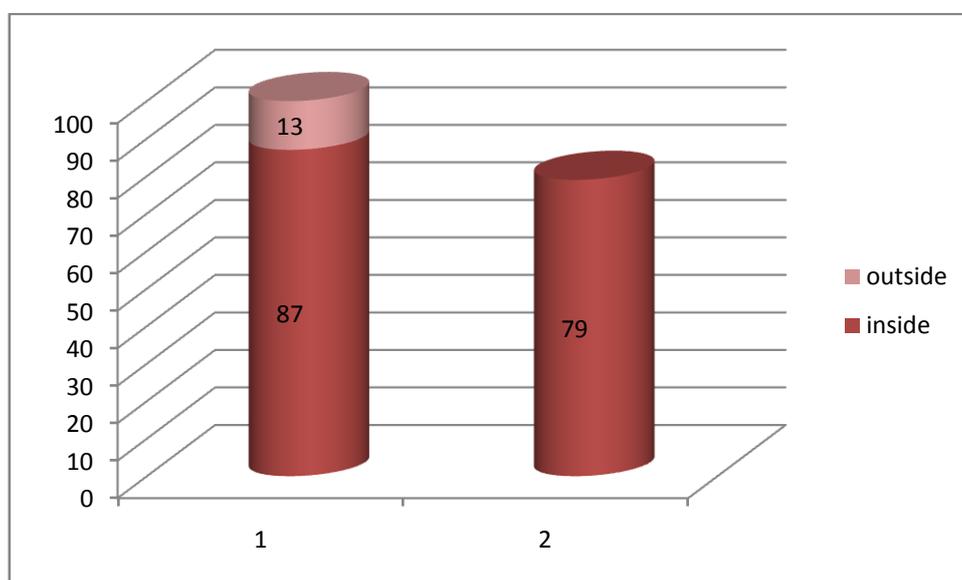
VIII. CALCULATED LOSS OF INCOME DUE TO TRADITIONAL USE OF ENERGY

The study arrived at a conclusion from the personal interactions with 42 women that they spend about six days a week to collect fuel which satisfies their family needs for 8-9 days. An average implicit valuation was made that they collect about fuel worth of Rs.30 per day sacrificing a wage of Rs.300 per day. Further, the wages are more certain while getting fuel becomes uncertain. Thus, a great chunk of 10 times income is sacrificed for collecting fuel. Further, they are hidden labour input given by women which go unrecognized and

unpaid and are not considered as productive work and these women are missed out from workforce. In bringing sustainable energy supply to the family, women's greater productive capacity is undermined, their self sufficiency is sacrificed. This is a negation to women's mainstreaming in the economy and becomes a symbol of their disempowerment.

IX. STOCKING PATTERN AND WELLNESS OF WOMEN

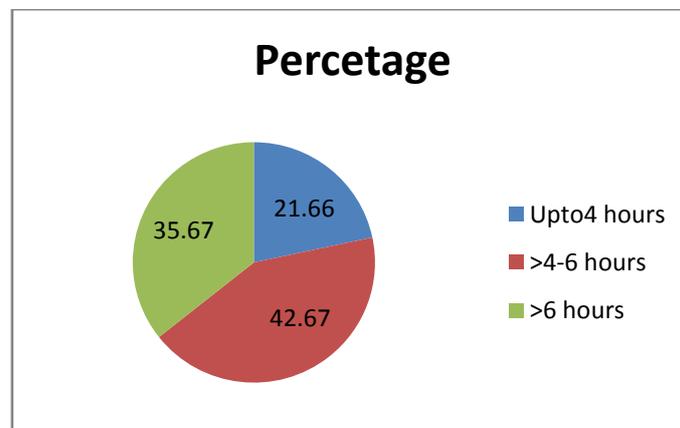
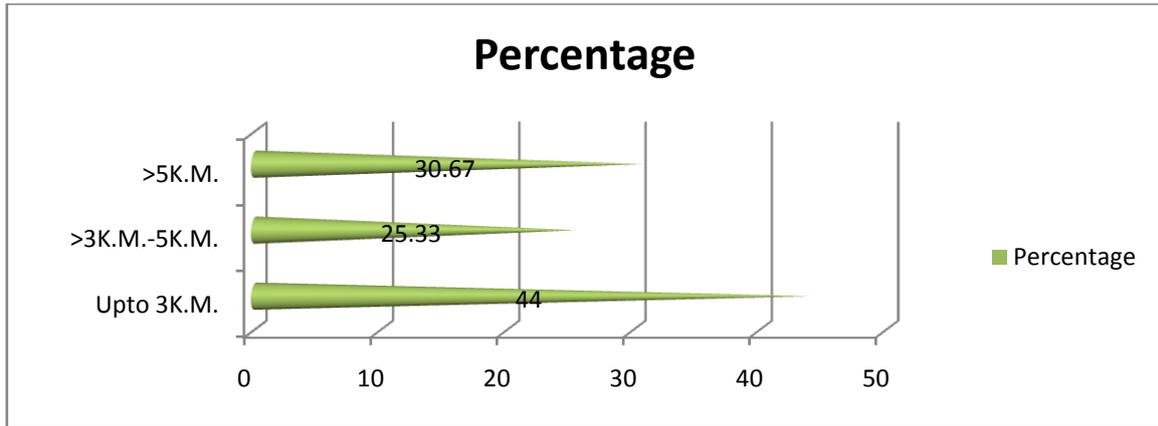
Traditional collection pattern of fuel needs storing them for the unforeseen days. Stocking of the fuels become problematic for the poor households. In 87 percent households, they are stocked inside the house which is in 79 percent cases single rooms. In 13 percent cases they are stocked outside the rooms. Stocking inside the room creates space crunch and the room becomes a breeding ground for insects and rodents. This denies a healthy living to the members of the household. Particularly, the women who spend a major chunk of their time in the house remain under congested situations which negates their well being and a good quality of life. The women who are principally engaged in the storing process often get verbal abuse for any accidental happening. However, the women reported, lack of outside space, apprehension of being theft by others and possibility of getting wet by rains compel them to stock it within the living rooms as precious, essential possession. The inside stocking within a single room and the outside stocking position is shown in the table below.



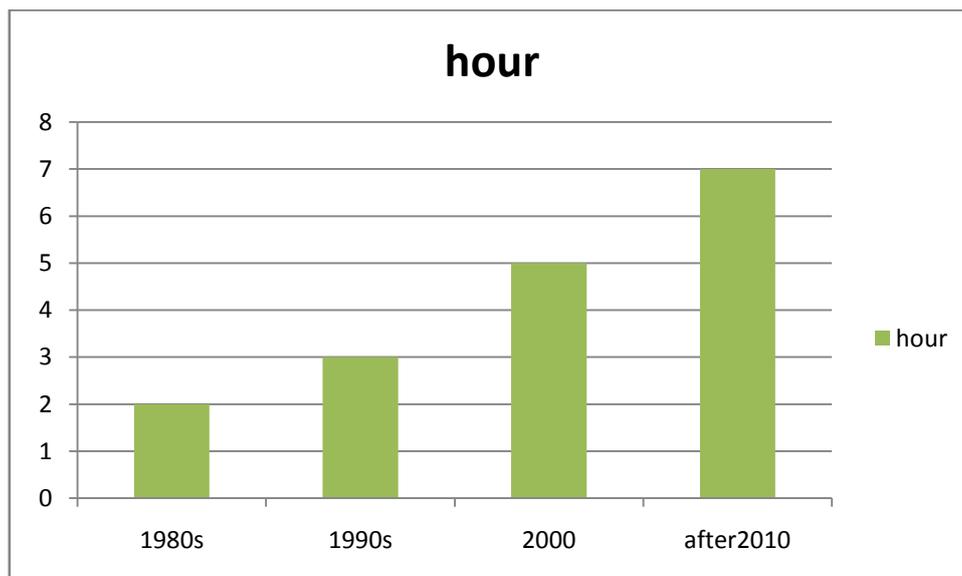
Time invested is high and destination covered is long: The next important dimension dealt in the research relates to fuel collection time and the distance of the destination. In this context, the women gave varied replies. In this context, they were asked to reveal the distance they cover and time they invest for fuel collection. The versions that emerged are quantitatively stated in Table No.2

Table No.2 Distance Covered and Time invested by Women for Fuel Collection

Distance covered in K.M.	Number of women saying with percentage	Time invested in hours	Number of women saying with percentage
Upto 3K.M.	132(44)	Upto4 hours	65(21.66)
>3K.M.-5K.M.	76(25.33)	>4-6 hours	128(42.67)
>5K.M.	92(30.67)	>6 hours	107(35.67)
Average distance	3.8 K.M.	Average time spent	6hours 30 minutes



Thus, women spend substantial part of their routine time and cover a long distance to collect biomass fuel. From a close interaction with 42 women who are the inhabitants of these slums for the last five decades, it was discovered that time invested and distance covered for fuel collection are increasing over the decades.



This is increasing day by day due to the depletion of greenery following super cyclone that hit the city in 1999 and the Philine in 2013 and rapid urban growth resulting in spreading the spread of concrete forest in the city.

Impact on child rights and empowerment of women: The traditional collection of sources of energy is detrimental to child rights and women empowerment. Particularly, the highest sounding slogan of Government of India "Beti Bachao, Beti Padhao" corresponding to the English translation "Save Girls and Educate Girls" get defeated when girls are engaged in collection of biomass task. Sometimes calculating the alluring monetary return from daily wages and ban on child labour, women engage their young children, particularly girls in the task. This gives birth to the syndrome of child labour who miss out their child rights like education, health and recreation getting engaged in this hazardous task without any monetary return with physical exertions. Sometimes girls also face violence during collection time as was reported by their mothers. From the sample households it was noted that 116(38.67%) households engage their daughters in this financially non rewarding task. When women themselves are engaged in the fuel collection task, they are treated as unproductive labour and sacrifice their productive power for financially non delivering tasks which lead to denounce their status in the household and ultimately disempowering them. Their economic disempowerment culminates in their social and political disempowerment.

Hazards are enormous: The traditional sources of energy from collection to use bring enormous hazards to the women. This happens at three stages. They are at the collection stage, storing stage and at the stage of use. The hazards are physical and psychological and short term and long term in nature. During the time of collection multiple problems starting from insect bite, hurting, sprains, infections, tearing of dresses, physical exertion, abdominal pain during child carrying stage, abortions, harsh behavior from people, conflict with competing parties often plague the collecting women. During storing stage, getting injuries from the thorns that are off shots from these branches, insect bites, tearing of sarees are common. During the use of fuels, suffocations with smoke, asthma, coughing, burning sensations, fire accidents become regular features. The hazards brought forth to the women in the traditional energy use process are indicated in Table No.3.

Table No.3 Hazards Encountered by women in the traditional energy use Process (Multiple Choice)

Stage	Hazards Encountered	Nature	Number of women	Percentage
During Collection	Insect bite	Physical	203	67.67
	Hurting hands and legs	Physical	165	55
	Incurring sprains		208	69.33
	Infections		112	37.33
	Abdominal pains		45	15
	Abortions		17	5.67
	Tearing of sarees	Economic	64	21.33
	harsh behavior from people, conflict with competing parties	Social	188	62.67
During Storing	getting injuries from the thorns that are off shots from these branches,	Physical	126	42
	insect bites		175	58.33
	Punjent smells			
	Tearing of sarees	Economic	29	9.67
During Use	suffocations with smoke,	Physical	285	95
	asthma,		34	11.33
	coughing,		102	34
	burning sensations		205	68.33
	fire accidents	Economic	19	6.33

Thus, it becomes reflective from the above table that, women are more prone to hazards during collection and use stage. Physical hazards supersede other hazards. They encounter social hazards during collection time. It spans from verbal abuse to violent behavior due to their encroachment of commons and private orchards and gardens, public parks. After a cyclone they rush outside to collect these biomass and competitive parties also get into conflicts resulting in fights

Thus, the study concluded that women suffer from energy scarcity and energy poverty in poor households. Till now they are the sheer energy consumers, but not energy producers. Traditional use of energy is detrimental to the development of women in terms of economic gain, health benefits and social security points. It disempowers the women in multiple ways. Instead of making the women the protectors of environment, it makes them the destructors of environment. Care economy and green economy become counter to each other through women's heavy dependence on traditional sources of energy. Traditional energy use pattern puts women into a risk trajectory. Energy individualism also challenges Green capitalism.

Interventions needed: The study made an attempt to solicit the opinion of the sample women about the strategies needed to ease the task of arranging energy for the households. In this context, it emerged that for an easier way of arranging energy resources; the current practice needs a change. Dissemination of knowledge, information, capacity building among women needs to be prioritized to develop a gender sensitive energy practice that can ease and empower women in the community.

- Women in slums make fuel collection their first target in their daily routine. It consumes their time and brings hazards to them, polluting the environment they live in. It is ecologically alarming and economically non-rewarding for the women. Now a time has come to train women in the economic and sustainable use of energy so as to save the environment.
- Women in slums practically use major share of energy in cooking. They need to use them in multiple ways, like heating, lighting. Knowledge dissemination in this regard needs to be given priority.
- Women should be trained for green investment, clean environment. They are to be sensitized for planting trees without depleting them to maintain ecological balance.
- Dependence on solar, bio and hydro energy has to be developed. As they are renewable energy sources and are cheaper they have to be generated and distributed to ease women's burden. Women can be trained to generate and use such alternative sources of energy.
- Development of biogas plants in concentration areas is a need. For this technology transfer and training is to be given to the slum dwellers in general and women in particular.
- The Government should see gender development through energy lens. A cost-benefit analysis is to be made and if subsidized electricity can be provided to the urban slums women will be liberated from the drudgery of fuel collection and use of bio-mass fuels. And keep themselves away from multiple health hazards.
- The civil society organizations are to develop innovative programmes to make the transit of women to modern and safe sources of energy which will be cost-free.
- Common facility centers are to be created in the slum pockets where heavy energy-dependent activities can be conducted at a cheaper rate.
- Commonism of energy is a need of the hour. Common pull of fuels can be introduced in the communities. Everyone has to deposit a targeted collection and the distribution will be based on contribution.
- Rationing of energy use is to be implemented.

All these interventions can be taken up on an experimental basis to make women transit to safe modern means of energy. Traditional use of energy needs a change. The process of energy generation, the practice of energy collection and energy consumption need a transformation to bring a balance between energy use, women's empowerment and a safe and sustainable environment.

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