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**RURAL WOMEN, ENERGY POVERTY AND ENERGY JUSTICE IN THE EAST
CENTRAL REGION OF BANGLADESH**

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Abstract

This research attempted to explore the gender dimension of energy poverty, which is a relatively new area of energy research. In the established literature, 'energy poverty' is described as either the lack of access to modern energy services or the lack of ability to afford to purchase energy and it is usually measured at the household level. Here, women's energy poverty in their everyday lives was investigated and its adverse affects were compared with men's experience. The research also scrutinised whether energy poverty was derived from or reinforced by energy injustice, and explored whether energy poverty has any relationship with the economic situation of women. To collect data, a qualitative research approach was used, consisting of in depth interviews and observation methods, in a rural area of Bangladesh, a developing country of South Asia. The research revealed that women's 'energy profile' is not the same as that of men living in the household and that they are more affected than men by energy poverty. It also discovered that women's lack of access to modern energy services is reinforced due to a lack of 'energy justice'. All three components of energy justice (distributional justice, justice as recognition and procedural justice) are deficient regarding women in this area. Women's energy needs are less cared about and not recognised from household to national level. They do not have access to energy related information and have almost no participation in energy decision making processes. Furthermore, energy policy in Bangladesh is 'gender blind' and rural women do not have any scope to participate in energy policy and planning. The research found that women's ability to contribute to the household's ability to purchase energy can improve their participation in energy decisions at the household level; however, the absence of modern fuel and a reliable power supply, together with

patriarchal societal arrangements and customs, restricts women's opportunity to earn an income and ultimately reduces women's financial capability. In addition, inheritance laws do not protect women's equal access to resources and social and cultural customs further restrict women's opportunity to access even their allocated share of family resources, further deepening their poverty and energy poverty. Finally, some recommendations for improving the energy situation of women in rural Bangladesh have been made and some future research areas are outlined.

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List of abbreviations

Abbreviations	Full Form
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ADB	Asian Development Bank
ASA	Association for Social Advancement
BGFCL	Bangladesh Gas Field Company Limited
BNEP	Bangladesh National Energy Policy
BPDB	Bangladesh Power Development Board
CO	Carbon Monoxide
CO ₂	Carbon dioxide
CRGGE	Collaborative research group on gender and energy
FPDD	Federacao Portuguesa De Danca
GAD	Gender and Development
HDI	Human Development Index
IDS	Institute of Development Studies
IEA	International Energy Agency
GO	Governmental Organisation

LDCs	Least Developed Countries
LPG	Liquid Petroleum Gas
MEPI	Multidimensional Energy Poverty Index
NGO	Non Governmental Organisation
OECD	Organisation for Economic Cooperation and Development
PRSP	Poverty Reduction Strategic Paper
REB	Rural Electrification Board
SO ₂	Sulphur Dioxide
TEA	Total Energy Access
UN	United Nations
UNDP	United Nations Development programme
UNECE	United Nations Economic Commission for Europe
WCED	World Commission on Environment and Development
WAD	Women And Development
WID	Women In Development
WHO	World Health Organisation

Chapter 1: Introduction

1.1 Background to the research

“Energy poverty’ may be defined as the absence of sufficient choice in accessing adequate, affordable, reliable, high quality, safe, and environmentally benign energy services to support economic and human development” (Reddy, 2000, p. 44).

The effect of ‘energy poverty’ is multidimensional. It adversely affects health, education, gender equality, income and infrastructure (IEA, 2012). According to the United Nations Development Programme (UNDP) (2009), globally more than 2.6 billion people use biomass fuels for cooking. In addition, 1.3 billion people throughout the world cannot access electricity (IEA, 2007). Using biomass fuel creates indoor air pollution and has adverse effects on the health mostly of women and children. Lack of access to electricity results in poor quality of lighting and to supplement light provision people use kerosene lamps, or candles which do not produce sufficient illumination; this hampers the education of children. Poor quality of lighting also reduces the earning opportunities of the household after daylight hours (Practical Action, 2010). ‘Household’ generally refers to a dwelling where a person or persons share meals and also share accommodation in the same dwelling (Haviland 2003) (see section 2.2.6) In addition, ‘energy poverty’ (see section 2.2) has a massive opportunity cost. Access to energy can create jobs, reduce unemployment and thus help to reduce poverty. Casillas and Kammen (2010) argue that modern energy access must be supplied to poor rural communities in order to provide opportunities to generate income that may reduce poverty and improve rural development. Moreover, energy access can improve the quality of lives and enhance social development. Energy access is essential for lighting in streets and in the home, to

provide power for pumping water, and cooking with clean energy, and also to access information and communications. It also aids health care systems; it refrigerates vaccines, sterilises accessories (such as needles, tubes, bottles) and provides power to operate diagnostic equipment (Practical Action, 2010). Thus, it is important to alleviate energy poverty in order to achieve economic and social development. According to IEA (2012) a country has to ensure fair access to energy services for citizens to achieve the Millennium Development Goals and poverty reduction.

Energy poverty is not similar throughout the world and moreover citizens living in the same country may not all have similar experiences of it. People living in developing countries and sub-Saharan countries are mostly affected by energy poverty; more than 95% of energy poor people are living either in sub-Saharan African or developing Asia (IEA, 2012). Energy accessibility in towns and rural areas is not the same; energy poverty is more widespread among rural people. According to IEA (2012), about 84% of the energy poor people of sub-Saharan countries are living in rural areas. The harmful effects of energy poverty may be seen during cooking activities as the people of those areas mostly use biomass fuel for cooking fuel. WHO (2006) claims that premature deaths from use of biomass fuel are the highest in the sub-Saharan countries and South Asia.

The experience and effect of energy poverty may not be the same for males or females living in the household. Women experience the negative consequences associated with the use of primitive cooking fuel. Practical Action (2010) argues that cooking with primitive fuels increases women's drudgery and has an adverse effect on women's health. Women are engaged in cooking and the collection of fuel from their surroundings, spending a significant amount of time gathering fuel. Women spend between two to six

hours on the collection of fuelwood (World Bank, 2001). In many undeveloped countries cow dung and untreated coal are used for cooking (Poletico, 2002; Wamukonya, 1999). These fuels create indoor air pollution and many women suffer from whooping cough, asthma, TB and different respiratory diseases including ‘chronic pulmonary disease’ like emphysema and chronic bronchitis that cause premature death and also increase the child mortality rate: such conditions could be reduced by using clean cooking fuel (Smith et al., 2004; MacDade, 2002; WHO, 2001). The Organisation of Economic Cooperation and Development (OECD) (2006) state that more than a million people globally die every year because of using primitive cooking fuel, and they are mostly women and children.

The concept of ‘energy justice’ emerges “*to provide all individuals, across all areas with safe, affordable and sustainable energy*” (McCauley et al., 2013, p. 2). ‘Energy justice’ is the fair distribution of energy resources in society through standard practices and procedures. “*...Inequitable distribution, lack of recognition, destruction of capabilities and limited participation all work to produce injustice, and claims for justice*” (Schlosberg, 2004, p. 529) (see conceptual framework (section 1.3) to find a brief discussion of ‘energy justice’). The concept of energy justice or injustice is relevant to this research because women’s energy poverty may be due to unfair distribution, no, or lack of, recognition of their energy needs at household and/or national level and women’s lack of participation in the decision-making process. This assumption is reinforced by evidence from some south Asian countries. In such places as India and Nepal, women’s needs and preference for energy are not given importance at the household level. Men want to reduce their workload by using energy services and like to use an energy service for information and recreation. On the other hand, women want to use clean fuel for

cooking to diminish drudgery and indoor air pollution that may reduce health hazards. Men take the decisions within the households and choose to satisfy their needs and pay less attention to women's needs (Dutta, 1997; Makan, 1995). Along with decisions governing the use of cooking fuel, men also take decisions related to kitchen and cooking appliances, though women are solely responsible for cooking (Nyoni, 1993; Dutta, 1997; Wilson and Green, 2000). The women of the rural areas have almost no participation in energy decisions at national level in South Asian countries. The participation of rural women could allow them to claim their rights related to their energy needs and choices (Clancy et al., 2000).

Energy policies provide principles to extract and/or import and distribute energy resources and services within a country. Energy policy should be formulated and executed in such a way that everybody, irrespective of gender, should have equitable access to modern energy services. But, Clancy et al. (2007) argue that most energy policy is 'gender blind'. Gender discrimination exists in the policy of the developing countries and few frameworks address it (Oparaocha et al., 2011). According to Clancy (2000) in developing countries energy policies and planning support male benefits, because men have the bargaining power and men are mostly the policymakers while women have no participation in policy. It is to be noted, the gender issue is not a new idea in policy because it has already been considered in different sectors like water, agriculture and forestry, but Huyer and Westholm (2001) argue that in the case of the energy sector, policy makers have not paid attention to the gender issue. It is important to develop gender friendly energy policy and planning to attain gender parity (Clancy et al, 2016). Furthermore, gender concerns need to be analysed in order to express the strategic energy

needs for men and women so that women may not be marginalised and excluded from benefiting from the energy infrastructure (Keller et al, 2016).

Lack of access or inability of the household to purchase clean energy, is regarded as the main reason for energy poverty (Pachauri et al., 2004; Rao et al., 2012). Affordability of energy for a household is determined by the aggregate income of the men and women in a household. Denton (2002) argues that women are poorer than men in the rural societies of developing countries; approximately 1.3 billion people are poor and among those people 70% are women. From this argument it is assumed that women have less financial capability than men and they may make insignificant or less contribution to a household's ability to purchase energy. It is important to improve the earning opportunities of women. But, according to the Asian Development Bank (ADB) (2001), division of labour according to gender exists in the rural society of developing Asian countries. Women mostly stay in their homes and undertake household work. They have limited or no scope to generate income. They normally do not go and work outside their homes. Different factors like political, social, religious, or cultural influences may be responsible for this prevailing situation.

In Bangladesh, the effect of energy poverty is highly significant. Bangladesh is a developing country in South Asia surrounded by India, Nepal, and Myanmar and is close to Pakistan. About 80% of the population of Bangladesh is living in rural areas and lack access to modern energy services. Bangladesh (population 161 million) is ranked 146 out of 185 countries according to the Human Development Index (HDI). Less than half of the population has access to electricity and only 9% cook with modern fuels (IEA, 2011).

Most of the people in urban areas have electricity access whereas large portions of the

rural population are not connected to an electricity network (Asaduzzaman et al., 2009). The ‘demand gap’ (where demand is more than supply) of energy is too high and restricts the access of rural people to energy and the majority of them have low ability to purchase energy at a higher price. Consequently, billions of people including men, women and children are living in energy poverty. Most of those households depend on dirty and harmful solid fuels to meet their energy needs for cooking. Rural people have limited access to television or radio and modern communications. They have inadequate education and health facilities. Moreover, people’s employment opportunities and income are squeezed due to lack of sufficient power. Though almost 77% of health centres have electricity, there is no national data on electricity for schools (Saha, 2002). Like the rural people of Bangladesh, low-income people in urban and suburban areas are also suffering from energy poverty and the number of urban poor is increasing day by day. Though the international community recognises a number of basic rights: the right to water, food, and health, adequate housing, to gain a living by work and take part in cultural life, the right to energy is missing in the list. The issue of energy needs for schools, clinics, public institutions and local infrastructure such as street lighting are not properly addressed in Bangladesh (Practical Action, 2010).

1.2 Aim and research questions

The aim of this research is to analyse the gender dimension of energy poverty in the context of rural Bangladesh. The following research questions were developed in order to attain the aim:

(1) How does energy poverty affect women's everyday lives compared to men in the household in east central rural Bangladesh?

(2) To what extent are women in rural Bangladesh recipients of energy justice at household, community and national scales?

(3) What factors affect women's contribution to the household's ability to afford energy?

To address these research questions, a case study was carried out at Shahbazpur village, in the district of Brahmanbaria, a rural area in east central Bangladesh. The salient features of this village are similar to most of the rural areas of Bangladesh. It is a low lying plain land. Inhabitants are mostly Muslim. Men are mostly involved in agriculture and women are engaged in household activities.

1.3 Conceptual framework for this research

Literature tends to examine energy poverty at the household level, and does not address the different situation of different household members e.g. men and women. The best established framework for assessing multi-dimensional energy poverty, the Total Energy Access (TEA) approach, puts forward the minimum level of access of different energy services needed to overcome energy poverty and it is applied at household level (Practical Action, 2010). Though there is another model named the Multidimensional Energy Poverty Index (MEPI), this is designed to measure energy poverty at regional level (Nussbaumer et al., 2011). TEA expresses the minimum energy needs of people on the basis of six indicators. These are cooking and water heating, lighting, cooling (including refrigeration), space heating, access to information and communication

technologies, and access to energy for earning a living. It is used to measure whether a household achieves minimum acceptable access regarding the six different energy services. This approach recognises the minimum energy service needs of the household, which is an improvement over measures based on the energy supply. The NGO Practical Action (2010) proposed the model, but they do not think it is exhaustive regarding minimum energy access requirements. They welcome other views and encourage debate in order to attain an international standard of total energy access. This research makes use of the TEA model in order to measure the energy needs and experience of women and men separately in a household, which is a new application of the framework. Moreover, it considers whether the minimum standards are sufficient to meet the energy needs and wishes of the people (see section 2.2.6 B Table 2.1).

The concept of energy justice was developed from theories of social and environmental justice and like environmental justice it is generally held to have three components; these are (1) distributive justice (2) justice as recognition and (3) procedural justice. Fair distribution of 'goods', 'entitlement' and 'resources' are essential for 'distributive justice' (Barry 1973; Sen, 1982; Dobson, 2009). Distributive justice suggests equitable distribution of 'social goods' (Barry, 1999; Schlosberg, 2007). Development agencies argue for 'distributive justice' in allocation of natural resources or infrastructure development (WCED, 1987; World Bank, 2006). The simplest concept of distributive justice is fair distribution of public goods or bads; people should get equitable shares of benefits and bear equitable burdens (Kuehn, 2000). According to Rawls (1971) 'distributive justice' is 'justice as fairness'. But, different groups live in a society where

less advantaged groups may exist. Rawls (1971) in his 'difference principle' supports giving more benefits to the disadvantaged groups in the society (see section 2.6.1)

Recognition of the different groups is important to ascertain justice but the 'distributional justice' approach does not fully address this (Fraser, 2000; Young, 1990). Recognition relates to group affiliation. According to Fraser (2000), both 'distribution' and 'recognition' are important for justice. She argues that different groups or identities in a society need to be recognised along with distributive justice. 'Mal-distribution' may take place due to 'misrecognition' of different groups. She argues that many social movements for justice took place from 1960 to 1970 for mal-distribution that were due to misrecognition of gender, race and religion. Lack of recognition causes dissatisfaction among the people in the society (Honneth, 2001; Taylor, 1994). In that situation people feel that they are ignored and this may lead to feelings of deprivation. According to Taylor (1994) and Honneth (2001) recognition together with redistribution can ensure justice. But Fraser (2000) argues that 'recognition' and 'redistribution' are not always interdependent. She argued that injustice mostly takes place due to cultural disrespect and economic exploitation. She claimed people suffer because of gender and race. In the case of women, they suffer by doing unpaid jobs or work which is paid at a relatively lower rate than for men employed in similar work (see section 2.6.2).

In the case of 'procedural justice' Rawls (1971) argues that 'correct' or 'fair' procedure has to be followed to achieve similar 'correct' or 'fair' outcomes respectively. Political process and institutional behaviour should be fair for all citizens (Schlosberg, 2004).

Institutions are formal social structures which administer actions; institutions include family, religious institutions, educational institutions, economic institutions and political

institutions (Brinton and Victor, 1998) (see section 2.5). If oppression or domination prevails in society, it will affect political process and also the behaviour of the institutions. It is essential to remove domination and oppression to ensure fair distribution and also recognition of the citizens (Young, 1990). People should have the right to participate in every activity (Gould, 1996) and participation of all citizens has to be ensured in all spheres of life, including government policy formulation and in every decision-making process (Gould, 1996; Young, 1990).

Three things need to be ensured for every citizen in a society in order to achieve procedural justice; these are (1) access to information (2) meaningful participation and (3) access to legal process and courts (UNECE, 1998, 2006). These three pillars of procedural environmental justice were formulated in the United Nation ‘Aarhus Convention’ in 1998 in order to disseminate appropriate information to citizens of the 47 signatory countries and maintain transparent procedure in environmental issues. It is recognised as a useful tool to understand procedural justice in the case of energy justice as well (Yenneti and Day 2015). It is important to disseminate information so that citizens can know their rights and privileges and to implement inclusive procedures. This research scrutinised whether the fundamentals of ‘energy justice’ were present in the fieldwork area and explored whether it has any connections with the prevailing energy poverty (see section 2.6.3).

Energy poverty occurs in part due to lack of ability of household’s ability to purchase energy. Household’s ability to afford energy can be improved if women have the financial capability so that they can purchase energy or can contribute towards households’ ability to purchase energy. Women’s financial capability depends on

women's income opportunities and their access to resources. Women in many developing countries are restricted in their ability to work outside the home mainly because of patriarchy. Patriarchy is prominent in the rural societies of developing countries and controls women's mobility, roles and responsibilities (ADB, 2001). Patriarchy expresses the supremacy of men over women; it controls and determines women's behaviour by men (Bennett, 2006). According to Rich (1973), political systems, religion, social rituals and beliefs also perpetuate patriarchy; this scenario has not been much improved after four decades. In Bangladesh, societal beliefs and attitudes support patriarchy. Patriarchy is the main hindrance to gender equality and it is common in south Asian countries like India, Pakistan, Bangladesh but it may be found in different forms in different locations (Parpart et al., 2000). Besides patriarchy, lack of work opportunities for women outside the home also squeezes earning opportunities of women. Work opportunity is suppressed mainly for lack of energy, power and communication along with the patriarchal attitude of the society.

Besides income generation, women's financial capability can also be improved if women can receive inheritance resources. But, women and men do not have equal rights to inherited property in South Asian countries like India and Pakistan because the laws of those countries mostly follow religious laws (Agarwal, 1994; Haddad et al., 1997). The resource allocation system of Bangladesh is similar to India and Pakistan and depends on religion, marriage and legal systems where men are mostly benefitted in comparison with women. In addition, women are sometimes not able to receive their allocated property share due to a male-focused social stance and culture. Women do not get cooperation from relatives and neighbours if their brothers decline to give them their due share.

Moreover, arbitration is not effective because brothers mostly disregard it as they do not have to face any consequences if they ignore arbitration. Social insecurity also restrains many women from claiming their rights. They want to maintain a good relation with brothers to get shelter with them if they face problems in their husband's household. This is for two reasons: one is that most of the women have no income to cover their expenses and the other is society does not permit a woman to live alone. Use of the legal system to address injustice is not a popular option for women because they do not have proper information about legal procedures. These women are mostly poor and uneducated and have a perception that court procedure is time consuming and incurs a huge cost. Along with the aforesaid obstacle, the potential barriers to women's income opportunities and women's access to resource were scrutinised in this research.

Energy access has a direct relationship with women's empowerment; it can improve women's opportunity to generate income that in turn can bring significant improvement in gender equality (O'Dell et al, 2014). "*Empowerment is the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control and hold accountable institutions that affect their lives*" (World Bank, 2002, p. 11). Women's empowerment is crucial to establish because it can challenge male domination in society and protect the human rights of women (Oxfam, 1995). Women's empowerment can be enhanced by improving women's capability and this also helps economic development (UN, 1995). According to Batliwala (1994) the evaluation of a person based on performance and not on gender will lead to the building of a humanistic society. It is important to recognise the 'voice' of women for gender development; strategies have to be developed so that women's voices may be heard in the decision-making process

(World Bank's PRSP, 2006; World Bank, 2012). There is a positive relation between women's empowerment and 'energy justice'. Women's empowerment can improve energy justice for women as it calls for the participation of women in decision making processes and for their 'voice' to be recognised and addressed in times of taking decisions. If women's empowerment is ascertained women can take part in energy decision making processes and their 'voice' will be heard and addressed; this is one of the three pillars of procedural (energy) justice.

1.4 Contribution of the thesis

Discussion of energy poverty in the literature is dominated by a focus on economic aspects and the smallest scale at which it is conceptualised and analysed is the household level. This research shows that 'energy poverty' has multidimensional aspects and to eradicate 'energy poverty' it is necessary to understand and address those different factors. It examines the experience of energy poverty of women and men, and it shows that energy poverty can be conceptualised at a smaller scale than the household, on a gender basis. This is a significant contribution to the energy poverty literature. It also contributes to the growing literature on energy justice by scrutinising the energy poverty and energy justice relationship on a gender basis. Furthermore the research contributes an understanding of energy poverty and energy justice in the context of Bangladesh specifically, where it has been little explored, with a focus on gender which is a new development. It checks the energy policy and planning of Bangladesh with regard to gender equity and explores women's financial capability in rural Bangladesh and the relationship between this and energy poverty and energy justice.

1.5 Structure of the thesis

Chapter 02: Literature review

This chapter discusses the different definitions of ‘energy poverty’ and explains the approaches and frameworks to measure energy poverty as well. It describes women’s drudgery and health effects due to lack of access to modern energy services and discusses what is known about the energy access of men and women. It scrutinises women’s status in energy policy and planning. Finally, it draws attention to the relationship between energy justice and energy poverty, and puts forward suggestions based on literature.

This chapter also talks about ‘patriarchy’ and its effects on women’s roles and responsibilities. It describes patriarchy’s influence on resource allocation, income opportunities, health and education of women. In addition, it discusses the concept of ‘gender equity’ and explains the importance of women empowerment and the voice of women in order to achieve ‘gender equity’. Moreover, it describes the different approaches for the development of women.

Chapter 03: Methodology

This chapter explains the reasons for selecting qualitative research and a case study as the research approach in order to collect primary data. It also discusses the data collection method and interpretation. In addition, it describes the context of the fieldwork area. Moreover, it considers the author’s positionality, explains the challenges of a male researcher conducting interviews with women in a conservative society and explains how the strategy helped to overcome them.

Chapter 04, chapter 05 and chapter 06 are the empirical chapters written on the basis of primary data collected from fieldwork and from secondary data

Chapter 04: Energy poverty within households and gendered experience

This chapter discusses women's experience of energy poverty. Here, the 'Total Energy Access' (TEA) model is applied to capture the energy access and experience of women and compare it with the experience of men. The effects of using indigenous fuel with the resultant pollution of indoor air and environment are discussed. Moreover, the opportunity cost of energy poverty is also expressed. The chapter also scrutinises whether the minimum standards set in the model are enough to express energy poverty.

Chapter 05: Energy poverty and women's energy justice status

This chapter scrutinises whether justice is ensured in the distribution of energy resources to women from household to national level; in order to do so it discusses women's opportunities to consult and participate in energy decisions. It also scrutinises women's participation in the formulation and implementation of energy policy, laws and rules.

Chapter 06: Energy poverty and women's financial capability to afford energy

This chapter discusses the situation of women's access to resources and opportunities to become involved in economic activity. It also scrutinises the effect of energy poverty along with social, religion and cultural factors on women's income opportunities inside and outside the home.

Chapter 07: Conclusion

This chapter synthesises the key findings derived from the empirical chapters in order to provide answers to the research questions. It puts forward some recommendations to

address the energy poverty of women in rural Bangladesh. Finally, it points to future potential research areas.

Chapter 2: Literature Review

2.1 Introduction

Energy poverty is defined broadly as the lack of accessible and affordable energy at household level. Different approaches are used to determine ‘energy poverty’ where economic factors only are considered, rather taking a holistic approach which embraces social, cultural and political factors. In addition to the various definitions and approaches, two multi-dimensional frameworks have been developed to measure energy poverty. One is known as ‘Total Energy Access’ (TEA) that tries to measure the minimum energy services required for a household and the other is the ‘Multidimensional Energy Poverty Index’ (MEPI) that attempts to uncover the energy related deprivations from national to international level. In all definitions, approaches and frameworks the ‘household’ is considered as the unit that suffers from energy poverty.

The energy needs and desires of men and women within a family may be different. In addition, the impacts of ‘energy poverty’ at an individual level may vary. It is important to analyse energy needs and wishes of men and women separately, but the gender dimension is not analysed in the various definitions, approaches or frameworks. The ways in which women are affected socially, politically and culturally are not given attention in any ‘energy poverty’ definition, approach or framework. Traditionally, women have to do most of the household work including cooking, housekeeping, and childbearing. Due to lack of access to modern energy services, women in undeveloped rural regions often have to work two to six extra hours to collect fuelwood and prepare fuel sticks from cow dung, which not only increases the drudgery experienced by women

but also jeopardises their health (Practical Action, 2010). Besides the domestic drudgery and health risks, women's education, social position, reproductive ability, recreation, voice in society, and consciousness are also affected by 'energy poverty'. Access to modern energy supplies can provide women with the opportunity to become educated and more involved in income generating activity, as the reduction of time-consuming menial work associated with primitive energy will release enough free time to ultimately improve their economic and social position.

This chapter first discusses the definitions and approaches of 'energy poverty'. It explains 'fuel poverty' (see section 2.2) and energy poverty concepts and implications in Europe as these were initiated in the UK and Europe. It then describes frameworks to measure 'energy poverty' in non-European settings. Then the chapter turns to what is known about women's energy poverty experiences. It describes how households are entrapped in the vicious circle of 'energy poverty' and how they can break out from this circle. It discusses how energy policy adversely affects women's lives in the developing countries and least developed countries (LDCs). Then, it discusses the concept of energy justice. Following that, it explains the financial capability of women, and discusses patriarchy and its affects on gender equity. Finally, it discusses different approaches of gender development and the experience of Bangladesh.

2.2 Energy poverty concepts and approaches

There are different approaches to defining energy poverty, some based on expenditure, some on access, some on usage of energy and some on combinations.

Different conceptualisations of energy poverty

Energy poverty is simply the lack of access to modern energy.	IEA (2010)
Household's inability to access electricity and clean cooking facilities (e.g. fuels and stoves that do not cause air pollution in houses).	Bravo et al. (1979); Krugmann and Goldemberg (1983); Goldemberg (1990); Pachauri and Spreng (2004); Foster et al (2000); Saghir (2005)
The lack of affordable and reliable clean energy carriers and technologies to meet energy service needs for cooking and those enabled by electricity to support economic and human development.	Rao et al (2012)
Energy poverty is considered as a shortfall of energy consumption (in Tonne of Oil Equivalent) from threshold level.	Pokharel (2006)
Energy poverty can be considered on the basis of personal consumption level and it is suggested that the basic need of energy is about 500 Watt per person per day based on the assumption only of light and stove.	Goldemberg et al (1990)
The absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe, and environmentally benign energy services to support economic and human development	Reddy (2000: p 40)

Fuel poverty

‘Fuel poverty’ is directly related to the percentage of income that is used for the energy expenditure of a household. According to the original UK definition, a household is defined as in fuel poverty if they need to spend more than ten per cent of their income for all fuel use including sufficient warmth (DTI, 2002; FPDD, 2009). It is based on proportional expenditure, not on amount. So it recognises that people with less efficient buildings and appliances or in an area of expensive energy, will have a bigger problem. The measure is not meant to express how much energy people are consuming, it is meant to indicate what the financial burden of their energy needs is. Poor and disadvantaged people may have to pay more for energy than more solvent citizens (Leach 1987). Poorer households depend on more inefficient fuels which are the most expensive fuels in terms of the price per unit useful energy (Pachauri et al, 2005; Leach, 1987 & Foster et al, 2000). Besides, these households use less efficient home appliances which need more energy and ultimately increase energy cost (Hosier & Kipondya, 1993; Reddy, 2003). Moreover, a large budget share could be due to high consumption e.g. large household size and it also be due to higher prices, which further complicates the interpretation of this indicator (Foster, 2000).

The concept of ‘fuel poverty’ is not used in this research because it is not suitable for the fieldwork area, where energy access is a problem and hence the concept of energy poverty is more suitable. The concept of fuel poverty is only briefly discussed here because it is important in the development of energy poverty related research and its development largely in the UK helped draw attention to related problems that require further research elsewhere.

2.2.1 Expenditure based approaches

The UK definition of fuel poverty is important as it was one of the first. It has also been influential on other European countries. The assumption of this concept is that energy supply is available. This definition actually puts the emphasis on energy cost and efficiency because people may be fuel poor because they are using expensive fuel (Pachauri et al., 2005; Leach, 1987; Foster et al, 2000) or inefficient appliances, or because their house is not energy efficient (Hosier and Kipondya, 1993; Reddy, 2003). However, some people may be spending more than 10% of income because they choose to use a lot of energy for luxuries (Foster, 2000).

This definition is not suitable for developing countries as lack of access to clean and modern energy is the major problem there. The International Energy Agency (IEA) (2010) describes energy poverty as the lack of access to modern energy services for developing countries and Sub-Saharan countries. According to Pachauri et al. (2004), energy poverty is simply the lack of access to energy, whether it is clean or environmentally unfriendly. It can be inferred that supply of energy is not enough in comparison with demand for energy and they feel it is important to ensure the availability of energy no matter it is clean energy or pollutes the environment. This definition sketches the severity of the energy crisis scenario in south Asia like India, Pakistan and Bangladesh.

The Expenditure based concept is also applied in the context of developing countries and sub-Saharan countries. It is the domestic energy spending budget of a household where the energy expenditure of the household is measured and compared with the standard of energy needs. Households do not have the ability to buy the minimum amount of energy

they need (Ailis and Cutler, 2004; Dendukuri and Mittal, 1993; Reddy and Srinivas, 2009). Households' energy budget may be less than the cost of energy to satisfy their minimum needs. Households have to spend money to buy different goods and services including energy. They fix their budget based on their priority of expenditures where energy may not be their first choice (Krugmann and Goldemberg, 1983; Pachauri and Spreng, 2004; Foster et al., 2000; Saghir, 2005).

2.2.2 Amount of energy used approach

The second approach to 'energy poverty' is the measurement of the shortfall of energy consumption (in Tonne of Oil Equivalent) from a defined threshold level of energy requirements; it may be calculated at household level (Pokharel, 2006) or at a personal level (Bravo et al., 1979; Goldemberg et al, 1990; Modi et al., 2005). The defined minimum energy need is calculated based on the direct need for energy (for example heating, lighting, cooking); however the drawback of this method is that the minimum amount of energy needed for a household or person may vary from location to location. It also doesn't take any account of the different fuel used; and would need to be defined differently for different regions and this is hard to establish.

2.2.3 Energy poverty in terms of income or expenditure poverty

People who do not have a minimum level of income are in income poverty; it is measured against an income or expenditure poverty line. If a household's income is below the line they are considered to be living in income poverty. Using this approach to energy poverty, it is assumed that such households are not able to satisfy their minimum energy need and are living in energy poverty (Foster et al., 2000). The assumption of this approach is that poor people cannot satisfy their needs, including energy needs. This is a

presumption (i.e. assumption without proof) where no research has been carried out to support the definition. If ‘income poor’ people prioritise their energy needs, they may cut budgets for other needs in order to satisfy their energy needs (and hence may not be energy poor). Alternatively poor people may cut down their budget for energy to meet other expenditures.

2.2.4 Access to clean energy

The World Health Organisation (WHO) (2006) considers lack of access to clean fuel as ‘energy poverty’. It defines the minimum air quality of clean fuel at combustion (Maximum carbon monoxide is 30mg/M³; < 10mg/M³ for 8 hours exposure period, and overall conversion efficiency > 25%).

2.2.5 Definitions that combine

Here, ‘Energy poverty’ is defined as the shortage of energy services at household level, in terms of accessibility, affordability and reliability of clean energy services and technologies (Reddy, 2000; Rao et al., 2012). This definition combines the three major things of the aforesaid definitions; these are affordability and accessibility, and energy should also be clean.

2.2.6 Multidimensional frameworks that focus on energy services.

There are two multi-dimensional frameworks to measure energy poverty. One is the Multidimensional Energy Poverty Index (MEPI) and the other is Total Energy Access (TEA).

A. The Multidimensional Energy Poverty Index (MEPI)

Nussbaumer et al. (2011) developed a framework consisting of multiple criteria to capture the multiple deprivations of energy poverty. This composite index suggested different variables for cooking, lighting, services provided by means of household appliances, entertainment/education and communication. MEPI captures the multiple energy related deprivation and it is used for country/regional level. It gives insight into a country's energy situation with a view to comparison between different countries or locations rather than comparison at community level. Although its idea of energy poverty relates to households, its interest is in monitoring regions and countries; it is therefore designed around data that is readily available for most countries. It is not the best framework for smaller scale studies because it is simplified for the purpose of national level comparisons.

B. Total Energy Access (TEA)

The Total Energy Access framework for understanding and assessing energy poverty is designed and used by the UK based NGO Practical Action (2010). Six types of energy services are described, lighting, cooking and water heating, space heating, cooling, information and communication, and energy for earning a living. It defines the minimum energy need for these six services for a household. If a household is able to meet these standards they can be considered to possess a satisfactory level of energy access. The TEA standards are listed in Table 2.1 below:

Table 2.1: Total Energy Access (TEA) standards

Number	Energy service	Minimum standard
1	Cooking and water heating	<p>1 kg fuelwood/ 0.30 kg charcoal/0.04 kg LPG/ 0.20 litres of kerosene or ethanol per person per day, taking 30 minutes per household per day to obtain.</p> <p>Minimum efficiency of improved wood and charcoal stoves to be 40% greater than a three stone fire in terms of fuel use.</p> <p>Annual mean concentrations of particular matter (PM 2.5) < 10 µg/m³ in household with minimum goals of 25 µg/m³ and 25 µg/m³</p>
2	Lighting	Three hundred lumen at household level
3	Space heating	Minimum daytime indoor air temperature of 12 degrees Celsius
4	Cooling	<p>Food processors, retailers and householders have facilities to extend life of perishable products by a minimum of 50% over that allowed by ambient storage.</p> <p>All health facilities have refrigeration adequate for the blood, vaccine and medical needs of local populations.</p> <p>Maximum indoor air temperature of 30 degrees Celsius</p>
5	Information and communications	<p>People can communicate electronic information beyond the locality in which they live</p> <p>People can access electronic media relevant to their lives and livelihoods</p>
6	Earning a living	<p>Access to energy is sufficient to start up any enterprise</p> <p>The proportion of operating costs for energy consumption in energy efficient enterprises is financially sustainable</p>

(Source: Practical Action, 2010)

‘Household’ refers to a dwelling where a person or persons share meals and also share accommodation in the same dwelling (Haviland 2003). Standard definitions of ‘household’ consider the intersections of some keywords; those are dwelling requirement, share meal and combine income/ production of all members of a house (Beaman and Dillon 2012). OECD and UN consider all those keywords for ‘household’ definition (sharing meals and accommodation, income accumulation; moreover, also consider the collective expenditure by a common budget) (OECD, not dated; UN, not dated). In this research, a ‘household’ is considered as a dwelling where people live and share meals together; their income is accumulated and household has a common budget and so the UN/OECD definition was applied. This is considered as a yard stick in household surveys of Bangladesh (BBS, 2010). There may be different types of households like (a) one person household, (b) nuclear household (single family: husband, wife and their children or father with children or mother with children), (c) extended household (single family with father /and mother, two or more families with relations) and (d) composite household (one family nucleus with other persons related or not related to nucleus, two or more families nucleus with other persons related or not related to one nucleus, two or more families without relation) (UN, not dated). In this research, participating households were mainly nuclear families consisting of husband, wife and children and a few households were chosen from extended families where father, mother, brothers and their families are living together, because this situation is quite common in rural Bangladesh. Homeless people were not interviewed in this research. The reason is that the TEA model consists of different indicators like lighting, heating, cooling and earning a living and

without a house the TEA model cannot be meaningfully applied to measure energy poverty.

The TEA model has the advantage compared to other approaches that it gives the minimum standard of all energy services. No other approach covers the multidimensional energy needs of a household for everyday lives. This approach not only meets the basic need of energy like cooking and lighting; it takes care of the comfort and health issues. In case of cooling, it is not limited to space cooling for human comfort; it covers medicine and food preservation issues. For modern life style, it covers information and communication and suggests the minimum standards. If a household can access the minimum standards they will get a minimum acceptable quality of life. Moreover, it will help to enhance the financial security of a household if they can access the minimum energy to become an entrepreneur which is ascertained through 'earning a living'. For those reasons, this approach was used in this thesis as a means of assessing access to energy.

2.3 Gender and Energy poverty

Most of the aforesaid definitions are related to household energy poverty, except the 'amount of energy used' approach defines energy need at individual level (Bravo et al., 1979; Goldemberg et al, 1990; Modi et al., 2005) and the MEPI (Nussbaumer et al 2011) measures it at a large scale, i.e., for regional and national level. However the household is always considered to be the unit that is in energy poverty. These definitions and approaches do not consider the energy need of the individuals may be different and the effects of energy poverty may be different. The absence of one energy service may harm

to one gender and the opposite gender may not be affected to that and may do not realise it is a problem. Suppose, in developing countries, women are involved in cooking. They use indigenous fuel and face drudgery and ill health but men are not affected for the energy poverty of cooking fuel.

In many developing countries the social roles and work distribution of men and women are determined by custom and religion, and powerful groups in society play a vital role in formulating those decisions. Male-favoured work distributions mostly affect women and girls. Women are responsible for cooking, managing their children and housekeeping. Lack of modern energy access adds more drudgery to the work of women.

Where firewood is used, it is generally collected by women and girls, who often have to travel a long way to collect fuelwood. They may have to spend two to six hours on average for this purpose (ADB, 2001). There are also health effects: when gathering fuel, many women suffer from backache, neck ache, headache (Parikh, 2011). These situations are common as poorer households of developing countries frequently use fuelwood, cow dung and untreated coal as fuel for cooking. For example, in West Sumatra of Indonesia, poorer households mostly use fuelwood for cooking (Polestico, 2002). In the case of the Philippines, in 2005 almost 90% of the energy was used for cooking where 75% of the energy source for cooking was fuelwood (Dutta, 2005). In Namibia in 1999, biomass was used in 90% of the households for cooking (Wamukonya, 1999). Biomass energy source is reducing due to excess use; poor women are mostly affected by this because it becomes harder for them to collect fuel and they have to travel further and spend more time (UNDP, 1995).

Cooking with indigenous fuel such as wood, agricultural residues and animal dung is a problem for indoor air pollution; it always leads to incomplete combustion so that unburned carbon and carbon monoxide (CO) is released into the surrounding environment with adverse effects on health. Women are directly affected by indoor pollution as they are responsible for cooking, but how much indoor pollution will be experienced by them depends on the type of fuel and burner used. Poor women are exposed to more indoor pollution as they do not have enough money to buy clean fuels and improved burners, and the houses often have poor ventilation. The World Health Organization (WHO) (2006) indicate that indoor air pollution is more common in those countries that have less than \$1 per capita income per day. Lal et al. (2011) conducted an epidemiological study showing that cow dung (not only wood) is responsible for respiratory diseases. Smoke produced from the burning of cow dung increases the risk of pulmonary tissue damage and may create respiratory infections in the people living adjacent to the cooking area. Using cow dung cake as fuel is more risky in areas contaminated by arsenic. Research shows that cow dung cake (goi) is used as cooking fuel in ovens without ventilation in the 'arsenic contaminated area' of the Ganga Meghna Brammaputra plain where people are directly inhaling arsenic with smoke which affects the respiratory tracts (Pal, 2007).

Burning of biomass fuel including wood and dung increases the possibilities of 'chronic pulmonary disease' (chronic bronchitis, emphysema) among adult women (Smith et al., 2004). WHO (2005) argues that cooking with such fuel produces smoke that has three times the chance of causing 'chronic obstructive pulmonary disease' in those exposed to biomass fuel than cooking with electricity and 75% of the people dying of this disease are

from the low and medium income countries. Every year, due to indoor air pollution caused from use of biomass fuel, almost 1.30 million people die prematurely around the world; among those casualties are mostly women and also children as they tend to stay in the house close to their mother and are exposed to environmental pollution like their mothers (OECD, 2006). It is observed that rural households mostly do not have a separate kitchen; moreover smoke affects the surrounding areas of the cooking areas not only around cookers. Premature deaths caused by use of biomass fuel are the highest in the sub-Saharan countries and Southeast Asia (WHO, 2006). Besides women and infants, girls are also affected by the use of biomass for cooking fuel. In most rural households girls have to assist their mothers to accomplish the household work and have less opportunity to go to school than boys. Sometimes, girls are withdrawn from school to satisfy the family needs. Many girls have to leave school to take care of their younger brother and sister and remain more illiterate than boys. It can be inferred that the consequence of girls' illiteracy has a long-term effect as an illiterate woman has less opportunity to learn about health and environmental safety. The lack of knowledge jeopardises their health because they do not take precautions against smoke and fumes produced from cooking (Danielsen, 2012; Karlsson, 2007; Parry et al 2007). Energy poverty reduces women's ability to earn a living and contribute economically; they may become entrepreneur if they could access sufficient energy (Bathge, 2010; Energia, 2011).

The benefits of moving to clean fuel and improved burners are enormous. Clean fuel may reduce respiratory diseases and consequently decrease the mortality rate significantly (MacDade, 2002). It was estimated by the WHO in 2001 that India could reduce the

mortality rate by 50% for children under five years old by using clean fuel (WHO, 2001). Improved burners also (e.g. brick made platform with long chimney) play a significant role to reduce indoor air pollution even where biomass continues to be used. Research shows that the introduction of improved wood-burning cookers with chimneys reduces the chance of heart disease in women by reducing blood pressure (McCracken et al., 2005); it is to be mentioned that high blood pressure is a major reason for heart disease. But, it is costly to buy or incurs additional cost to prepare an improved burner. Though, solar burners are given by NGOs on credit on a small scale in some regions.

Besides energy poverty affecting women more than men, there is also a question about women's ability to influence energy related decisions. Men and women may have different opinions, wishes and choices about the usage of energy. Individuals within households do not always have the same entitlements and bargaining power (Korf and Oughton, 2006) and some past research has found that women struggle to assert their needs in times of resource allocation including use of modern energy services and equipment (Dutta, 1997). Men may have different priorities, e.g. they want to use electricity to reduce their workload and save time, or they may place emphasis on the importance of using indigenous fuel at no cost rather than considering the women's drudgery and health hazards caused by the use of primitive fuel (Dutta, 1997). In some cases, men have been found to value their own energy service usage higher than women's. A study in South Africa found that young men enjoyed music by listening to the radio and would spend household money on batteries in order to do so. But in many cases, female household members were not allowed to use the radio nor allowed to have a role in decisions relating to purchase of batteries (Makan, 1995). The kitchen is used by

women and in developing countries they have to carry out the arduous task of cooking with primitive fuel and appliances. But, men mostly take or influence decisions on whether modern energy appliances for the kitchen should be purchased (Tucker, 1999). In Zimbabwe, men thought it not important for their wives to use solar cookers, but they purchased batteries for themselves to listen to the radio (Nyoni, 1993). Besides taking decisions which select the type of cooker purchased, men also take decisions that control environmental comfort in the kitchen, i.e. materials selected for roofing, kitchen walls (Dutta, 1997). But, the decisions taken by a man depend on his attitude and foresight. Some men think that improved cookers will save women's time and they will be idle, but others think it is an opportunity for women to take part in productive activities that will help to improve family income (Wilson and Green, 2000).

Women and energy linkage has to be established in such a way that it will reduce drudgery and alleviate poverty. In Mali the introduction of the diesel engine and some mechanical devices reduced the menial work of women which liberated enough time to involve them in income generating activity. This ultimately helped to bring about poverty reduction (Havet, 2003). However, the introduction of new technology and modern energy does not always remove drudgery and improve the income of women. Sometimes, it may pose a threat leading to loss of jobs for women. For example, in Bangladesh, the traditional paddy husking was carried out by poor women. But it is observed that the introduction of milling machines has significantly reduced the employment opportunities for women and in the course of time men have mostly been employed in milling. Moreover, modern energy might reduce women's workload but women may avoid the use of it as they fear this will lead to additional new work in the portion of the time they

free up. When modern energy is used it will reduce the time taken to do routine tasks. Women fear they will have to do other work with the saved time that may increase their overall workload. Jackson's (1997) study showed that in water projects women were unenthusiastic about the introduction of modern technology to reduce drudgery; women guess that they may have to perform new work with the time saved.

Three things are necessary to reduce energy poverty of women: (a) improved access to energy services (b) participation of women in policy formulation and implementation of energy projects and (c) training to acquire technical knowledge (Berthaud, 2004). In addition, rural electrification may also improve access to energy services, improving women's access to radio and television so that they can get necessary information (Chaieb and Ounalli 2001). This information may be related to health, education and fundamental rights so that in the process of time their consciousness may be developed and they may express their opinions in the family. Street lighting helps women to attend evening education; social activities help them to be educated and socially connected (Clancy et al., 2012).

2.4 The vicious circle of energy poverty

According to the Institute for Development Studies (IDS) (2003) poor people globally are living in a vicious circle of energy poverty as they have lack of access to modern energy services and technologies. As modern energy is not available to them, they have no opportunity to work with the help of machines resulting in lower productivity and lesser ranges of output. Low productivity leads to fewer surpluses. Since there are fewer surpluses, they can sell fewer products to the market, so little cash is produced. As a

result, poor people have no or little amounts of money to afford energy supplies or to buy energy conversion equipment that again restrains poor people to lower outputs. The vicious circle of energy poverty is shown below in Figure 2.1:

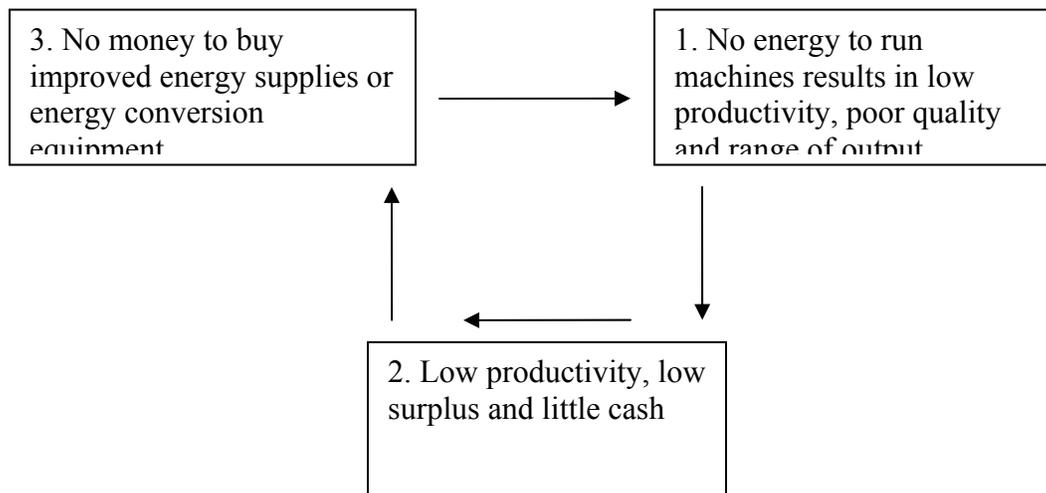


Figure 2.1 The vicious circle of energy poverty (Source: IDS, 2003)

To break the chain of the vicious circle of energy poverty, access to modern energy services at the household level has to be improved. When modern energy services are ensured this will increase productivity as well as reduce time taken to complete work. Women will get more free time than earlier, when using indigenous energy and will get more opportunity to perform economic activities. When women can work more, they can produce more products and so augment more surpluses. Consequently more surpluses increase sales that ultimately boost profit. Therefore, household income will be increased. So, poor people will be able to afford modern energy supplies or purchase equipment that uses modern energy. Then access to modern energy services will be ensured. As a result people can afford modern energy supplies or buy energy equipment so that they can

better access improved energy services that help economic development. A virtuous circle to break up energy poverty is shown below in Figure 2.2:

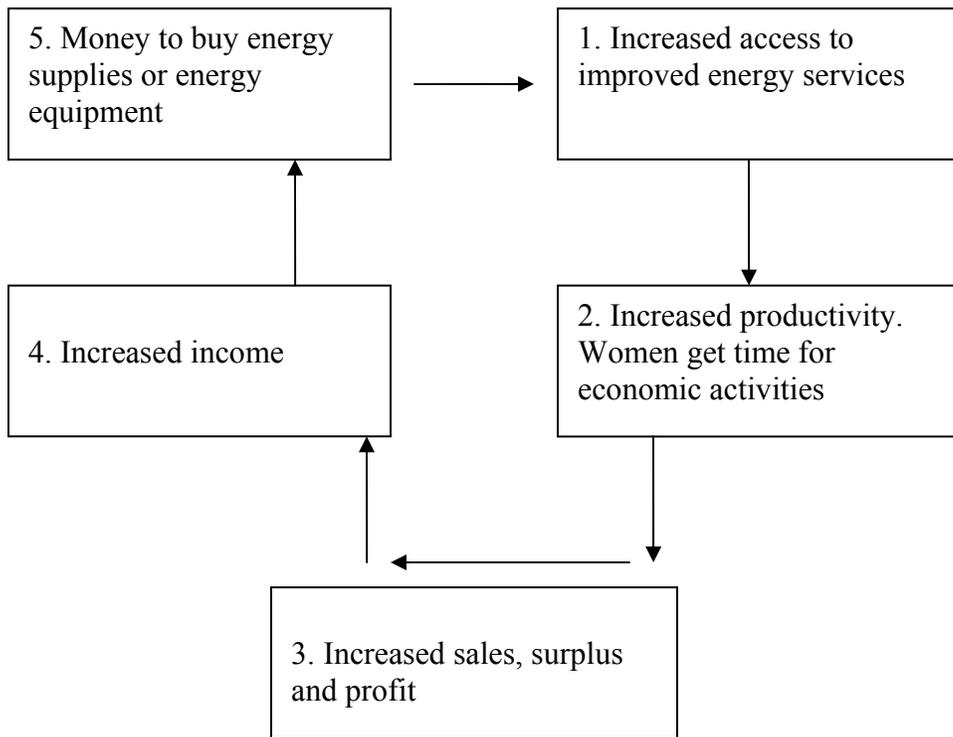


Figure 2.2 Virtuous circle to break out of energy poverty (Source: IDS, 2003)

From the above Figure 2.2 it can be seen that proper strategies have to be introduced to ensure access to modern energy services at the household level. To do this, it is necessary to understand how decisions are taken at household level that determine the energy purchased and design a strategy of intervention accordingly. Steps should be taken to convince the community that clean energy is necessary to overcome poverty. Motivation and training programmes should be carried out in the local community. A country's energy policy may be an important framework to protect the right of the stakeholders and

it is therefore important to scrutinise the energy policy to investigate whether it is gender friendly.

2.5 Energy policy and women

Energy policy and planning are still ‘gender blind’ (Clancy et al., 2007) though many rural women in Asian and sub-Saharan countries are living with drudgery and ill health. In very few energy policy frameworks has the discrimination been addressed properly (Oparaocha et al., 2011). Gender mainstreaming is essential to solve the problems, but two factors are responsible for gender bias: these are (a) the social position of women and (b) institutions’ gender biased attitude (Clancy and Feenstra, 2006). Institutions are formal social structures which administer actions; institutions include family, religious institutions, educational institutions, economic institutions and political institutions (Brinton and Victor, 1998). Political institutions and financial institutions are discussed in this research. Political institutions are the organisations normally created within a legal framework in order to formulate and apply laws, negotiate among stakeholders and frame policy. According to Karl Marx, these institutions serve the purposes of the dominant class; it is important to counterbalance the supremacy of the dominant class in order to ensure justice (Harvey, 1993). Financial institutions are formed by regulations. These are the financial intermediaries that collect deposit, provide loans and invest in order to earn profit (Gitman, 2001). Many people in rural Bangladesh do not have access to formal financial institutions. Informal institutions are *socially shared rules, usually unwritten that are created, communicated, and enforced outside of official channels* (Helmke and Levitsky, 2004; p727). Informal institutions are not formed under regulation; these are

untaxed and remain unmonitored. These provide loans to small farmers and lower income people at comparatively high interest rates (Sarkar, 2006). Both formal and informal financial institutions are discussed in this research.

Generally in developing countries the voice of women is neglected in society. As policies are mostly formulated by consultation with the stakeholders, women have a very narrow opportunity to explain the significance of their needs. Moreover, extension workers' (government staff responsible for giving assistance to the rural people) male-dominated philosophy and private sector's lack of awareness about gender issues in energy may understate the energy needs of women (Dutta, 1997). This may be an outcome of the preconceived idea about men's superiority over women that men internalise from the custom and practice of society. Thus women's needs are not properly assessed in energy policy, or by energy suppliers who may be private or public sector.

Women in much of South Asia and sub-Saharan Africa not only have less opportunity to be educated in comparison with men but they are also socially and politically deprived. They have less chance to work at top managerial level, though some women are equally qualified as men, but due to social and political structures they are overlooked in times of recruitment and promotion. This situation is also similar for energy companies' recruitment and promotion. Moreover, large-scale energy consumers are concentrated in heavy industries and agricultural sectors that are also male dominated. As a result, in developing countries the policymakers, top management of energy industries and bulk consumers are male dominated. When consultations about the demand and supply of energy take place, it is very usual that males are talking with males (Clancy et al., 2007). So, males mostly benefit from these consultations.

The incorporation of gender issues in policy is not a new idea because this issue has been analysed and acknowledged in many sectors, like agriculture (Croppenstedt et Al, 2013; Lal and Khurana, 2011; Dolan and Sorby2003) water (Molle, 2008; Panda, 2007; Hulsebosch and Ombara, 1995) and forestry (Agarwal B (2010, 2001) and Martin and Lemon, 2001)). But, gender issues in terms of energy and development have not been acknowledged sufficiently yet by the policymakers. Traditional policies ignored the critical role of women, especially in the rural areas, and women have to bear the burden of lack of access to modern energy services. To overcome the gender bias in the energy sector, it is obvious that the policy should be gender sensitive. Gender awareness among people has to be built up, and it can be aided by presenting the exact scenario about the present energy deprivation of women. The main obstacle to address gender issues is that aggregate data is mostly unavailable about the energy needs of women in developing countries. As there is no data available, no visible problem is understood, therefore no interest or attention is given by the policymakers to this issue (Huyer and Westholm 2001). It may be assumed that primary data collection may solve the problem easily, but the reality is data collection is a challenge in the rural societies. The head of the families are men and most of the consultations are done with the head of the family. Women cannot speak about their energy needs in presence of their family. Therefore, when data is collected at household level, it does not reflect the needs of women. This type of data also creates gender blindness (Skutsch, 2004). The governments of the developing countries have paid less attention to collect representative data as energy ministries do not engage field level workers like agriculture or food ministries (Clancy, 2000). It can be inferred that energy ministries and energy companies have no or insufficient contact with the end

user, especially marginally poor women. As there is no effective data available for women's energy needs and no initiative to collect primary data, the energy needs of women are not properly addressed in the policy. Women may not receive their energy rights from household to national level and policy may not support their rights. This leads us to consider whether there is any lack of energy justice in rural society in developing countries, especially with regard to women.

2.6 Energy Justice

In most of the literature on justice the central demand of justice is 'distributive justice' which refers to proper distribution of goods and services among the people in a society. The reasons responsible for distributional injustice should be examined thoroughly. The analysis of injustice will be more thorough when procedural and recognition-based injustice are properly examined: "...*Inequitable distribution, lack of recognition, destruction of capabilities and limited participation all work to produce injustice, and claims for justice*" (Schlosberg, 2004: 529). Thus, three concepts of justice are to be applied to address the problem of injustice. These are (a) justice as distribution (b) justice as recognition and (c) procedural justice. McCauley et al. (2013) argue that the objective of energy justice is to provide safe and sustainable energy to all citizens at an affordable price.

2.6.1 Justice as distribution

Justice is considered as the 'basic structure' necessary to ensure the equitable distribution of 'social goods' (Schlosberg, 2007; Barry, 1999). Brighouse (2004, p.2) emphasised the equal distribution of benefits and the same share of burden among all people in a society.

Fair distribution of 'goods', 'entitlements' and 'resources' is essential for 'distributive justice' (Barry, 1973; Sen 1982; Dobson 2009). John Rawls defines justice as "a standard whereby the distributive aspects of the basic structure of society are to be assessed". Justice, then, defines "the appropriate division of social advantages" (Rawls, 1971 pp 9-10). According to Rawls (1971) distributive justice is the conception of 'justice as fairness'; the central idea of the concept is to ensure equitable distribution of advantages and disadvantages of all types of socio-economic and political goods. Kuehn (2000) argues that the simplest concept of distributive justice is fair distribution of public goods or an equitable share of benefits and burdens. All these concepts consider society has homogeneity in terms of social, economic and religious perspectives. But, there may be the inequality in society and disadvantaged groups may exist related to age, sex, race and religions. Rawls (1971) in his 'difference principle' supports giving more benefits to the disadvantaged groups of the society. Development agencies also argue for 'distributive justice' in natural resources allocation or infrastructure development (WCED, 1987; World Bank, 2006).

2.6.2 Justice as recognition

Fraser (1997, 1998, 2000, 2001) and Young (1990) criticised the 'distributive approach' of justice as the theory does not scrutinise the fundamental reasons responsible for improper distribution of resources, like social norms and values, cultural beliefs and institutional conditions. Cultural injustice is "rooted in patterns of representation, interpretation, and communication" (Fraser, 1998, p.7). Misrecognition is attached to organisational subordination and lack of respect for some groups. Social injustice is entrenched when a group of people in a society do not receive equal respect to others. If

there is a lack of recognition, people may be ignored or dishonoured. In this way the well-being of that group may not be properly recognised. Due to the lack of recognition, the basic needs of that group may be overlooked. Lack of recognition may cause psychological harms that ultimately affect the health and stability of society (Honneth 1995, 2001; Taylor, 1994).

Fraser (2000: 109) considers 'justice' as 'bivalent' because it requires 'recognition' as well as 'distribution'. She argues that different groups or identities in a society need to be recognised along with distributive justice. 'Mal-distribution' may take place due to 'misrecognition' of different groups. She claimed many social movements for justice took place from 1960 to 1970 for mal-distribution that was due to misrecognition of gender, race and religion.

2.6.3 Procedural justice

Rawls (1971) argues that 'correct' or 'fair' practice should take place whatever procedure is followed to get the similar 'correct' or 'fair' outcome respectively in the case of 'procedural justice'. The institutional process of a state should be 'fair' and equitable to all citizens (Schlosberg, 2004). Distributional and recognition-based injustice may take place due to political process and institutional behaviour. Young (1990) argues that supremacy and oppression in a society have to be eliminated. To achieve these, the unfair distribution of goods and the reason for apathy of recognition of people in a society have to be removed. Participatory democratic arrangements can address the distributional and recognition-based injustice. Honneth (1992) linked democratic participation and recognition. When the citizens are excluded from participation, they have a feeling of disregard or misrecognition.

Three things need to be ensured for every citizen in a society in order to achieve procedural justice; these are (1) access to information (2) meaningful participation and (3) access to legal process and courts (UNECE, 1998, 2006). These three pillars of procedural justice were formulated in the United Nations 'Aarhus Convention' in 1998 in order to disseminate appropriate information to citizens of the 47 signatory countries and maintain transparent procedure in environmental issues. It is recognised as a useful tool to explain procedural justice in the case of energy justice as well. It is important to disseminate information so that citizens can know their rights and privileges. Gould (1996) emphasised the need to ensure the equal right of every person to participate in a common activity. In this process every person will get an opportunity to share his/her opinion with others. He can establish his right to any common activity that will boost self confidence and development. Gould (1996) and Young (1990) campaigned for participation to be ensured not only at the socio-cultural level but also in government policy and decision-making processes. Participatory democracy can address the social norms and values, recognition and consultation that can ultimately reduce the issues of misrecognition.

If the behaviour of political and cultural institutions is not gender friendly, it will hinder fairness and recognition that will lead to distributive injustice and misrecognition. It also hampers women's participation in decision-making both in political and cultural institutions. Issues of justice are not just bivalent, but trivalent. So, participative democracy is very important to solve the problem. Thus, justice is related to distribution and recognition. These two types of justice should be supported by political and social systems.

Gender relations and balance are not properly maintained in policy. In developing countries, rural women are not treated as equal to men and have no or little voice in society. Men of the rural communities of those areas have the only bargaining power in society, policymakers mainly focus on the needs of men. Consequently, in the policy, women's needs and desires are mostly ignored and marginalised (Clancy 2000). For example, rural poor women have less cash to purchase fuel and have little or no participation in decision-making processes from household to national level; they have to bear the consequences of using dirty fuel.

Though very few women become entrepreneurs, income generation has not ensured the social and economic rights of them. Yet, they have very little access to credit and loans from banks and financial institutions in comparison to men, and less voice in decision-making from household to community level. In African countries in 1999, women still received less than 10% of all credit (Blackden and Bhanu, 1999). This is procedural injustice because microfinance institutions are gender biased and they do not sanction and disburse loans based on the entrepreneur's ability, consequently women are deprived.

In most developing countries, information on rural women's energy requirements are not collected from the rural areas. So, their needs are not properly reflected in policy. Women have no meaningful participation in policy. Consequently, women do not receive any benefit from the policy as they have no meaningful participation in the decision-making process. Poor women have no or little access to the courts to get energy justice, so they remain in energy poverty. To challenge the decision of public and private companies, there should be a mechanism to access the legal process and courts. There should be a

legal framework that assures people access to a satisfactory level of energy services; equal participation of all segments of society is essential to lessen injustice.

2.7 Financial capability of women

Traditionally 'division of labour' exists in rural society of developing countries where women are responsible for household work (ADB, 2001). As they are involved mostly in non-income generating activity, women remain poorer than men. According to Denton (2002) almost 1.3 billion people in developing countries are living below the poverty line where 70% of these are women. Social structure and custom in society dictate a deeply rooted belief that women should not work outside the house. It is observed that in the rural areas people do not allow their daughters and sisters to work with men. Parents believe that it will be difficult to find a bridegroom for social marriage, as men do not like marrying women who are working outside the home. For example, if we consider the rural areas of Bangladesh, marriage is mostly arranged by the parents, and love marriage is treated as an offence. Family heads do not allow the women to work outside the home before marriage. The scenario remains the same after the marriage of women, as their husbands' family members think that women should be busy with household work. As women are not able to take part in income generating activities, poor women and their families are deprived from the income which could reduce their poverty to some extent. Sometimes women generate income, but their labour is not properly recognised and they do not receive sufficient payments for their activity. One example of this is where sometimes women produce food for selling in the local market but they remain unpaid and unrecognised by the other male members of the family. Many women are engaged in microenterprises like weaving and sewing. The products are sold in the market and

money is taken by the male members of the family. Therefore, gender analysis is important to learn about the root causes and barriers to women's energy poverty and inability to participate in energy decisions.

2.8 Gender and development

Previous to the last two decades the term 'gender' was considered to be synonymous with 'sex' (Siwal, 2008). 'Gender' describes the roles and functions of women and men based on the socio-cultural structure of the society (Oakley, 1972). In addition to socio-cultural influence, there is little influence from biology to define gender (Kessler and MacKenna 1978; Lorber, 1994). According to Lucal (1999, p.784), gender can be defined as *“culturally established sets of behaviours, appearances, mannerisms and other cues that we have learned to associate with members of a particular gender”*. It can be considered as a phenomenon which is socially constructed and it has a consequence to personal relationships which has economic as well as social implications (Mukhopadhyay, 2003).

The concept of 'gender' is better described by Sabates-Wheeler and Kabeer (2003, p.1):

“Gender refers to the social construction of difference between men and women in different societies, differences which translate in practice into inequality in resources, responsibilities, opportunities and constraints. And thus, gender analysis has to take into account the fact that these differences and inequalities are not uniform across the world. They vary according to such factors as cultural context, levels of development and the policy environment.”

It can be inferred from the definition that patriarchy creates inequalities between men and women, including difference in resource distribution and it is not uniform everywhere;

cultural and policy environment are other components of gender inequality. It is important to explain 'patriarchy' which may be considered as the root cause of gender inequality. In addition, it is necessary to recognise the changeable behaviour and aspects of social relationships and experience of people to make a positive change in gender relationships (Pollert, 1996).

2.8.1 Patriarchy:

Patriarchy refers to male 'dominance' and 'chauvinism' over women. Patriarchy is the idea that expresses husband's supremacy over his wife and father over his children. It determines and controls the behaviour of women (Bennett, 2006). Patriarchy refers to the absolute power of the father in a family or the eldest man who not only rules the women members but also the young and economically subordinates family members (Rajadurai and Geetha, 1998). Male domination over women is very common and widespread and may vary based on time, place and situation. But, this dominating and oppressing role of the father or husband often adversely affects the woman's life (Parpart et al., 2000).

Rich (1977, p. 57) refers to the term patriarchy as:

a familial-social, ideological, political system in which men – by force, direct pressure, or through ritual, tradition, law, and language, customs, etiquette, education and the division of labor, determine what part women shall or shall not play and in which the female is everywhere subsumed under the male.

'Patriarchy' might not be in the same amplitude everywhere (Bennett, 2006); so it is important to analyse the term based on location and situation. As males are mostly involved in productive activity, paid work and represent the state and institutions, they

can oppress, exploit and dominate women and the scenario may vary in different circumstances (Walby, 1997). So, the nature of patriarchy may vary in different societies and in dissimilar political situations.

2.8.2 Power structure in rural Bangladesh

Male dominant power structures exist in most developing countries (Malhotra and Schuler, 2002) where subordination of women to men is common. This statement is very much true in Bangladesh, especially in rural areas where people are mostly poor.

‘Patriarchy’ is deeply rooted in Bangladesh and women are dictated to and controlled by patriarchal values which uphold and maintain the ‘division of labour’ that restricts mobility of women, controls roles and responsibility as well as sexuality (ADB, 2001).

Father and senior male members take all decisions related to education, occupation and marriage. The wife and girls have no choice or are not consulted at the time of decision-making. The male child is treated as superior and every poor family hopes a male child will be born. When a family knows that a female baby is born the new born baby is not welcomed.

In Bangladesh, social norms and values predominantly favour man’s supremacy over woman. In the rural areas of Bangladesh most women are not able to work outside the house premises due to social and religious belief. Societal belief is that women should stay at home and do the household work like cooking, housekeeping, childrearing. If a female works outside the home, society does not take it positively; the household is not treated as good and faces difficulty at the time of their girl’s marriage. So, parents are sceptical about their daughters taking a job. This belief is so deeply rooted in the society that advocacy programmes of non-government organisations (NGOs) are sometimes

opposed and oppressed by the society, though tireless endeavour has improved the situation in the last two decades. Moreover, parents deliberately impose the social values on the girl child's mind that she should abide by the rules and values of the society and advise the girl that she should be aloof from the outside world.

2.8.3 Gender and resource allocation

In many developing countries gender traditionally dominates resource allocation (Agarwal, 1994). Males are mostly benefited from the resource distribution system. Laws do not protect the rights of women, especially for land distribution and resource allocation (Haddad et al., 1997). Exchange of property between men and women also depends on the basis of the marital system (Whitehead, 1981; Guyer, 1988, p. 163). One of the major reasons for this unequal allocation of resource is the inheritance laws of the developing countries which have been prepared on the basis of religious laws. In the case of India most of the citizens are Hindu where inheritance laws are based on Hindu religious guidelines; in Pakistan and Bangladesh the majority are Muslim where the laws follow the guidance of Islam.

A. Resource allocation and inheritance laws of Bangladesh

In Bangladesh, resources are distributed based on religious law where land distribution and resource allocation are not equal for men and women. In Bangladesh, inheritance law is not same for all religions. It is to be noted Bangladesh is a Muslim dominated country, among the total population about 88% people are Muslim and 12% are followers of other religions including Hindu, Christian and Buddhist (Discovery Bangladesh, not dated). For all religions there are different inheritance laws based on the guidance of that religion. For Muslims, 'The Muslim Family Law Ordinance, 1961' is the basis of

inheritance. At the time of inheritance, Muslim women do not receive an identical share to men. This law and ordinance are formulated based on Surah Nisa of Holy Quran; Verses 11, 12 and 176 of Surah Nisa describe the way in which the property of the deceased must be distributed. First, the 'Quranic Share' has to be distributed where the father and mother of the deceased will receive $1/6^{\text{th}}$ and wife (wives) will receive $1/8^{\text{th}}$ shares of the property. The remaining property, known as 'residuary', then has to be distributed among the sons and daughters at the ratio of 2:1 respectively, i.e. a son will get double of a daughter. If a person wants to distribute his property in his lifetime, he has to follow this act and ordinance. Sometimes marriage brings some opportunity for a woman to secure more resources if her husband is richer than her father's family, but in that case she suffers humiliation as her father cannot give sufficient dowries in her marriage due limited or no resources.

Buddhist and Christian inheritance law are comparatively more in favour of women than the Muslim inheritance law. Buddhists follow the custom where the husband goes to the wife's house after marriage and they are guided by matriarchy, where women get the property rights.

The Hindu inheritance law is named as 'Hindu Women's Right to Property Act, 1937'. According to Article 3.1, a daughter has an equal right as a son to property or resources in life time interest. Christian inheritance law is known as "The succession Act 1925" is applicable in Bangladesh where the equal rights of men and women are ensured in the case of property distribution.

B. Constitutional law of Bangladesh

According to the Constitution of Bangladesh (1972) all types of rights of women are ensured by law, including political participation, employment, resource allocation and human rights. According to Article 7 of the Bangladesh Constitution, every citizen is equal in the eye of law and has the right to get the protection of law and in Article 9, participation of women in local government institutions will be encouraged by the government. Moreover, Article 10 states that women's participation has to be encouraged in all spheres of national life. Furthermore, Article 17 ensures the equal rights of women; women and men have to be treated as equal and Article 19(1) states that the state shall ensure equal opportunities for every citizen.

The Constitution of Bangladesh ensures the fundamental rights of women. Article 27 affirms that every citizen has an equal right to get the protection of law and shall not be discriminated against based on age, sex, race or religion. The state shall ensure the freedom of movement (Article, 36), association (Article 37), assembly (Article 38) and thought (Article 39). But, societal belief and conservativeness are barriers to ensuring women's rights.

In the preamble of the Bangladesh Constitution it is stated that the Constitution is the supreme law of the state; if any law contradicts with this spirit it will be automatically null and void. But, in cases of property distribution, religious laws are upheld where women and men do not receive identical shares of the property. If any aggrieved woman goes to the court, the court will examine whether she gets the portion allocated by her religious inheritance law; if she receives property according to her religious law, the court will be satisfied. The court will only give her remedy if she does not receive her allocated

portion determined by her religious law which is not consistent with the constitutional spirit.

2.8.4 Gender equality and policy

Many new policies fail as they do not take into consideration the degraded social identity of women; the notion of gender hierarchy prevails in the society and this should be addressed first to march forward towards gender equality (Lister, 1995). Earlier in Bangladesh, gender issues were not prioritised in the policy frameworks of different ministries. But in recent years (from 2009) Bangladesh is more concerned with providing policy support for women; gender is considered as an important component in the budgetary framework. From 2009 to 2015, 41 ministries have prepared budgets for gender-related issues in their fiscal budget. The local government ministry has adapted benefits for women related to different projects under the umbrella of the social safety net programme, where different types of feeding programmes for old, pregnant, divorced and disabled women are introduced. Under these schemes 30 kg of rice is given to every beneficiary per month to feed them, though it is insufficient and every distressed woman is not listed in this programme due to inadequate budget. The Energy Ministry has also added a gender budget in their fiscal budget from 2013–14. In the budget document it is stated that energy exploration, generation and distribution will be augmented to improve women's lives but how it will be achieved is not expressed in that document.

2.8.5 Gender and employment

Women's employment is the most important area of gender analysis because women's positions may be threatened due to unemployment and the social security of women is thus reduced (Hoa, 2005; Anh et al., 1998). Alternatively, it is noted that economic

development has reduced poverty and improved gender equality (World Bank, 2001, p. 18). It is important to enhance the earning opportunities of women. If women can earn money, their decisions may be valued in the family. It may give them opportunity to take part in the decision-making process to purchase for example energy services and equipment. Women's entrepreneurship can improve their economic capability and it can be developed through microcredit financing at the individual level (Minniti et al., 2010). Their capability may also be enhanced by developing women's cooperatives (Karlsson, 2012). The necessary measures to address imbalance in gender roles together with microcredit financing for renewable energy are necessary to solve energy access for women (Farhar, 1997). In the case of Mali, when women took part in energy related business their bargaining power was significantly improved at home as they could generate income (Modi et al., 2005). It shows that if women can become entrepreneurs, their economic and household position will be improved. But, society and family possess male-dominated societal beliefs that discourage and restrain women from being entrepreneurs. According to (Kariuki et al., 2012) the prevailing household related job distribution restrains women to work in the households and discourages to initiate energy related business.

Women can generate income by 'small and medium enterprises' (SMEs) if they are supported by loans and training, but in the developing countries project planners are mostly concerned about the profitability and better performance of the entrepreneur, and are less interested in providing loans to women. Priority should be given to building women's leadership rather than considering the 'cost-effectiveness' and 'performance' of the business. The people who are positive about gender equality and committed to

support it should be engaged for project planning and implementation of women's SMEs (Huq and Moyeen, 2011).

2.8.6 Women's health, sanitation, and education

In developing countries, in addition to socio-economic and cultural unfairness, women are also discriminated against in health services, though information about this is inadequate and disregarded by the policy makers. Women are not receiving satisfactory health and contraceptive services. The health service is not gender sensitive because the health policy is not gender friendly, and needs structural adjustment (Vlassoff, 1994). In rural areas of Bangladesh most women are compelled to get married at a young age and have no knowledge about health, especially reproductive health; produce four to five children within a short period and suffer with various diseases. The adverse health situation of women is reinforced by the unavailability of sanitary latrines in rural areas (Jewitt, 2011). An unsanitary latrine is the carrier of various diseases and most of the waterborne diseases like diarrhoea, cholera. Many poor people have to use toilets in the open spaces; while the men are not embarrassed by this most women wait for night out of shame and uneasiness, so they drink less water. As a result of drinking less water and the long waiting time for use of the toilet, pressure is put on the kidneys; many poor women in rural areas are suffering from various types of diseases, especially kidney infections McIntosh (2016).

Families in poor rural areas of Bangladesh are not interested in sending their girls to school. They think it is better for female children to learn household work and take care of their younger brothers and sisters (Practical Action, 2010). Poor households think that education for girls is a waste of money as a girl has to go her husband's house, so she will

not be able to reimburse the family after her education. The government of Bangladesh has already taken initiative to provide free education for girls (MOPME, 2015), but many parents are not interested in sending female children to school, preferring to engage them in household work.

2.9 Gender equity

The term ‘gender equity’ refers to the equal opportunity of women to get the same benefits as men (Manning, 2007). Gender inequality persists in society, ‘endangering development’ due to the social structure, culture, custom, norms and values prevailing in the society (World Bank, 2001, p. 99). In developing countries, it is essential to establish ‘gender equity’ in social, economic and political contexts in order to ensure the equal rights of women which are necessary for balanced socio-economic development (Shabbir and Gregorio, 1996).

2.9.1 Approaches to achieve ‘gender equity’

Over time, different types of approaches have been introduced to protect and uphold gender equity. All approaches from Women in Development (WID), Women and Development (WAD), Gender and Development (GAD), women empowerment to women’s ‘voice’, try to improve the position of women in order to achieve gender equity in society, especially in developing countries where women are subordinate socially, economically and politically.

A. Women in Development (WID)

The ‘Women in Development’ (WID) approach emerged in the 1970s, initiated by academics and practitioners mainly of American influence that initiated women’s

inclusion in the development projects. This approach to development got momentum when the feminist movement in the United states took place in early 70s for employment opportunities and equal rights for women in economic, social and reproductive concerns became stronger. The concept of 'Women in Development' is 'women need development' (Everett and Charlton, 2014). The notion of WID is that women need 'direct benefit' to elevate their position. Here, women are considered as the beneficiary, not the mediator of the development (Lansky, 2000). The assumption of the 'WID' approach is that women need direct financial assistance to uplift their position. This approach advocates to support women by investing through development projects so that women can get the economic benefit (Razavi and Miller, 1995).

The objective of 'WID' was to link women into development activities. The development agencies realised that 'equity' and 'social justice' are necessary for women, and lack of these also hinders economic growth. Women's work is considered as traditional and non-productive as they do not produce cash directly. The 'WID' approach tried to improve the productive role of women and bring them under the umbrella of development activities through new policies. To implement this approach all the decisions were made from the top and implemented, where women have no participation or choice in the decision-making process. Feminist critics contested that women were not equally benefited as men by this approach as this approach overlooked reproductive concerns and social welfare for women; as a result women were in the previous roles as mother and wives, and rarely found they became the producer or economically self reliant (Razavi and Miller, 1995).

WID has tried to educate women and bring them into productive activity but the limitation of this approach is that it does not challenge the social structure where women are treated as subordinate to men. In addition, it advocates for gender equality but did not make any endeavours to streamline the gender relations and roles responsible for the exclusion of women. Moreover, WID did not protest the men's preconceived idea about their supremacy over women.

B. Women and Development

WAD approach was introduced after 1975 and it has rectified the shortcomings of WID to some extent. WID considers the direct involvement of women in the economic development activity, rather than they remain passive as in the WID approach. Through WID women only received benefits but the development of women was not achieved (Rathgeber, 1990). WAD challenged the idea of WID related to external assistance of women because it believes that women should always be a part of the development process (Parpart et al., 2000) and advocates 'women only development projects'. The 'WAD' approach identifies that women's roles and responsibilities are distinct from men's and that to ensure equality of women to men in the male-dominated patriarchal society it is imperative to launch 'women only' development projects (Bertrand, 2006). In some contexts the WAD approach struggled and failed as women are marginalised in the society, and their capacity and efficiency were not enough to accomplish the 'women only' development projects successfully. In addition, it considers the women as a 'class' and projects tended to be designed for a group with the same requirements and abilities; but women's needs and capabilities are not actually all the same.

C. Gender and Development (GAD)

The concepts of the development approaches have transformed over time; the WID concept considered women as a 'passive force' and WAD advocates 'women only projects' for their development where gender relations and responsibilities were not analysed. After, 'Gender and Development' (GAD) has been initiated from the mid 1980s to remove 'gender disparity' and ensure 'social equity' and 'justice' where the central idea is 'development needs women' (Everett and Charlton, 2014). This approach acknowledges that if women are marginalised and not able to take part in the economic process, economic growth will decline (Lansky, 2000). As women make up almost 50% of the total population of the world, there should be balanced social, cultural, political and economic development to allow women to participate in the development process. GAD not only focuses on the women in terms of biology, it tries to find out the social roles and responsibilities of men and women and their expectations. GAD found that women mostly have the role of mother care (Prugl, 2012) and men earn money for families (Moser, 1993). Nearly 70% of women are involved in care work where they are overburdened but receive no payment (Kabeer, 2008); but in the case of maid or nannies and others payments have to be made to receive the same service (Budlender, 2004). Some women have the opportunity to work but women receive fewer wages for undertaking the same work as their male colleagues. In Bangladesh, female labourers do not get the same wages as men, especially in construction work and farming. GAD has taken into consideration 'class analysis' as well as 'dependency approaches' and questioned the different assumptions of economic liberalism (Everett and Charlton, 2014). It emphasised gender relations: role identification and needs assessment of

women, resources reallocation and household decision-making mechanisms, and formulated gender-based planning by organisations to satisfy the needs of women. ‘Class analysis’ is done with a view to stratify the society into different groups to identify and monitor the different viewpoints of different strata. In the context of sociology it may be stratified based on sex, religion and race. From an economic point of view it may be divided into lower, middle and upper class. The economic ability and recognition of women varies in different strata. Women need may not be similar in different strata. For example the needs of women living in rural areas may not be same as in urban areas; even rural women need may not be same between poor and better off. So, recognition of different sectors is essential for gender based planning.

GAD has focused on the private sphere; it explained the significance of scrutinising the intra-household relations and power structure in order to understand women’s position in the family and society as women’s position may not same in different families and societies; and recommended ‘structural adjustment’ in order to achieve gender equity. If gender equity is achieved, women may become the agents of development, not the passive recipients described in WID (Everett and Charlton, 2014).

2.9.2 Women’s empowerment

Empowerment is possible through participation of the people. People should be part of development by taking part in the decision-making process to reflect their expectations. Women’s empowerment can be achieved through improving their capabilities; it also helps economic development and thus overall development (UN, 1995). Empowerment challenges the unfair male domination prevailing in the society that refutes the human rights of women (Oxfam, 1995).

Empowerment must liberate women from the so-called primitive 'value system' that is a tool of oppression against women; it allows everybody equal opportunity to work and evaluate a person based on performance to ensure humanistic society (Batliwala, 1994). Women's empowerment should be a bottom-up approach rather than through a top-down process; if it is done by others they may be hiding an intention to control the women (Rowlands, 1995). For empowerment every individual or organisation need resources, skill and leadership together with participation in decision-making, and for conflict resolution and there must be a democratic process in the organisation to empower women so that they can withstand family and social pressure (Sen and Grown, 1985).

In the last decade of the 20th century the 'women's empowerment' approach has emerged, where the focus is that women will be self-reliant by their own capability (OECD, 1998). To achieve 'women's empowerment' it is necessary to ensure that women have security, economic capacity, competence, the ability to take decisions in the family unit, a participatory environment in society, mobility and visible presence in society and groups (Moser, 1993). It should be noted here that "empowerment is the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect *their lives*" (World Bank, 2002, p. 11).

This concept recognises that development cannot be done only with the help of economic and social projects. The underlying beauty of this approach is that it advocates developing women's knowledge, skills and attitude about their rights, privileges and deeds so that they can protect their rights and privileges by their own sagacity and wisdom. When women will be able to do so gender equity and their rights will be

established in the society. When women achieve self-reliance they can break the shackle of male dominance, and claim for their rights and establish social justice for themselves. A considerable amount of time is required to achieve 'women's empowerment' especially in the least developed countries. Development agencies have to continue their direct assistance to meet the women's needs up to that time.

2.9.2 Voice of women

The World Bank emerged as a new approach or 'voice' for gender development (World Bank, 2012). The 'bottom line' of this concept is the 'voice of women' should be heard in the development process. Women in many developing regions face a tough reality (Rose, 1994, p. 32) and also experience subordination (Sen and Grown, 1985) but they are not able to express their ideas, expectations, experience and opinions in the family and society; if their voice is heard, it may help to formulate sustainable policy for gender equity. Consultation with women about their needs, wishes and expectations is essential to design a project because 'need assessment' is imperative before designing a solution package (Kotler, 2007).

To improve the women's voice at the household level resource allocation the law should be women friendly; the property rights of women should be strengthened. Therefore, policies should be gender balanced and women's participation in politics has to be fostered and quotas may be allocated in political systems. The voice of women can be enhanced by ensuring women's participation in the decision-making process, especially in the legislative body and local administration (World Bank, 2012). In Bangladesh, 45 parliament member seats are reserved for women who are selected by the three hundred directly elected parliamentarians. In local government there is a quota for female

participation. Besides the quotas women can also take part in any election and compete for the posts like men.

The participation of women is also enhanced by NGOs and different women's welfare associations that raise their voice on different occasions, especially in cases of violence against women. In the garment sector, women are raising their voice by trade unions and protesting against the lower payments and deprivations. For example, a feminist organisation (ASK, 2015) is protesting against various cases of discrimination such as lower payments of female workers and sexual harassment in the work place.

Policymakers and entrepreneurs are now better informed to evaluate women's demands for minimum wages.

2.9 Multidisciplinary tasks

The development concept is often confined only to economic development and ignores other adverse factors. The main reason for this narrow strategy is that it is launched by development agencies which have a main focus on economic development and reducing income poverty. Normally poverty reduction reduces gender inequality but some research shows that gender discrimination may be deepened with poverty alleviation due to other influencing factors prevailing in rural society. Women's earning opportunities are curbed due to socio-cultural and institutional factors (Jackson, 1996; Razavi, 1999). It is important to undertake gender analysis in the case of energy poverty. Apart from economy, there may also be other factors like religion, politics, social system and belief that can impact gender inequality. In essence, all types of socio- economic, political and religious factors should be critically analysed. It is to be noted here that the gender analysis needs multidisciplinary analysis as the adverse factors are multidisciplinary.

2.10 Conclusion

Energy poverty definitions are mostly concentrated on the ability of the households to afford energy. The assumptions of the definitions are households either do not have money to purchase energy or spend less money to satisfy their energy need as they have they fix a household budget where they have other priorities of expenditure and energy may not be in the priority. Some definitions fix a minimum level of energy consumption but the minimum level of consumption may not be same based on age, sex and location. The main assumptions of those definitions are that supply of energy is available but people who have money to buy energy may not have access to energy if the supply of energy is not available. However, many people living in developing countries and sub-Saharan countries, especially in rural communities, do not have sufficient access to modern energy. Accessibility of energy together with ability to afford energy are important.

Still, a household may be energy poverty even if they have the ability to buy clean energy and energy is available around them. For example, a household has sufficient indigenous fuel at zero cost and think it is wastes of money if they buy energy and their free energy will be remain unused. Or, a household finds if they buy fuelwood or other indigenous fuel at cheaper cost than clean fuel, they may not purchase clean fuel. There may be other factors apart from economics. If a household thinks indigenous fuel is not injurious to health, they may think clean fuel purchase is unnecessary though they have the ability to buy it. Or, husband/ the family head's mindset may be a factor; they may think that traditionally they are using this fuel so their household should continue. Moreover, every family around them are using indigenous fuel. Thus, it can be inferred that there is scope

to think beyond accessibility and ability to buy energy; there may be other factors like social and cultural factors including patriarchy.

Energy poverty is almost always defined at household level. But, need for energy may not be same at the individual level. In most developing countries in the rural areas division of labour exists, and women are responsible for cooking. Women need clean cooking fuel whereas men may have little concern for it. In addition, energy poverty may affect men and women differently even though they are living in the households. It is important therefore to scrutinise energy poverty at the individual level.

It is better to measure 'energy poverty' with a multidimensional model. Researchers mostly focused on examining and defining energy poverty in the context of cooking fuel and lighting as it has immense affects on daily lives. But, energy poverty also has impacts on socio economic development and on health. Practical Actions (2010) Total Energy Access (TEA) model captures all those needs like space heating, cooling and earning a living along with cooking fuel and lighting needs, and it is usually used to measure access to energy at household level. This model is used in the first empirical chapter (Chapter 4) to assess energy poverty of men and women separately in the household. This model sets up a minimum standard for every six aforesaid indicators. In case of cooking fuel and lighting it sets up the minimum quantity requirement. These standards may be scrutinised whether those are sufficient for minimum access. Information and communication is a qualitative judgment which is difficult to measure. In the case of space heating and cooling there is scope for development as it does not express separate minimum temperatures for day and night time. Moreover, the heating and cooling needs may be different in different regions. In the case of earning a living TEA suggests sufficient

energy access in order to be an entrepreneur which is a qualitative judgment. Though, it is difficult to quantify the amount for sufficient energy need to access for earning a living, this provides scope to work with.

It is important to scrutinise whether there is a relationship between energy poverty and energy justice. In the case of accessibility, it is important to ascertain 'fair' distribution of energy resources, recognise every group and accommodate them in the decision making process and address their needs to energy policy and planning. There may be inequitable distribution of energy resources for different groups. It may happen if different groups are not recognised; they may not have the participation in the decision making process and their voice may not be heard in decisions.

Gender relations need to be taken care of to reduce/ remove energy poverty. Energy poverty is related to the ability of the households to afford energy. In the developing countries rural household's income depends on the income of the male members in the households as women are involved in household work. If women could earn outside the houses like in urban areas they may contribute to household's ability to purchase energy. Patriarchy is the main hindrance in the rural society for women's employment. Society is conservative about the work of women. WID and WAD approaches consider women as a single group but women should not be consider as a homogeneous group. There are different strata based on society, culture and income. Even in the same rural area, women may not be in the same position. The dynamic relations need to be scrutinised.

A theoretical framework is shown in figure 2.3. From the energy poverty literature it is found that energy poverty is mainly due to lack of access of the household to modern energy services or households' inability to purchase energy. This research explored three

major things. Firstly, it tried to assess the energy poverty of women and compare it with men's experience related to energy. The Total Energy Access (TEA) model was used to assess the energy poverty of women and men, and compare women's experience with men. The reason for choosing the TEA model was that it is a multidimensional measurement of energy poverty in terms of energy services: cooking, lighting, space heating, cooling, information and communication, and earning a living; TEA not only captures the basic needs of energy in everyday lives, it also considers the impact of energy poverty on socioeconomic development and quality of life. Secondly, the research explored whether women's energy poverty is connected to lack of energy justice. Fair distribution of energy resources and services may not be achieved, which may be interpreted as a lack of 'distributional justice'. It may take place if a group is not recognised at the time of energy resource distribution which may be due to lack of 'justice as recognition'. There may be procedural injustice, i.e., there may be inadequate opportunity for some groups such as women to have their views heard in energy related policy at different scales, or by the energy companies. Therefore, it is important to scrutinise whether any lack of access to modern energy services for women is a form of or is due to energy injustice (See section 2.8.1). Thirdly, it attempted to explore whether women's energy poverty is connected to the lack of financial capability of women. Women's financial capability depends on access to resources and earning opportunity of women; those were scrutinised in this research. It tried to find out whether there are any obstacles of women's financial capability for social, economic and religious reasons (see section 2.8.2).

Different approaches to women's development were analysed to consider how to overcome/lessen energy poverty of women. WID/WAD/GAD are the different approaches; WID (women in development) was an initial approach, then WAD (women and development) was developed with the experience of WID; finally GAD (gender and development) was developed by accommodating the ideas and experience of WID and WAD. At the outset, WID approach was focused on the economic development of women. WID worked for direct financial benefits to women but overlooked their social welfare and position. It did not challenge the social structure, women's subordination and men's supremacy. Later, the WAD approach was introduced where 'women only' projects were launched. But, the performance of these projects was not satisfactory because women's capability and efficiency was not enough as they were deprived and marginalised in the society. WAD approaches tend to consider women as a single group but the needs and capabilities of all women are not same. Moving on from this, the GAD approach was introduced. It focused more on gender relations; on removing gender disparity and improving social equity. It recommends 'need assessment' of women, role identification, ensuring women's rights in resource allocation; it addresses women's work opportunity, develops decision making ability mechanisms for women, and gender based policy and planning. It acknowledges that women may have different experiences and needs based on different social position and economic ability, and that it is important to recognise the needs of each group of different strata. This GAD style approach was used in this research to consider the gender dynamics and social status issues underlying the energy poverty of rural women, and to consider how this may be addressed. In the light of the GAD approach, suggestions were put forward in order to improve women's energy

justice and financial capability of women to purchase energy. It is to be noted that the TEA model and GAD approaches are not directly connected or interrelated. TEA was used to assess the energy poverty of women and GAD thinking was drawn on to consider underlying reasons for the energy situation of rural women specifically as well as how best to alleviate the energy poverty of poor, rural women.

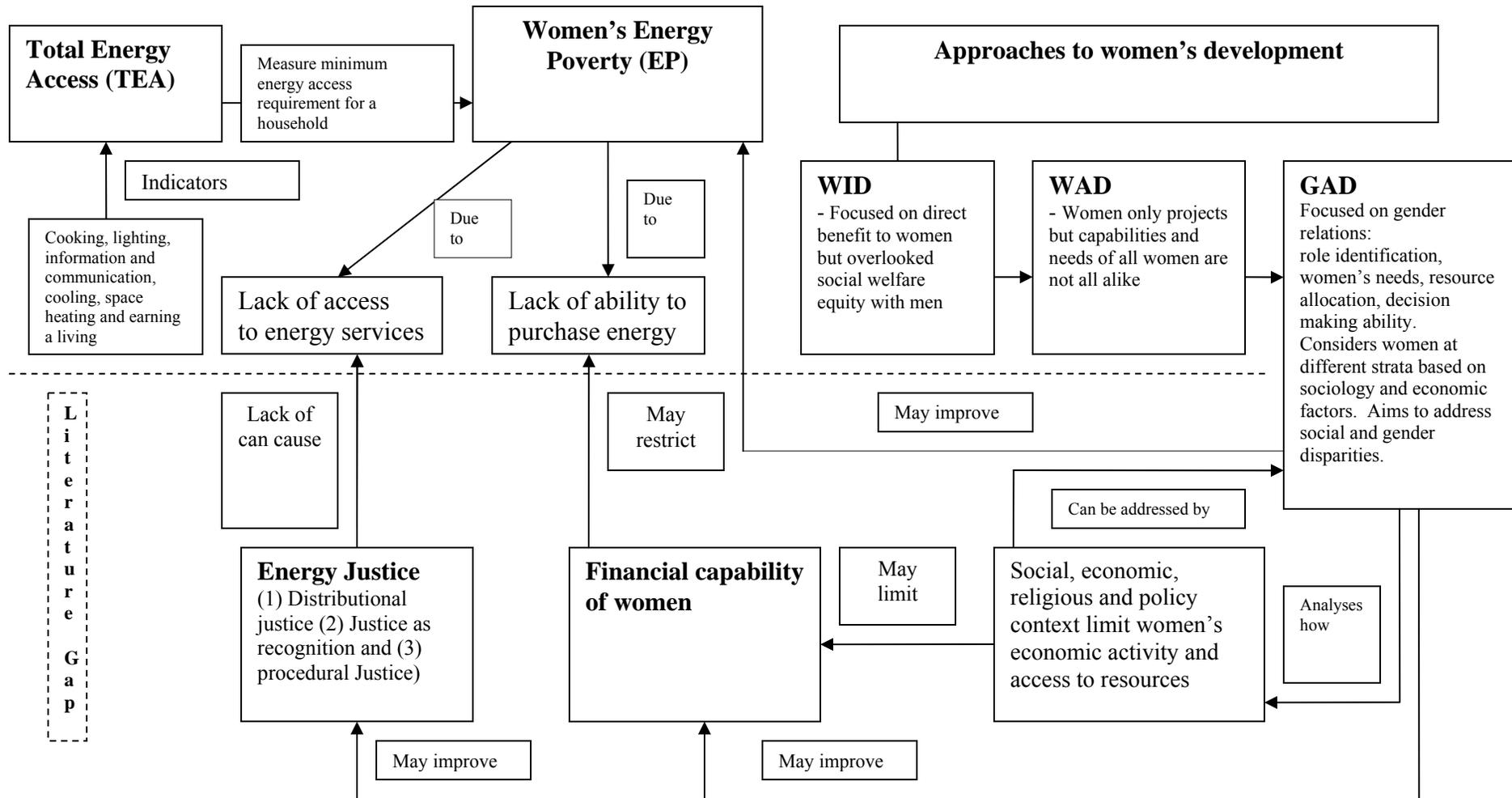


Figure 2.3 Diagram for theoretical framework

Chapter 3: Research Methodology

3.1 Introduction

The research methodology is the method used to study a particular topic or activity in a systematic way that guides the researcher to achieve effective collection and interpretation of empirical data (Louis et al., 2001). The methodology of this research was adopted in order to address the aim of the research and the research questions. The aim of the research was to explore the gender dimension of ‘energy poverty’ in the context of a rural area of Shahbazpur, under the district Brahmanbaria, Bangladesh. Research questions were developed to capture how and why women are experiencing energy poverty in daily life, whether this energy poverty is related to energy injustice; if so then to what extent, and also the extent of women’s contribution to the ability of the household to afford energy. This chapter is organised into six sections. It starts with a discussion of the case study area and provides the reasons for selecting the fieldwork area. Next, the ‘research design’ used to address the research questions is discussed and the research philosophy, approach and strategy and data collection methods explained. Then, the chapter clarifies the process of data analysis and interpretation. Fourth, it considers the researcher’s positionality i.e. multiple identities and consequent effects on the fieldwork. Being a student of a UK university and a civil service officer of Bangladesh living in an urban area representing the middle class, attention is focused on the way in which the researcher accessed the respondents, especially female respondents and undertook interviews. Fifthly, in the methodological reflection section the difficulties faced to collect data and apply the research method are discussed; and finally it discusses how ethical concerns were addressed.

3.2 Context of fieldwork area

It is important to give a brief discussion about Bangladesh before explaining the case study area. Bangladesh is mostly low lying plain land crisscrossed by many rivers and canals. It is a 'delta'; a significant area goes under water in the monsoon season. It has six seasons: summer, monsoon, autumn, late autumn (hemonto), spring and winter. The yearly day and night highest average temperature is 35 degrees in summer and lowest average temperature is 14 degrees in winter (climate- data, not dated) .

Bangladesh is one of the most densely populated countries in the world. The major people of the rural areas are engaged in agriculture. Agricultural lands have been reduced to build for new houses due to higher population growth for the last four decades though the growth rate is declining in recent years. A significant number of inhabitants do not have agricultural land and shifted to new jobs like day labour or migrated to urban areas for work. Poverty is deep and widespread in rural Bangladesh. Industrialisation is taking place sharply in urban areas but development in rural areas is much slower (BBC, 2016)

Rural people have less access to modern energy services. They do not have modern or improved burners or access to line gas like town areas, although, bottled gas is sold commercially throughout the country. Rural areas are connected increasingly by grid or off grid electricity supply in the last decade. Society, especially in rural communities, is conservative where women normally live in the house and does household work.

Shahbazpur village which was chosen for the fieldwork is an area located in the Brahmanbaria District within the Chittagong Division, Bangladesh (see Figure 3.1).



Figure 3.1 Map of Bangladesh showing location of Shahbazpur town

(Source: <http://www.google.com>)

Shahbazpur village is one of the 17 villages of Shahbazpur town. Shahbazpur town is located at 24.051667°N 91.173333°E comprising a total area of 23.9 square kilometres (BBC,2016). Shahbazpur union consists of nine wards and the chosen field work area is that designated as ward 8. According to the last national census of 2011, it is a densely populated area like other regions with a total population of 29,757 and a household population of 7,958. 96.2% people living there are Muslims and less than 3.8% are Hindus. About 53.8% of the inhabitants are involved in agricultural work whilst the majority of the remaining population are day labourers, drivers, shop keepers, rickshaw pullers etc. The total population of the chosen fieldwork area (Shahbazpur village) is about 5,317 where 2,871 are male and 2,446 are female (Population Census, 2011). There are three secondary schools and 11 primary schools and a Madrasa (religious school) in the village. According to the national census of 2011, the literacy rate in Shahbazpur is almost 65%; it is to be noted this percentage includes those who can only write their signature (A2I, 2016). It was observed that 11 brickfields are located on the bank of the river Titas.

The area of Shahbazpur town was chosen for fieldwork for a number of reasons. Firstly, the land characteristics and professions of the inhabitants are similar to those in most rural areas of Bangladesh. The village is situated on the bank of the river Titas. The land consists of a plain with low ground, which becomes inundated by water during the rainy season. People are engaged in fishing at that time. This is fertile land under cultivation, where 'paddy' (unmilled rice) is the main crop alongside the cultivation of vegetables like cauliflower, potato, brinjal, green chilli etc and the area also produces bamboo. The male inhabitants are mostly involved in farming and women stay at home responsible for

cooking, housekeeping and child-rearing. Secondly, as in other rural areas, most of them have no or little access to modern cooking fuel and they have inadequate access to electricity; in summary, the majority of inhabitants have limited access to modern energy services. The households I interviewed were already in energy poverty at household level. Thirdly, this area has good road connections with the surrounding towns and districts. It is easier for a researcher to access this area easily in comparison with the remote areas where motor vehicles are not available. The Asian Highway passes through the village and connects Dhaka, the capital city of Bangladesh to Sylhet, one of the nine divisions. It takes only three hours to reach the fieldwork area from Dhaka by road if there is no traffic congestion.



Plate 3.1 Bridge on the Asian Highway situated in the village

In Shahbazpur, the largest sector of the population is Muslim. Rural Bangladeshi society is conservative in nature and patriarchy is prevalent in the rural areas of Bangladesh. Patriarchal views have a great influence on the community in everyday life as in other areas. The belief and custom is that women should stay at home and do housework including cooking, housekeeping, taking care of children and older people. A few women work outside the home in the schools and community clinic, but they are a small minority. Women live with their father or husband. The father or husband is the head of the family and normally take decisions and women have to follow their decisions. In these respects Shahbazpur is again typical of other rural areas of Bangladesh.



Plate 3.2 Titas River beside which Shahbazpur situated.

As mentioned, Shahbazpur is situated on the bank of the river Titas. A further interesting point about it is that the largest gas producing field of Bangladesh is located nearby and supplies almost 20% of the gas throughout the country; however none of the villages of Shahbazpur town are connected to the gas grid.

Table 3.1 gives information on various individual and household social indicators for Shahbazpur. This data was collected from the different registers of the Shahbazpur Union Parishad, personal observation and the voter lists of the field work area. It is not possible to provide comparative information as there is no official data available which allows to compare these indicators with the central region of Bangladesh more generally. But, based on my observation, knowledge and experience working in the different rural areas of Bangladesh my assessment is that this area is typical of rural villages in central Bangladesh but that it is not possible to provide data to corroborate that. From my observation, knowledge and experience in working rural areas it is found that the socio economic features are similar across the rural areas of Bangladesh. For that reason National Data was used to compare with the field work area. According to the last 'household survey' of Bangladesh Bureau of statistics BBS (2010), the total adult literacy rate of Bangladesh is 57.7% but the scenario is improving. Youth literacy rate of males and females is 77.1% and 80.4% respectively. Regarding economic status, among the total population of Bangladesh, 13% people are living below the poverty line where 80% of these people in poverty are living in rural areas (Farzana and Munshi, 2016). With respect to religion, among the total population, 89.7% are Muslim, 9.2% Hindu, 0.7% are Buddhist, 0.3% are Christian (Roman Catholic) and 0.1% Animist (BBS, 2010). Men normally earn an income and women stay at home. Women in rural areas are mainly

involved in household work (non income generating activities) and their efforts are not recognised in the family. On the other hand, rural men are generally involved in agriculture and day labour (ADB, 2001; Paul and Saadullah, 1991). Though rural women have access to credit to generate income throughout the country, they are less involved in generating income. Different NGOs provide loans to rural women. As well, Krishi Bank (specialised Bank offering loans for the agricultural sector) also provides loan to both women and men (Haque et al, 2016).

Features	Men	Women
Education	Aged over 18 years (1) No education 23% (2) Can sign only 55% (3) primary 9% (4) Secondary 1%	Aged over 18 years (1) No education 49.5% (2) Can sign only 38% (3) Primary 2% (4) Secondary 0.5%
Occupation	(1) Farmer 61% (2) Day labourer (a) agriculture 11% (b) brick field 16% (c) construction 7% (3) Driver (a) bus/ baby taxi 4% (b) rickshaw/ van 3%	(1) Housework 99.8% (though 15% of them do some economic activity beside household work). (2) Teacher 0.04% (3) Community clinic 0.06% (4) NGO staff 0.09% (5) Community leader 0.009% (6) Entrepreneur 0.001%
Income	27.34% earn throughout the year and 71.66% have seasonal	0.23% has regular income. 15.62% of women have small amount of

	income, if a farmer or day labourer related to farming.	spending power by taking credit from NGOs.
Wealth	67.71% have some assets (includes land, house, cash)	Women normally do not have assets.
Social class	<p>Upper class 3.12% (have significant property from inheritance and have comfortable income from their sons in the towns and abroad)</p> <p>Middle class approximately 9.54% (the economic and social position of some has improved in recent years as their sons are sending money from abroad and through earning from farming.)</p> <p>Lower class approximately 85.69% (poor farmer, day labourer and driver).</p>	Women are treated as upper, middle or lower class based on their family position, not their own characteristics or occupations.
Economic status	<p>Based on own income per month</p> <p>1. Higher income group (more than £ 500 (Taka 50,000.00): 3.12%</p> <p>2. Middle income (less than £500 (Taka 50,000.00) but more than £200 (Taka 20,000.00): 9.54%</p> <p>3. Lower income (lower than</p>	<p>Based on own income per month</p> <p>1. Higher income group (more than £ 500 (Taka 50,000.00): 0%</p> <p>2. Middle income (less than £500 (Taka 50,000.00) but more than £200 (Taka 20,000.00): 0%</p> <p>3. Lower income (lower than £200 (Taka 20,000.00): 13.47% (but it is between £25 (Taka 25,00.00 to £50</p>

	£200 (Taka 20,000.00): 85.69% 4. No income 1.65%	(Taka 5,000.00) 4. No income (86.53%).
Religion and caste	99% are Muslim in this area. 1% is Hindu of lower caste. There is no segregation.	99% are Muslim in this area. 1% are Hindu of lower caste. There is no segregation.
Access to credit	Men can take credit only from banks.	Women can take credit from NGOs as well as banks.
Gender roles	Men work outside the house in any kind of job they wish and have the skills for	Women must take care of housework and care work and can work to generate income after doing this. They need permission from their husbands and family heads to work outside the home.

Table 3.1 Social and economic features of the field work area (Shahbazpur village)

3.3 Research design

3.3.1 Research Philosophy

‘Interpretivism’ is a research philosophy that recognizes that social reality is subjective; it has multiple dimensions and the interpretivist approach emphasises to understand the multiple meanings (Lincoln and Guba, 1985). The knowledge can be perceived by understanding the social construction with the help of subjective interpretation (Carson et al 2001 and Hudson & Ozanne, 1988). Receptive and flexible approaches are important to understand the human interaction and multiple realities. The researchers always welcome new ideas throughout the research period; and knowledge cannot be gained

properly without experiencing social realities (Hudson and Ozanne, 1988). Interpretivism always tries to understand as well as interpret human behaviour; not concentrate only on the cause and effect. On the contrary 'positivism' strives for objective judgments where a rigid 'deductive' approach is used throughout the research with appropriate hypotheses. This approach is normally used in scientific research where statistical/ mathematical methods are normally used to find out the unique solution. Conversely, 'pragmatism' is the mixed method where both qualitative and quantitative methods are used.

Interpretivism was preferred as the research philosophy, as it assisted in revealing and ultimately understanding 'subjective' as well as 'multiple' dimensions of social reality (Guba and Lincoln, 1985). By observing the interdependency of human behaviour and belief systems of the village it was possible to interpret the role of external or objective reality and its influence on peoples' behaviour. It was therefore necessary to be open-minded and flexible to capture the reality, not only to find out causes and effects but also meanings and perceptions. My research questions were developed to find out the facts, opinions and suggestions of the respondents where it was important to be flexible and open minded to welcome other opinion; it is consistent with interpretivism. By adopting an open and flexible philosophy new ideas were welcomed throughout the research period (Carson et al., 2001; Hudson and Julie, 1988).

3.3.2 Research approach

I. Inductive VS deductive

The 'inductive' approach starts from specific observation and ends with broader generalisation and focuses on developing new theories from the data emerging. It is carried out in the field and not suitable for use to collect data in the laboratory. The

researcher gathers data, observes patterns, finds out the theme, analyses data and ends with broader generalisation/theory. It is a 'bottom-up approach' where the conclusion is drawn from 'premises' that have no certainty (Lancaster, 2005). This approach helps to develop a concept and guides the explanation of the situation. There is no theory at the very outset; the researcher is not certain about the type of findings and it does not test any theories or patterns. The theory may be developed towards the end of research (Neuman, 2003). On the other hand, the 'deductive approach' is considered as a 'top-down approach' that begins with 'general observation'. Normally a researcher approaches with a theory on his/her 'topic of interest' from which s/he develops 'hypotheses'. In this research a logical sequence is followed where the conclusion is deduced from the 'premise' that may not be 'proved' because there is a possibility it could be 'not proved' (Guati, 2009; Wilson, 2010; Snider and Lerner, 2009). Inductive VS deductive approach is discussed in the Figure 3.2 below:

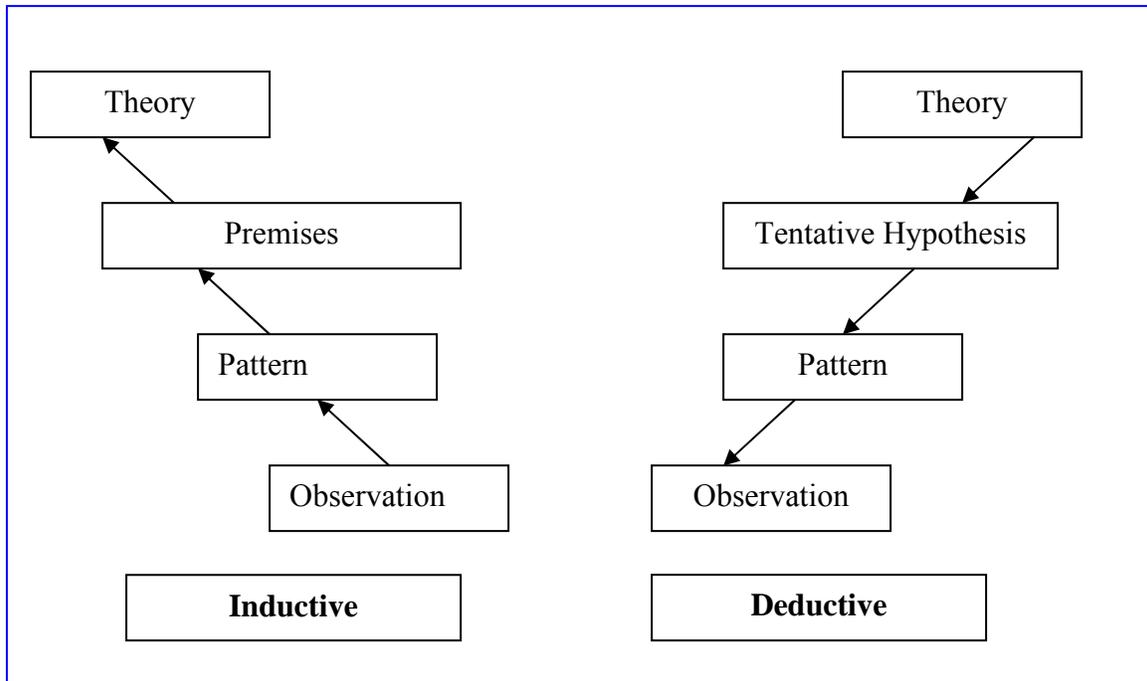


Figure 3.2 Inductive VS Deductive Research Approach (Source: author)

It was not straightforward for me to choose a single approach. I put more emphasis on the ‘inductive approach’; I also used deductive approach to some extent. The reason for using the ‘inductive’ research approach was to explore the rural energy scenario of women living in the rural areas and also tried to identify the factors responsible for this situation because inductive approach is ideal to explore new problems where researchers have paid no or little attention in the past. It can explore the cause(s) and suggest alternative solutions to solve the problems (Brown, 2006; Singh, 2007). It allowed interpretation of the interaction of women and household members related to use of fuel and energy poverty. Moreover, I started this research with research questions, carried out the research in the field, collected and analysed data to achieve broader generalisation and expected to get some possible solutions; the approach used being mostly similar to the ‘inductive approach’. But, in order to develop research questions, published energy

poverty related literatures were studied and analysed. Following this attempts were made to identify the 'literature gap' and 'research questions' were prepared to respond to and rectify the gap. I learnt about energy poverty from different theories, approaches and frameworks and applied theories to some extent that is similar to 'deductive approach' (e.g. I have used TEA framework) though I have not tested any hypothesis.

3.3.3 Case study method

A case study approach is beneficial to analyse the social reality; it is important for two reasons. It helps to shed light on reality including human behaviour that may not be easily understood from theories, and context dependent knowledge can be developed by studying a specific situation. Study from a distant place without feedback (opinion and experience about that matter may be different from researcher's understanding) may lead to unclear findings and research may be misdirected as it is untested without feedback. It is better to develop 'context dependent knowledge' (Flyvberg, 2006) because it focuses on the particular situation not the overall idea. It concentrates on 'subject' as well as 'relevance' and it is effective when small/individual groups or populations are considered for investigation. It was useful to examine underlying cause(s) responsible for a situation that may be either 'prospective' or 'retrospective'. The study was able to narrow down a vast field into relatively easier research topics. Interviews were conducted in a flexible manner to hear the experience and opinions of the respondents, and focused on observation. It allowed the researcher to act more as an observer and let the respondents express their opinions more freely (Sheppard and Robert , 2003; Robert, 2009).

3.3.4 Data collection

A qualitative method for data collection was chosen, as my research philosophy ‘Interpretivism’ supports it (Bryman, 2004; Mason, 1996). Qualitative research was also preferred for its flexible nature; it allowed in-depth interviews of the interviewees together with observation in order to know their experiences and social realities (Denzin and Lincoln 2005; 1994). Data were collected from both primary and secondary sources, though the research was mostly based on primary data. It is important to gather primary data in order to know women’s experiences, expectations and effects related to energy poverty and to understand the causes responsible for this. There may be several reasons responsible for energy poverty and there may be multiple effects that might not be expressed by interviewees; however, I did not find sufficient secondary data to examine and evaluate the problems. Primary data were collected through in-depth interviews and observation, and secondary data were also collected by document review.

I. Primary data

I started field work from 26th September, 2014 and completed my field on 20th May, 2015. I stayed with the community in the day time. Within this time I also stayed day and night for more than a month (from 5th February to 15th March, 2015).

A. In-depth interviews

In-depth interviews were preferred because they are a common technique used in qualitative research to interview a relatively small number of respondents to find out their ideas, experiences and expectations of a particular situation or programme. The main advantage of this technique is that it is a very effective way to collect detailed

information (Babbie, 2001) about the interviewee's thoughts, experiences and circumstances. It was felt that the face-to-face interview allowed easy understanding of the likes, dislikes, comments and disapproval expressed by interview subjects (Boyce and Neale, 2006). It was also important to conduct face to face interviews in order to observe the interaction of household members and the role of women in the household and their relationships to energy and fuel in the household. I took all female interviews in their homes and most of the male interviews also in their home except a few shopkeepers who wanted to give their interview in their shops situated in the village market, at their leisure time.

Sampling, sample selection and recruitment, and conduct of the interview

Non-probability sampling was preferred because both 'case study' and qualitative research approaches support this type of sampling; it does not follow random selection like probability sampling (Babbie, 2001). Among the different non-probability sampling, 'purposive' sampling was used for interviews that can also be stated as judgemental, subjective or selective sampling (Saunders et al., 2012). The objective of this research was to uncover the experience of energy poverty of rural women and the contributing factors. Non-probability sampling helped the study to reach the specific target group in an effective way because proportionality of sampling is not a core concern of the study. It was suitable for the research as it is effective for small sample sizes. This type of sample allows the study of specific characteristic of a sampled population in order to answer the research questions related to experience, attitudes, beliefs and customs (Babbie, 2001).

In rural areas of Bangladesh women's work, behaviour and movements are dependent on the structure of village society and the intensity of control mostly depends on their

husbands' attitude, beliefs and behaviours. It was therefore important to conduct interviews with men to capture their attitudes and behaviours that affect women's energy poverty. Moreover, it was important to conduct interviews with the community leaders because they have comprehensive information about the locality and they are also able to influence people in rural areas. To some extent they can also shape peoples' behaviour so it was important to hear their stance related to women's energy poverty. Like other rural areas, it was found that community leaders are the representatives of the two major political parties that have been ruling the country since January 10, 1991.

In this research the sample size numbered a total of 53 people. The respondents were 25 women, 25 men who are the husbands of those women and 3 community leaders from the fieldwork area. NGOs working in the rural areas helped in the selection and recruitment of women. NGOs were contacted to assist in the selection process and they arranged introductions to their female employees who deal with women residing in the case study area. They were the best source to reach women because the NGO staff has informal relations with them as they regularly visit this area to provide loans and collect weekly instalments from the women. It was possible to walk around this area in the company of the NGO staff to identify women living in the locality relevant to the research.

Appropriate women were selected and a list made of their names. Preference lists were prepared based on women's age and their husbands' professions and income. Women and men were grouped into two separate pools so that participants could be recruited from the relevant pool. Women from different age groups were chosen because it was assumed that young women's experience and attitudes may be different from those of middle-aged women because the mind-sets of young and older husbands may differ. Table 3.2 shows

the list of women interviewees, their age, husband's profession, income and comment about husband's earning. It is to be mentioned each male respondent is the husband of the corresponding number female respondent (e.g. male respondent 01 is the husband of female respondent 01).

Women	Age	Husband's profession	Husbands Income	Comments about husband's earnings
Woman interviewee 01	30	Farmer (a day labourer in a farm)		Remains idle for 6 months
Woman interviewee 02	25	Day labourer (Working in cultivable land)	GBP 1. 70 per day when in work	Remains idle for 6 months
Woman interviewee 03	40	Day labourer for earth cutting	GBP 1. 80 per day when in work	Does not get work regularly
Woman interviewee 04	25	Day labourer (Working in cultivable land)	GBP 1. 70 per day when in work	Remains idle for 6 months
Woman interviewee 05	20	Rickshaw puller	GBP 2.00 per day when in work	Spends money to meet his personal expenditure
Woman interviewee 06	25	Construction worker	Good income in village area (average GBP 5.00 per day)	Not interested to bear the family responsibility. Sometimes assaults his wife physically
Woman interviewee 07	30	Day labourer (Working in cultivable land)	GBP 2.00 per day when in work	Reluctant to work regularly
Woman interviewee 08	30	Retail vegetable seller	Wife has no idea about income	Income may be GBP 1.50 per day
Woman interviewee 09	30	Farmer works by machine	Good income	Remains idle for 6 months
Woman interviewee 10	30	Rickshaw puller	GBP 2.00 per day when in work	He is ill and cannot work properly
Woman interviewee 11	35	Business (cattle seller)	Good income	Works whole year

Woman interviewee 12	25	Day labourer (Working in cultivable land) and fishing	GBP 2.00 per day when in work or catches fish	Earns throughout the year
Woman interviewee 13	35	Brick field worker and boatman	GBP 2.00 per day and boatman pay	Earns throughout the year
Woman interviewee 14	27	Tea stall owner	Earns something	Remains sick most of the time
Woman interviewee 15	35	Brick field worker	GBP 2.00 per day	Jobless in rainy season
Woman interviewee 16	45	Brick field worker	GBP 2.00 per day	Jobless in rainy season
Woman interviewee 17	32	Medicine shop owner	Good income	Earn throughout the year
Woman interviewee 18	35	Vegetable seller	GBP 2.00 per day	Jobless in rainy season
Woman interviewee 19	22	Brick field worker	GBP 2.00 per day	Jobless in rainy season
Woman interviewee 20	30	Day labourer	GBP 1.70 per day	Jobless for six months
Woman interviewee 21	30	Farmer works by machine and uses 20 to 30 day labourers)	Significant income	Good income. He has bought many properties for the last some years
Woman interviewee 22	45	Driver of three wheel motor	GBP 8 to 13 per day	Works regularly
Woman interviewee 23	20	Farmer works by machine	Significant income	He is solvent
Woman interviewee 24	27	Construction worker	GBP 5 to 7 per day	He is solvent
Woman interviewee 25	30	Farmer works by machine	Significant income	He is solvent

Table 3.2 List of Female interviewees, age, husband's profession and income

Though the majority of men are involved in farming, some husbands have small businesses, or are drivers, labourers working in a factory, or construction workers and their attitudes and mind-sets vary and that may have an impact on women. Two other separate lists, one of their husbands and the other consisting of community leaders, were also made. Information was provided to women interviewees about the research by use of the Project Information Sheet (PIS) (Appendix I). Many women do not have education; in that case I read the every word of the PIS and made every point in detail to them and asked whether they understood it. I did this until they said it was clear to them. Each female participant was informed that the researcher was interested in talking to her to know about her experience and needs related to energy access and choice, as she may have different needs for energy than the other members of the household which may be different from the energy needs of men. It was indicated that in order to understand the energy needs and experience, the study wished to identify the process of fuel collection, cooking system, lighting, thermal comfort, collection of water, access to information and communication technology (especially related to health), resource allocation, women's income generating activity and the participation of women in energy related decision-making processes. Interview participants were advised of their rights when asked to sign the consent form (see section 3.4). Appointments were made in advance and interviews scheduled at a time and place convenient for the interview subject. The visit lasted for around an hour, but the interviewee was able to have a break or stop the interview at any time, and interviews were recorded with the consent of the interview subject. Women interviewees were approached in order based on the preference list in presence of the women NGO worker who accompanied me in the interviews. A few women were not

interested in taking part in an interview; they claimed their husbands or father in law is opposing her to take part in the interview. They thought it is unwise to allow women to talk; it might hinder their privacy and people will know their family matters. Assurances were made that it will not harm her or their privacy and reputations in any ways; sometimes they then gave permission to attend the interview. If they still preferred not to take part, the next person on the list was contacted. Information was also provided to the men about the research by the Project Information Sheet (PIS) (Appendix II) prepared for them. A good number of men do not have education; in that case I read the every word of PIS and make every point in detail to them and asked whether they understood it. The husbands of the 25 women interviewees were invited to take part in interviews and all the men agreed to participate. They were interviewed to determine their opinions and experience of lack of access to modern energy services.

Information was collected about the community leaders from the government offices and inhabitants of this area in order to find suitable participants and three persons were selected and provided with information about the research through the PIS prepared for them (Appendix III). Everybody consented to take part in interviews which were conducted at a time and place convenient for the interview subjects. One intended interviewee was the chairman of the Union Parishad (the smallest unit of local government). However, as the chairman could not discharge his duty due to serious illness the members of Union Parishad selected the acting chairman as a replacement. The second person was also a political leader who was the close competitor of the acting chairman in the last Union Parishad election. These two community leaders are from the

two major political parties who have ruled the country for the last two decades. The third interviewee was an elected female member of the same Union Parishad.

Three semi-structured interview schedules were developed for the three constituent groups of interviewees: women, men and community leaders (Appendix IV, V and VI).

The interviews started with open-ended questions and allowed the interviewee to share their views and opinions in his/her own language. If an interviewee deviated from the topic prompts were used to bring them back on track. Prompts were also used when an interviewee raised a point but did not explain it or his/her explanation was not clear.

Leading questions were avoided as well as questions requiring yes/no answers (Babbie, 2001; Boyce and Neale, 2006). Women had the tendency to respond with short answers.

They answered with few words or one to two sentences that sometimes were insufficient to explain the phenomenon. In these cases, prompts or follow ups were used. Though men said a little more than women, prompts were also used to collect their views.

Community leaders expressed their views elaborately.

Before the interview started the interview subjects were advised how the interviews would start and proceed. It was important and effective to conduct the interview in the local Bengali dialect as the people are almost uneducated and have no English knowledge; they even have difficulty in properly understanding the official Bengali language. Importantly a female member of an NGO with good relations with the women in the case study village accompanied the researcher throughout all the interviews with the women interviewees. This was important because in this society a man usually does not talk to a woman directly and their husbands and society do not accept it. Moreover, a woman does not feel comfortable talking to a man without the presence of her husband,

relative or another woman. Husbands had no objections about their wives taking part in the interviews in the presence of this person and the women felt comfortable to talk under these circumstances.

Interviewees were invited to choose a location and time, and interviews were conducted according to their choice. Women preferred to talk in their houses in the daytime around 11 am to 12 pm. During this time their husbands were outside their homes for their work and women felt comfortable talking at that time. But it was relatively laborious to conduct interviews with the men. They preferred different times and places according to their convenience. Most of them consented to be interviewed at 4 pm and onwards in their homes after returning from their work. Sometimes it was necessary to wait until the evening if they were delayed. A few male interviewees were shopkeepers; most of them wanted to attend interview in their shops in the market between 1 pm to 3 pm when they had their lunch break as customers usually do not come to the market at that time. At the last stage of fieldwork it was found that the households became very busy as the paddy harvesting had started and it was necessary to wait for relatively more time to conduct interviews with men and women. During the harvest men and women were busy collecting paddy, to boil and dry it in the sun and men took paddy in the rice mill in order to get rice. Some families declined to take part in the interviews at that time, but most consented to a shorter interview if they had free time. The interviews took place at a convenient time in their houses when they had completed their tasks and became free; it was normally between 2 pm to 4 pm. It was effective to conduct interviews in their preferred places and time because the interview subjects felt relaxed and comfortable to speak and nobody wanted to withdraw from an interview. Community leaders chose

their homes for interviews and preferred a time of around 10 am to 11 am for the interview. The research followed ethical guidelines (described in the ethics section below 3.4) and the researcher conveyed his heartfelt thanks at the conclusion of the interview. Notes were taken in a diary, the key findings verified by checking, and a Dictaphone was used to record all interviews (Boyce and Neale 2006). After every interview, a gift value of taka 200.00 (GBP 1.67) was given to each interviewee (men, women and community leader). This was to thank him/her for his/her time and effort.

ii. Observation

Besides in-depth interviews observation was used as a method of data collection. I maintained a research diary and took field notes on the corresponding day when I observed anything relevant to my research. I did it to validate data and understand the underlying reasons responsible for the realities. It was found that participants sometimes had not shared information in detail; they answered in two to three words, sometimes within one to two sentences. They could not express their thoughts elaborately due to lack of education and/or they had no experience to speak to a person from a middle-class professional background. I as the researcher tried to follow their lifestyle and energy experience and field notes were taken when something relevant to the research was observed. Informal discussions took place with the villagers who were not participants in order to understand the social dynamics and insights of their custom and value system. It helped me to validate the women's claims about their social position and the attitude of the society including male members like husbands, brothers, fathers and neighbours that helps to write narratives. For better understanding of the energy services, photographs were taken in order to contextualise the scenarios; these photographs were sometimes

planned and sometimes unplanned. For example, the photographs of cooking fuel were taken in a planned way, when the fuel was collected, prepared and used for cooking. On the other hand, if during an interview with a participant, somebody was boiling paddy, that picture was taken spontaneously. Videos in public spaces were also taken to understand the villagers' activities and efforts, and to know the cooking procedures.



Plate 3.3 Farmers cutting paddy from the agricultural land

Photographs were also taken of other energy services. Sometimes, especially in the afternoon, a walk around the village resulted in pictures and videos of anything related to the field work. For example pictures of a modern decorated house where the

householders use indigenous cooking fuel instead of modern fuel; they have enough money but they do not buy modern fuel as cooking is done by maidservants. The family is also living in energy poverty but it does not affect them directly; they have made a separate kitchen adjacent to their house.

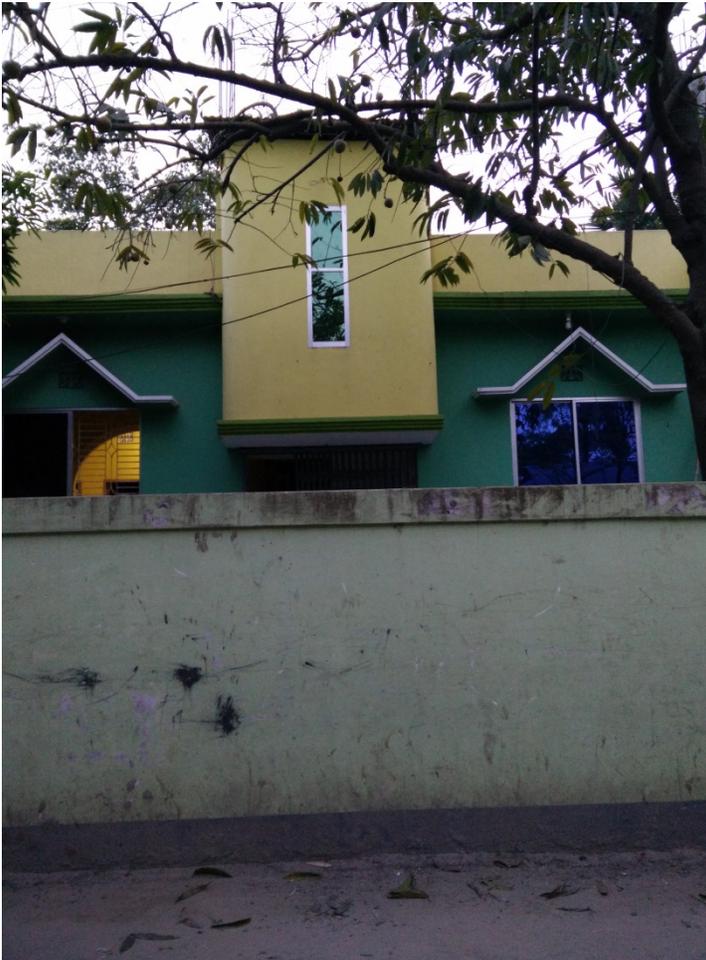


Plate 3.4 Household is in cooking fuel poverty by choice

Before taking photos or videos, permission was sought on every occasion. I took permission not only when I took photograph of a person. I also asked permission of the owner when I took the photographs of a house, cooker and animal.



Plate 3.5 boats are prepared to use as transport in monsoon

It was important to stay close to the fieldwork area; before engaging in the fieldwork the plan was to stay in an Upazilla government guest house which is only four miles away from the fieldwork area and as a civil service officer I had access and permission to stay there. But, at the beginning of the fieldwork period there was political turmoil throughout the country and the guest house was occupied by duty officers and law enforcement agencies. In that situation I had to stay in a hotel in the town which was a 40 minutes' drive from the fieldwork area. Though the fieldwork area was calm and quiet, I had anxious journeys between the hotel and the fieldwork area because there were road

blockades throughout the country and traffic continued on the roads only with the help and intervention of law enforcement agencies. Newspaper and TV reports indicated that some vehicles were attacked and people were injured throughout the country. One day I heard a vehicle was attacked adjacent to my fieldwork area and some people were seriously injured.



Plate 3.6 Van (manually operated three wheelers)

B. Secondary data

The following documents were reviewed in order to understand the government plan and actions regarding energy services for the rural people (see Table 3.3). I was looking for

the themes related to energy justice, women’s participation and in energy policy and planning, allocation of energy for women in acts and rules and women’s share in inheritance law when I reviewed those documents. I took notes and marked those relevant pages. These documents are mostly available on websites and some of the documents reviewed were from the related ministry. It is to be mentioned that ministries, divisions and departments upload documents to their websites on a regular basis under ‘Vision 2021’ in order to achieve ‘digital Bangladesh’ (GED, 2012).

Serial number	Name of the policy documents
1.	Bangladesh National Energy Policy, 1996 (updated 2005)
2.	Renewable Energy Policy of Bangladesh, 2002
3.	Private Sector Power Generation Policy of Bangladesh
4.	Small Power Policy
5.	Vision Statement Policy & Statement of Power Sector Reform
6.	Remote Area Power Supply Systems Fund (RAPSS) Guidelines
7.	Solar Guide Book
8.	Country Action Plan for Clean Cook Stoves
9.	500 MW Solar Programme
10.	Policy Guidelines for Power Purchase from Captive Power Plant
11.	Policy Guidelines for Enhancement of Private Participation in the Power Sector, 2008
12.	Budget (2014–15) related to gender budgets of Ministry of power and energy
13	Gas distribution rule (household), 2014
14	Gas distribution rule (commercial), 2014

Table 3.3 List of the documents reviewed (Source: author)

3.3.5 Data analysis

Thematic analysis was used for data analysis and interpretation, searching across a data set to find repeated patterns of meaning. It helped to discover patterns and develop

themes from the broader sources of qualitative data. In this analysis codes were generated manually to label the data selected from interviews, observations and documents I reviewed into different categories (Boyatzis, 1998; Lolfand et al., 2006). It was flexible method that helped to recognise broader patterns to reach closer understanding of the data for in-depth analysis and it was not closely tied to specific theories (Boyatzis, 1998; Charmaz, 2003). In this study, the following phases of thematic analysis were involved: familiarisation with data by transcription of verbal data and translation into English; generating initial codes; searching themes; review of themes; definition of themes and finally data analysis and interpretation in order to write empirical chapters.

The first stage involved familiarisation with the data. All interviews were recorded on a Dictaphone. I transcribed verbal data in the Bengali language with the help of a computer and then translated it into English by myself. Transcription and translation was a challenging and important exercise because the interview dialogue was expressed in a local language which is slightly different from the standard Bengali language. Different unfamiliar words and jargons were revealed and discussed with several educated women and men of that area in order to understand the meaning and significance of the words, and translated carefully to capture their idea. After translating the interviews into English, the interviews were categorised into three groups and saved into appropriate folders for women, men and community leaders. Then, familiarisation with the data collected involved reading and rereading the interview for three times before coding to try to identify patterns. The folders were imported into NVivo 10 as 'source' and gathered under 'internal' part of it and I took notes before starting coding.

Coding is considered as the major step for data analysis as it reduces and summarises the data into emerging themes; the first step was therefore to generate ‘initial’ codes. The creation of initial codes helps to reduce data (‘data reduction’) and identify broader themes relevant to the research questions. Within the interviews, I was looking for women’s energy usage, their experience related to energy services, the reason for inaccessibility of energy services, women’s opportunity or barriers to access resources or to income opportunity.

The third stage I generated themes manually and also developed sub themes. Under the nodes (known as ‘parent nodes’ in NVivo) I prepared some sub nodes (known as ‘chicken nodes’ in NVivo) (summary of nodes in appendix VII). It was important to level the data; and to do so each interview was read to identify the line, phrase and paragraph relevant to the nodes. Themes were identified by searching for repetitions, transitions (pauses and sections), linguistic connectors (because, before, after, next) and similarities and differences observed through constant comparison (Ryan and Bernard, 2003).

Generated themes were reviewed for representativeness of the data and coding. The ideas for codes come only from the data gathered through interview. Different codes were carefully examined and grouped in order to discover potential themes. Figure 3.3 shows thematic analysis:

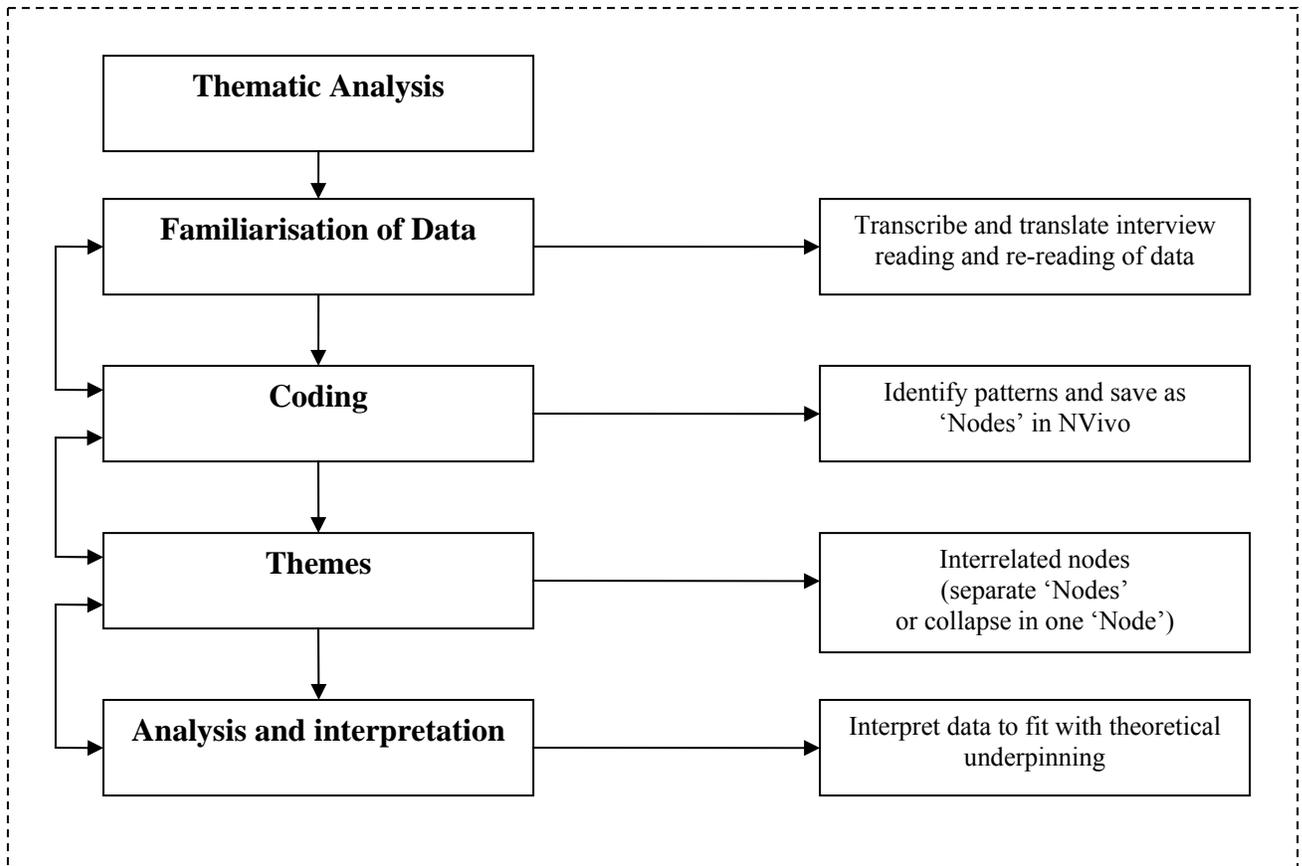


Figure 3.3: Thematic Analysis (Source: author)

The fourth stage involved reviewing themes and providing names for themes. Some themes were found to be similar, so were combined into a single theme. I also found some themes were more important and felt those needed detailed discussion; these were divided into ‘sub themes’. Coded data were re-examined to form logical patterns in order to fit within the themes. Some data would not fit within the themes, and I strived to rearrange the data to accomplish this. I reviewed themes with data corpus. The themes were given short and effective names in such a way that a reader, looking at the theme, could get an idea what the theme is going to describe. In this stage, I developed the overall narrative of the data and checked whether each theme converged with its individual narrative and overall narrative (Boyatzis, 1998). Finally data analysis and

interpretation were undertaken. Data analysis is an iterative process requiring several iterations and interpretation. The original expressions of interviewees were retained as much as possible, with minimum interpretation so that there were frequent opportunities to re-examine original opinions or expressions. The ideas and opinions shared by the interviewees were combined; if the ideas or facts were corroborated among most of the interviewees' opinion, I considered it as a common phenomenon. For example many women interviewees said that their husbands do not allow them to talk about their claims for energy. When contradictions were found among interviewees I tried to find the reason why there were differences in their opinions and provided an explanation in the writing up. Suppose: A few women told that they can take part in energy decisions; I checked the attributes and found they are contributing to household energy purchases. At the time of writing up the themes attempts were made to compare and contrast the analysis with the literature review.

Significance of using NVivo

NVivo was helpful to handle a high volume of data as it reduced a huge amount of manual work. If the data were to be analysed manually, several copies would be required of every interview script; then it would need to be cut and lines/paragraphs placed into specific folders relevant to themes. Then every folder would need to be opened and combined for reading and rereading. But using NVivo it was possible to copy the relevant line/paragraph and paste them into relevant nodes and the themes could then be read at any time when required. As mentioned earlier, 'data analysis' is an iterative process and it was necessary to read different themes (nodes) several times in NVivo in order to understand and analyse what interviewees shared. This action would be difficult if the

researcher had to read pieces of papers of different themes. The ‘attributes’ in NVivo were also used; an excel file of women interviewees was prepared on the basis of age, husband’s professions and household income in order to understand the philosophy and experience of the different groups and similarity or dissimilarity in group behaviour.

3.4 Ethics

Following research ethics approval by the University of Birmingham ethics committee field research commenced in Bangladesh on December 26, 2015. Appropriate information about the project was delivered to the interviewees through the Project Information Sheet (PIS) which included the purpose of the interviews, types of people to be interviewed, and the experience and opinion the study wished to research. Interviews were conducted with women, men and community leaders; consent forms (Appendix VII) were used to take the consent of the interviewees before taking the interviews. In the consent form it was confirmed that s/he had read and understood the form properly. S/he had the opportunity to ask questions and have had these answered satisfactorily. S/he agreed to take part in the interview without influence and fear. S/he consented that his/her interview to be taped and his/her quotations from the interview could be used as anonymous sources, so that s/he cannot be personally identified, in publication. It was found that a considerable number of interviewees have no/little education and have low capability to read and understand properly. The consent forms were read to the interview subjects and confirmation sought that they understood every point, following which their signatures were taken. Some interviewees cannot sign a signature and in that case a thumb mark on the consent form was used instead. In Bangladesh, a thumb mark is often

used when people cannot write their names. It is officially used in court when a witness is illiterate and it is also commonly used to register and transfer land and property, and is accepted by the courts as evidence. After taking the consent, the interviews commenced.

I was conscious about the respondents' confidentiality. Participants were informed that their identity would remain in confidence and no one would be able to identify them personally from the research. It was confirmed that their personal details would not be passed on to anyone and that the interview would not harm them in any way. In case of women they were assured that their response would not be shared with their husband or any community leaders. Participants were informed about their right of withdrawal via the interview schedule and Project Information Sheet. Before starting the interviews the participants were advised that if they felt uncomfortable or dissatisfied during the interview, they could withdraw at any time. If after the interview they wanted to withdraw, within a three month period they could do so. Also, it was mentioned that if an interviewee wished to discontinue an interview once started, this was also possible.

Interviews were recorded with the prior permission of the interviewee and the interviews were kept by code so that confidentiality of data was ensured. The information was saved on a password protected and encrypted personal laptop. The Dictaphone and diary were kept in a room under lock and key. Therefore, confidentiality and security were secured and all participants remain anonymous to all others, with the exception of the author and the woman NGO worker who accompanied. She was also asked to keep the information and identity confidential and she did not take any notes or recording.

3.5 Positionality and accessibility

The fieldwork was conducted in a rural area of Bangladesh. Though 80% of the people of Bangladesh are living in rural areas, I was born and brought up in cities. I studied in school and college in Khulna city which is the third largest city of Bangladesh. I completed my Graduation and Master in engineering from the Bangladesh University of Engineering and Technology and completed my MBA in Finance from Dhaka University (top university for general education) situated in the heart of the capital city, Dhaka.

Though I had not stayed in the rural areas in early life, my service experience helped me a lot to gain an insight of the rural people's life. As a civil service officer I had to stay in the rural areas for almost two years when I was posted as the Upazilla Nirbahi officer (UNO) (CEO of Upazilla)¹. I had to travel around the villages, watched their lifestyle, distributed different government aids to old people and distressed women, and also give food, money, house building materials as relief to people at times of natural calamity. In addition, I worked closely with people, especially with women, as I was responsible for coordinating NGOs activities at that time.

One NGO at that time was working on the topic 'violence against women' to find out the root causes of domestic violence. Along with NGO workers, I tried to understand why women are the victims of violence, how it happens and to discover what the victim's suggestions were to overcome the problems. I found lack of communication from the women's side due to two problems; firstly they cannot understand the official Bengali language properly and secondly they feel shy to talk in front of a man.

¹ District consists of three or more Upazilla. Every upazilla has six or more Union Parishad (smallest unit of local administration).

I felt it important to gain their confidence to get proper information. I observed they have a rapport with the female NGO officials. I talked to them in the presence of women NGO officials. Initially they felt shy but they talked comfortably in the course of time.

I had an additional duty as Magistrate and I gave verdicts and sentences of imprisonment on many cases related to 'Eve teasing' (unwanted sexual remarks/advances by a man to a woman in a public place) where the victimised girls and women expressed their memories of incidents without fear. I know the social system and difficulty of conducting interviews with women. From my experience, I knew it would be difficult for me as a researcher to reach women respondents and take their interviews without the help of women. Female NGO officials assisted me to reach the target group of interview subjects and helped in the selection and recruitment of women. The interview schedule was translated into the local Bengali dialect.

To overcome the initial apprehension of the women interviewees, attempts were made to develop an informal relationship with them from the first day when they were provided with information about the project through the Project Information Sheet. I asked them about their family members, especially their children and parents, and every woman talked a lot about their family. This is a useful technique in Bangladesh to encourage informal and relaxed conversation with women because they live far away from their parents and have emotions for them but they cannot communicate with them due to lack of time and money. After a few days, I went to their houses to take their schedule for the interview. All of the women indicated that this was the first time someone had asked for their time to talk with them; they felt honoured. I found it helped me a lot to gain their confidence. One woman accompanied me at the time of conducting interviews with

women respondents. Before starting interviews, I sometimes gossiped, and when it was felt the interviewee was comfortable, the interview started. Many women countered interview questions with their own question in an attempt to gain the researcher's opinion on that matter. However, care was taken to avoid answering their questions directly because it might be against their social beliefs or system. I did not feel any problem with my dual identity (research student and bureaucrat) and no women asked me about it. Moreover, they felt honoured as interviews were scheduled at their assigned time and the start delayed if the interviewee remained busy. At the end of every interview, the women came outside their homes, walked a while to see me off with good wishes for my future life.

I have easy access to any area of Bangladesh because the UNO (CEO) of every Upazilla who are the supervising authority of Union Parishad are my junior colleagues. Moreover, they are the president of the Upazilla NGO committee. Contact was made with two NGOs with the help of the Upazilla administration before commencing fieldwork. People knew of my double identity; though I am a student of a British university they came to know that I am also a bureaucrat. This provided some advantages and also some problems. Initially community leaders and people received me warm heartedly. Easy access was offered without any opposition that would have faced an outsider of this locality. But, it was found that people felt shy to talk to me, especially lower income men who did not feel comfortable initially in conversation. It was felt important to spend time with them to develop an easy relationship. I walked around the locality, especially my targeted fieldwork area after my work. I put on T-shirts and jeans like the young people of this village, attending the 'village fair', purchasing home-made food and sweets and

enjoying the company of children. After some days the men felt comfortable with me and told me many problems with the expectation that I can solve their problems. Though they were informed through the Project Information Sheet that this research was only for academic purposes, some of the men thought I could at least help them to get a gas connection. After understanding their expectations I told them that the research was for my degree purpose and it would not help them to get any energy services if they seek any assistance. The men were provided with an explanation of how the government system works. The practice is they can complain to the local Member of Parliament through the local chairman of the Union Parishad. He can raise the issue with the ministry and ask for a decision. They understood that I could not influence decisions to solve their problems. People trusted me and many of them said many people had told them earlier they would help but did nothing; now they could understand why they had not been able to help them. In this way the confidence of the men was gained. They mixed and talked to me easily though I belong to the middle class. During the interviews, a few men asked for advice regarding many issues, but impartial answers were returned to questions in a tactful manner. The opinions of the interviewees were invited on those issues and when they started talking the topic was changed after some time to intentionally distract them from enquiry.

3.6 Methodological reflection

I. Case study design

There is a common criticism about the suitability of a single case study design in terms of representativeness, validity or generalisability (Simons, 1996; Kennedy, 1979). Flybjerg

(2006) argues that the common misunderstanding of single study design is it is considered less valuable in comparison with context independent theoretical knowledge. Generalization is not possible from single case and it is not suitable for theory building. There may be bias to confirm researcher's preconceived ideas. Theory development is difficult from a single case study.

It was important to choose a rural area of Bangladesh for the case study where women's energy accessibility and energy usage patterns are similar and social dynamics are the same as other rural areas of the country. A representative area was chosen which was effective for the research as the rural areas of Bangladesh mostly have the same social, cultural and economic similarity and people have the same lifestyle. But, the challenge was to conduct interviews with women and also to make them understand the importance of participating in the interviews. When different households were visited for sample selection the men asked why interviews with women were necessary. The men claimed they are the family member who earns money and runs the household. They felt they have better knowledge about the needs of the family and considered their input was sufficient to explain the energy experience of households and wives' experience as well. They were told it was required by the research that interviews were necessary with both men and women living in the household to scrutinise women's experience. The men were assured that all women interviewees would be accompanied by a woman they knew during interviews. In view of the explanations provided, the men allowed their wives to take part in interviews. Community leaders were advised of the research topic during meetings at the initial stage, and all considered interviews with them alone would be sufficient to explain the phenomenon and they expressed positive views about this

research within the locality. In my experience, it is important to know the social reality and communicate with the local people; explaining the importance of the research, addressing their concerns and seeking their assistance will help to overcome the hurdles of fieldwork.

To avoid the bias I have not performed as omniscient narrator. I tried to tell the story as it is found from the field work in order to avoid bias and leave scope for different interpretations. I also have not summarised the main results only, but tried to write the narratives as a whole (Flyvberg, 2006). Besides, I stayed in the field work area and through observation and informal conversation I tried to validate the data I achieved from in depth interview.

II. Fieldwork timing

It was planned to take all interviews during winter, but the winter is short in Bangladesh normally lasting from December to February. Though, more than 70% of the interviews were taken within the winter period, some interviews took place in spring and suddenly the weather changed with hot and humid days like summer. This had the advantage of collecting data more effectively about the summer experience due to changing weather which had not been considered when planning the fieldwork timing. Though I had wanted to capture the summer experience, the summer time had not been considered for conducting fieldwork as the literature is focused on the winter energy poverty experience and as I had been living for two years in the UK I was less focused on summer. During the first stage of taking interviews, people focused on expressing their winter experience and talked less about their summer experience. At the time of carrying out interviews it was found that people mainly focus on explaining their present comfort and discomfort.

During the last stage of fieldwork, from 15th May, 2016 I experienced hot and humid climate and found interviewees focused on explaining their summer experience and they talked less about winter. I felt a researcher needs to do fieldwork at the relevant time if the data/information to be collected is related to a particular time period.

III. Working experience with two languages

It was explained earlier about the importance of taking the interview in the local Bengali dialect. It was laborious and time consuming to translate the local dialect, transcribe interviews and translate them into English. It had been planned to transcribe and translate interviews directly into English but this was found to be nearly impossible for two reasons; one was that some words and jargons were not possible to translate directly.

Another problem was that some unfamiliar words were found and it was felt necessary to consult the local people to ascertain the Bengali translation. In view of this, the interview was transcribed into Bengali with certain words underlined to discuss later with educated local people. It was found these words have connections with social belief, myth or with reality. These words or proverbs provided a better understanding and insight of societal views. It would have proved difficult to transcribe and translate interview dialogue directly into English. It was necessary to repeat the recording again and again to transcribe the interviews and it took several hours a day to transcribe them. Then the interviews were translated into English. As I am familiar with the local dialect and culture of that area and took assistance if the meaning of words or proverbs was unclear, I was able to transcribe and translate the interviews correctly.

3.7 Conclusion

This qualitative research was carried out in order to gain a more in-depth understanding of women's energy poverty experience, to identify the reasons responsible for it and put forward suggestions (if any) to overcome the problem. To do this a case study approach was followed where in-depth interviews were conducted with women, men and community leaders in the local Bengali dialect. Women were able to comfortably express their views and experience in detail as there was not a language barrier. Sometimes, the interviewees used different jargon and proverbs to express their views which provided a better understanding and insight of the problems and their mind-set. The study also used an observation method to gain an insight of the problems, people's mind-set and social reality. It also helped to scrutinise the 'validity' of the interviewee's opinion. In addition, a review was conducted of energy related policy documents, plans and programmes and development activities for women, in order to understand government plans and actions related to energy services. My positionality as a middle class person and civil service officer had an impact on the rural people, from access to the fieldwork area to the data collection process. I was careful and cautious about social dynamics and successfully overcame those hurdles by adopting certain techniques. Comments were never offered on any topic, and an impartial facial appearance maintained even when gossiping. I was a positive listener to the interviewee and gave sufficient time during the interview so that participants could express their opinions comfortably. I showed respect to everybody, especially women, so that they felt honoured and were motivated to express their opinions elaborately. As a result the expected amount of data was obtained and the

fieldwork was successful. The next three empirical chapters are based on the data collected from fieldwork and document review.

Chapter 4

Energy poverty within households and gendered experience

4.1 Introduction

Energy poverty is considered to be the lack of access to modern energy services (IEA, 2010). Inhabitants living in rural areas of developing countries, especially south Asian and sub-Saharan countries, have limited access to modern energy services including cooking, lighting, space heating, cooling, information and communication and energy for earning a living. The limited provision of such services affects their lives significantly, impacting on health, education and income (Practical Action, 2010). Energy poverty has an inverse relationship with ‘Millennium Development Goals’ (MDGs) as energy poverty is considered to be an impediment to achievement of MDGs. The United Nations consider ‘universal energy access’ is a key agenda for global development; without it people are compelled to live in unhealthy as well as polluted environments. Energy poverty also affects land, forests and atmosphere (Practical Action, 2010).

Different definitions, approaches and framework for energy poverty have been discussed in chapter 2.0. In this chapter, the Total Energy Access framework suggested by Practical Action (2010) will be used as the most appropriate framework for assessing multi-dimensional energy poverty at household level. TEA considers six types of energy services comprising cooking and water heating, lighting, space heating, cooling (including refrigeration), information and communication and energy for earning a living. These six services have individual minimum standards and are used to check whether the household has access to energy services at a satisfactory level.

Measures of energy poverty take the household as the smallest unit of assessment.

Previously researchers have analysed energy poverty at household level. However as discussed earlier there is reason to expect that men and women in the household do not have the same use of energy or access to energy services and so energy poverty may not be the same within the household. This chapter will explore this by drawing on interview data and observation collected in the study area in rural Bangladesh.

The chapter will discuss households' energy situation, using the services stipulated by the TEA as a guide. In doing this, it will pay attention to the difference between women's and men's experience. This is the main aim of the chapter. In addition it will consider whether the standards of the TEA model are sufficient to define the basic energy needs of households in the study area. Here the energy needs of households are observed and compared with minimum standards; it also checks whether all energy needs are addressed in the model. Thirdly, this chapter also asks whether the understanding of energy poverty as a lack of affordable, accessible and/or reliable modern energy services and technologies) is adequate or if there are other contributing factors.

4.2 Cooking

This section explains the fuels used for cooking and the reasons for their use, the cooking appliances and methods which are related to the fuel used, and considers the effects on different household members especially women, and the opportunity costs of using these fuels and associated methods for cooking.

4.2.1 Fuel use

Approximately three billion people in the world have little or no access to modern energy services and the situation is worst in rural areas of developing countries and sub-Saharan countries where people mostly use biomass fuel (UNDP, 2009). Fuelwood is considered to be the most used biomass fuel in different regions of the world and it takes the lions' share (approximately 80%–90%) in volume (WHO, 2006; Nankhuni and Findeis, 2003; Parikh et al., 1999; Thakuri, 2009; Wickramasinghe, 2001).

Cooking with modern fuel can help to achieve MDGs; it can reduce poverty through time saving associated with more efficient cooking and shorter time spent in cooking activities and households can use this freed-up time for economic activity (MDG 1); it can improve school attendance as children (especially girls) do not have to go to collect fuel in school time (MDG 2); it can improve quality of life (MDGs 3 and 5), and life expectancy (MDG 4), reduce ill health (MDG 6) and provide cleaner cooking environments (MDG 7) (Practical Action, 2010). If TEA standard for cooking is achieved, the target of the aforesaid MDGs will be automatically attained because it suggests the improved burner for modern cooking system and LPG for cooking fuel.

Inhabitants of the fieldwork area living in the rural areas of Bangladesh have no or little access to modern cooking fuel and exploit indigenous fuel for cooking, based on their own capacity and fuel availability. People mostly use indigenous fuel like cow dung cake (goi), fuelwood, straw, dry leaves, coal, and powder (chohol) for cooking. In this area cow dung cake (goi) is predominantly used for cooking fuel (more than 80%) and fuelwood is used by a few people. Previously, people mostly used fuelwood for cooking as in other developing regions, but the density of the population has increased over time

and private forests and vagar [abandoned places] have been reduced and the spaces occupied by buildings and houses. Now people have to buy fuelwood from markets and prices have escalated due to scarcity; consequently the use of fuelwood has declined.

Previously there were enough open spaces and I saw many trees in this locality. People collected leaves; they dried and used those as fuel. But, in course of time population has increased, open spaces have been occupied with new houses. People cut trees and use those for making houses. Now the fuelwood price is going up very sharply and people have limited income so that it has become difficult for the people to buy fuelwood (Community leader 01).

A, Cow dung cake (goi)

The majority of households use cow dung cake (goi) for cooking. Women follow identical processes to prepare ‘goi’: cow dung is collected into piles; chota (cake) is made by rubbing the cow dung with hands and then it is dried in the sun. It takes one to two hours to prepare sufficient fuel for one week’s cooking.

“At first cow dung is collected and shaped it into chota [cake] by pressing and rubbing it with hands. Ten minutes is required to make ‘chota’ and at least two days is required for drying” (Female respondent 01).



Plate 4.1 Preparation of cow dung cake

Plate 4.2 Dried cow dung cake

People use cow dung as fuel because it is cheap, available and easy to collect. Little attention has been paid by researchers to the efficiency of using cow dung or cow dung cake as cooking fuel in unventilated ovens. The efficiency of cow dung as fuel in comparison with other fuels, especially with other types of biomass fuel, has not been scrutinized.

B. Fuelwood

Households either collect or buy fuelwood and use it as cooking fuel. Fuelwood is mostly collected; women collect firewood from surrounding areas like gardens, abandoned places and from the roadsides. Firewood is also bought when it is not available, especially in monsoon periods, because it is difficult to collect at that time, plus the fuelwood is wet and it is not easy to make fires with it. In addition, there are many

brickfields in this area where fuelwood is burnt during the initial stages of firing with coal. There is scrap fuelwood in the fieldwork area and some households near the brickfields also collect scrap fuelwood from there. Sometimes girls help their mothers and remain absent from school.

“Most of the time, I have to collect alone. Sometimes my daughter helps me”
(Female respondent 13)

C. Straw

Straw as agricultural wastage is left after harvesting of the rice paddy. Women use straw at the beginning of the cooking process to help ignite fires and use it until flames are produced by other fuels.



Plate 4.3 collection of straw



Plate 4.4 dried straw

Straw is collected by households. Straw occurs at the time of processing rice and those who do not have cultivable land help farmers during rice collection and receive straw in return. People collect straw by separating it from the grain in order to collect rice. They do this job by using machines, working day and night for two to three days of the year.

“If I work for them then they give me straw; nothing is free now. Farmers invest huge money for paddy; they will not give anything free” (Female respondent 16).

D. Dry leaves

Dry leaves are available in abandoned places and private forests. Leaves are normally collected from the vagar (abandoned lands) around houses. Sometimes women bring leaves of trees from a distant place; they have to search first in different places before collection because leaves and trees are not available closer to home. Women first sweep the leaves, gather them in a pile and put them into a sack, then put the sack on their head and bring it home. Sometimes, girls assist their mothers in times of collection. Women collect leaves once a day or every other day, as the demand for leaves is high.

“I also collect straw and leaves around us. I have to collect those every day otherwise I cannot cook” (Female respondent 04).

E. Powder (chohol)

This powder is produced from rice husks when rice is harvested. If charcoal is produced from the rice husks and burnt in gasifiers, it produces a blue flame leading to carbon emissions. Chohol produces a huge amount of smoke leading to health hazards if it is directly burnt (Oliver and Hymen, 2012). It behaves like a catalyst that helps to catch fire and expedites the burning, and lessens the need for fuel like goi, fuelwood, straw and leaves for cooking. It is only used with straw throughout the cooking period.

F. Coal

Significant numbers of brickfields are located in the fieldwork area, where coal is burned to make bricks. Burned coal is reused for cooking by poor households. A few households use coal for cooking purposes, especially brickfield workers, because they can access it. Normally young girls or husbands collect this coal. It has to be processed because at the time of collection it is a mixture of coal, soil and sand and needs to be separated first from soil and sand, then washed in water and dried in the sun. After drying, this coal is used for cooking purposes.

G. Gas

Insignificant numbers of people use bottled gas in the fieldwork locality. It is not used for cooking main foods like rice and curry; people use gas generally to warm cooked food and milk.

“I cook three times a day. I cook one time by fuelwood and warm it by gas in the other two meals” (Female respondent 10).

It should be noted here that gas supplied by gas lines is not available in this area. Gas cylinders are sold in the main market, known as Communication and Bridge (CNB) market. People purchase gas with the cylinder for the first time and after that they refill it from shops.

I. Fuel mix

People combine different fuels for cooking, not only to reduce their costs and labour but also in consideration of the availability and suitability of the fuels.

“I collect fuelwood, straw and leaves. We also purchase fuelwood. We collect cow dung from our cattle and make goi, dry it in the sun and use it; it is very painful to prepare goi” (Female respondent 19)

The primary focus of the rural households is to spend the least amount of money for cooking fuel. To do so, a ‘fuel mix’ is very common, not only in poor households; it is also found in the solvent households (who have the financial capability to afford modern fuel) in order to reduce household expenditure for fuel.

We have cattle and prepare goi from cow dung. We cultivate a paddy and get straw. Moreover, we get rice from the paddy by machine and the powder produced named as chohol, we use it. We purchase five to six months of fuelwood and it costs 1200 taka per month on an average. We use gas for preparing breakfast, tea and milk processing. One gas cylinder works for two to three months (Female respondent 25).

Though some households use only fuelwood for cooking by their choice, most people use it as a supplement to cow dung cake due to the shortage of cow dung.

“As I have one cow; cow dung is not sufficient for cooking, I have to purchase lakri [fuelwood]” (Female respondent 02).

Fuelwood is used by most of the women in monsoon periods and the scarcity of fuelwood becomes more acute in the rainy season, because most of the available fuel types become wet or do not ignite properly with the exception of fuelwood at that time. Most of the women try to gather and store firewood throughout the year for the rainy season but the supply is not sufficient to meet demand. Poor people struggle a lot in the monsoon period as they have to purchase firewood at that time. Other than during the rainy season, poor people somehow collect fuelwood, straw, leaves, coal or chohol or buy it from others at a relatively lower price.

If I get more fuelwood, I gather those for the rainy season. I use coal and goi; if it gets wet I use fuelwood from the house. In the rainy season we have more problems for fuel. I cook twice at that time. If there is no fuelwood in the rainy season, I have to buy it; all the time I cannot buy, I have to struggle with my children at that time (Female respondent 20).

J. Collection, preparation and time employed

The average time for fuel collection is not identical; it varies from location to location depending on the distance travelled per trip, geographic location and the availability of fuel, and greater times and efforts needed in the hilly areas (Parikh, 2011). Women living in rural areas of south Asian and sub-Saharan countries have to spend from two to six hours per day to collect fuelwood (Practical Action, 2010). In the fieldwork area, it was found that most of the women use cow dung cake, and a few of them use fuelwood to supplement the cow dung cake. These women collect fuelwood once a week, spending one to two hours per week to do so. A few women depend only on fuelwood; they collect it from gardens and abandoned places; they also collect scrap fuelwood from brickfields. They normally collect it for two to three days per week and spend an average of two to four hours per collection.

I collect those two to three days a week. I go in the morning and come back at noon (Female respondent 03).

It needs two hours, sometimes more for collecting fuelwood and I do it once in two days. Most of the time, I have to collect alone (Female respondent 13).



Plate 4.5 collection of fuel wood

In this area, women are typically responsible for management of fuel; men have little or no idea of how their wives manage fuel. Women prepare goi from cow dung; collect fuelwood, dry leaves, straw and chohol from their surroundings.

Since the most used fuel is cow dung cake, women have to prepare the cake and dry it in the sun. Most of the households have cows and oxen; women mostly collect cow dung and pile cow dung; husbands or other family members occasionally help them. Women collect it two to three times a day. Those who do not have cattle have to purchase cow dung in order to prepare goi as the scarcity and price of fuelwood is higher in that area. However, coal is mostly collected by the men; sometimes young girls collect from the brickfields directly. Generally one hour is required to collect the coal once a week. The

poor households around the brickfield also collect the burned coal. Women have to take on the tedious task of preparation which requires at least two days.

My husband collects coal from the brickfield. I filter and separate coal from soil and dry it in the sun and use it. I am using this fuel for the last nine years (Female respondent 15).

A good number of husbands recognize that the collection of fuel is a difficult job for women but insignificant numbers of husbands help their wives to collect fuelwood, straw and leaves for cooking, they do not even collect the cow dung.

My wife collects those [fuelwood, straw and leaves]; sometimes I also collect. It is difficult to collect for women, I help to collect. I collect from field, crop field and the forest (Male respondent 08).

II. Cost of indigenous fuel

Normally, expenditure on fuel is not incurred for indigenous fuel (Panchauri and Spreng, 2003; WHO, 2006; Practical Action, 2010) but in this area people have to spend money due to the scarcity of primitive fuel caused by over population.

Fuelwood demand is not met by collection as the source of fuelwood is limited; gardens and trees are few in comparison to demand; the scarce supply of fuelwood is covered by purchasing firewood from the market. People normally buy a sufficient amount for a week's use or when it is essential, in piecemeal system, as the people are poor, and not able to buy a large amount at once. The cost of fuel wood is 200 to 300 taka (GBP 2 to 3) per mon (mon is a local unit to measure goods which is equal to 36 Kg). A household use cow dung cake also has to use fuelwood, especially in the monsoon. Normally, for fuelwood they have to spend up to 1000 taka (nearly GBP 8.00) per month. The average

expenditure for a family is about 1500 taka (nearly GBP 13.00) per month if they use only fuel wood for cooking.

We also need four to five months fuelwood which costs 800 to 1000 taka per month on an average. (Female respondent 19)

Nowadays, fuelwood demand and price are so high that nobody can collect fuelwood from the private forests. It is to be noted, there is no public forest in this area. People have to pay if they want to collect fuelwood and leaves from anybody's garden. So, women have to carry out the wearisome task of collecting fuel, spending time and travelling sometimes long distances, and have to pay for the fuel as well.

I have to buy these now; I collect this from the neighbour's garden and I have to pay 200 to 300 taka per month so that they allow collection. Fuel [supply] has a crisis in this area so these are now sold (Female respondent 22).

Cow dung is also sold in this area; poor households who do not have cattle buy it because it is cheaper than fuelwood and the seller allows them to purchase it on credit. Women then follow the cumbersome process to prepare 'goi'. A few purchase goi to avoid the inconvenience of preparation.

I purchase cow dung and prepare goi. One bowl of cow dung costs 10 taka and I purchased 10 bowls of cow dung at a cost of 100 taka. Then I prepare goi and it will work for five to six days. Fuelwood has to be purchased in cash but I can purchase cow dung with credit. The fuelwood cost is higher; cow dung has been sold for the last three years (Female respondent 16).

III. Fuel quality considerations

Parikh (2011) described fuel quality based on two factors: heat value and effort required for handling and ranked fuel as follows, from lowest to highest: (a) dung cake (b)

agricultural residues (c) fuel wood (d) kerosene (e) LPG. He argued that the role of women in cooking declines with the increase of fuel quality while the role of men increases. However the fuels used in the study area are not the same as in Himachal Pradesh and the area studied is a level plain rather than a hilly area. Moreover, in addition to heat value and work load there are also some other factors to be considered, like smoke, time for preparation and cooking. Based on the smoke, heating value, time and labour needs for collection, preparation and cooking, indigenous fuel used in this locality may be ranked from lower to higher quality as (a) cow dung cake, (b) coal, (c) dry leaves, (d) straw, (e) chohol, (f) fuelwood and (g) gas. Cow dung is considered as the most inferior fuel collected and gathered. Women collect cow dung several times a day and pile it into a separate place. The preparation process was discussed earlier and the dung dries in the sun for several days, needs the longest time for fuel preparation and women have to put more human effort into making the dung cake and bear the unpleasant odour of dung. It takes more time to ignite than any other fuel and creates more smoke than any fuel, except dry leaves. Coal is collected by girls and sometimes by men. Though it creates less smoke it generates unbearable heat that is higher than any other fuel and it is most difficult to cook with this fuel. Dry leaves are collected by women. Women first sweep the dry leaves that drop down from the trees, gather them into one place and place in a bag, taking the sack on their head to transport home. It is a time consuming and tedious process. This fuel creates a huge amount of smoke and women need to work hard to keep the flames constant. Straw is collected by both men and women during the harvest period of paddy rice as both work together to collect rice. It creates more smoke than coal but generates less heat. But chohol is produced when paddy is converted to rice

in machines and it is collected by men. Chohol is used in support as a catalyst for straw or dry leaves.

Women have to work hard to collect fuelwood but it is relatively easy to cook with this fuel; it produces less smoke and food can be cooked more quickly than using other fuels. If it is purchased, men purchase firewood from the market and transport it home with rickshaws; it requires less menial work for men to bring those from market. But in the case of access it is somewhat similar in that the role of women declines with the increase of fuel quality and the role of men increases, with some exceptions. Bottled gas is transported solely by men and it is very comfortable to cook with bottled gas. For coal, women have no role in collection where young girls are taking on the task of collection, but women clean and prepare it for cooking, and straw and chohol are collected by both men and women.

IV. Reasons for not using clean fuel

It was noted earlier that most of the definitions of energy poverty state that lack of affordability, accessibility and/or reliability are considered as the reasons for not using clean fuel. These were the case in the fieldwork area but, there are other factors, including some explained below, with respect to cooking fuel

a. Affordability

Bottled gas is available in this area but people cannot afford to use it due to its higher initial cost and costs of refilling. First a household has to buy a cooker and cylinder filled with gas that costs GBP 50.00 initially; this is a one-time cost. The cost of refilling the gas cylinders is a recurring expenditure which costs GBP 12.00 for each refill.

It can be used by the rich and middle class but poor are not able to use these; they can not afford due to lack of money (Community leader 02).

A good number of the inhabitants of this area do not have the ability to afford gas for cooking; people have little income and limited resources to afford gas.

We cannot think for bottle gas as we do not have money to buy it (Female respondent 14).

b. Economy

Both men and women of rich households do not feel using gas is economical for them; they think that the cost of gas is much higher in comparison to other fuels, especially for a large family and/or in situations where households own cattle.

I have to cook soft rice for cattle and also need to cook three times a day for us. This bottle will not be sufficient only for our cattle food. ...Bottled gas is not economical for us (Female respondent 11).

I have the [financial] capability but I do not need gas..... We have to cook rice and varieties of curry; if we cook by gas it will need more than a day but we can cook those within two hours by fuel wood and goi (Male respondent 24).

Like large families, small families who have the ability to afford gas also think it is not economical to cook with bottled gas.

If the cost of gas is less or equal to fuelwood, I could bring gas. (Male respondent 12)

Some women cook once a day with indigenous fuel and warm another two meals on a gas burner in order to reduce the cost of cooking with gas and avoid the inconvenience of making fires with indigenous fuel for other meals.

Now I am using gas in two meals just to warm the cooked food. If I use gas only I need more money; we just reduce the cost by using fuelwood with gas (Female respondent 10).

In spite of being able to afford the use of bottled gas, some women think that using gas will invite additional expenditure and they do not consider cooking with the existing indigenous fuel to be a problem. They have made a choice not to tell their husbands to bring gas for them.

Even in households who possess the financial capacity some husbands decline to bring gas for their wives; they feel it will incur extra cost as they have free energy sources.

“Fuelwood and straw is better. I have no extra expenditure. (Male respondent 24)

c. Experience and custom

In spite of having financial capability, some husbands think that it is unnecessary to use gas because their predecessors used indigenous fuel and they did not feel cooking with such fuel was a problem.

I ask my husband but he says, ‘my mother and aunties cooked [with indigenous fuel], why can’t you? (Female respondent 15)

In joint families, elderly family members such as fathers- or mothers-in-law sometimes make decisions; as they are familiar with primitive cooking systems from their experience they do not feel these present a problem or they do not want to incur new additional costs for cooking.

My mother-in-law does not like it though they have capability. She says there is abundant fuel in the house, why do you want to buy it [gas]? (Female respondent 21)

d. Reliability of supply

Sometimes households do not use gas due to the uncertainty attached to a continuous supply of bottled gas. In this area, the gas supplier takes orders from the households; when they obtain a satisfactory number of orders, they collect them from the town and deliver to the households by a pick-up van. When the gas is finished and requires a refill, households have no certainty of being able to receive a refill when desired; either they have to reserve an extra refilled cylinder that costs an additional GBP 40.00, or wait for certain intervals, sometimes more than a week.

My building would not be dirty and would not need to colour it earlier than usual time if I could get bottle gas at the right moment when I need it. But you will not get gas after it [bottle] finishes; they will come when all bottles have finished in this area. It is not like town, if you call they will come with bottle. It will take 15 days to get gas from them (Male respondent 14)

e. Information

Women have little or no knowledge about the cost of bottled gas. Most of the men and women have heard of, but have not seen, bottled gas; they never tried to use it, or thought of using bottled gas. They have the perception that it is more costly than the remaining available fuels in this area.

I don't know the price of gas. I guess price of gas will be higher. This is my perception; I have not asked anybody. (Male respondent 16)

4.2.2 Cooking Appliances

Almost all households are using clay stoves. A brick-made cooker is rarely found in the fieldwork locality. Stoves are made by households from mud and dried in the sun. It is a laborious process to prepare a stove. Water is added to soil and mud is prepared and then

shaped into a stove by hand without tools. It requires a huge amount of time and concentration. Then the stove is dried in the sun. Women normally make them in the winter season when there is less chance of rain and a higher chance of sunlight.

I use a clay stove. It is very difficult to prepare this cooker. (Female respondent 05)

Two types of stove are used depending on the fuel used for cooking. In order to cook with fuelwood, straw and leaves, cookers are made with one to three openings; people normally use a double opening for cooking and other openings for boiling paddy rice. Large families also use cookers with four openings. Those who are using gas, cook on a single burner.

If the fuel is either goi or burned coal, the clay cooker is slightly different from the aforesaid cooker. This cooker has single opening and steel stakes are attached horizontally as a platform in the middle. Goi or coal is placed on the platform and straw and leaves are fed through the mouth under the platform.

I use the clay oven with steel stakes. (Female respondent 10)

A few male respondents have a little information about the modern burner and solar cooker; they do not have any idea about the price of the cooker but their perception is the price is not affordable for them.

The modern burner and solar burner are here but we cannot afford the cost. I have no idea about the price. I have not seen those yet. (Male respondent 02)

The solar cooker is rarely found in this area. In the solar cooker, sunlight is used as fuel. The cooker is placed in a sunny place, sunlight is collected and heat trapped in a dark pot or in panels on the cooker; as heat is concentrated in a small area it is collected and

intensified. This heat is used for cooking. This type of burner has no fuel cost but needs a significant initial cost. This cooker does not work in dark places and at night. This solar cooker is effective for a tropical country like Bangladesh except during the monsoon season. However, the people of this area are not able to afford solar cookers due to the price. Some NGOs advocate the use of a solar cooker named 'bondhu chula' but it is not ideal for a large family.

I used one bondhu chula which is suitable for small family of one to two members; it is not suitable for joint family of 8 to 15 members. (Community leader 01)

Large numbers of male respondents have never seen nor heard about improved cookers like the biogas burner or solar cooker and do not have any idea about these modern burners. A negligible number of people are using biogas for cooking; some people have an interest in using it but cannot afford to do so due to the high initial cost. In addition, people also claimed that solar cookers are slow and while suitable for a small family are not effective for them.

I have seen the improved cooker. It is good for a small family. It is slow which is not good for us. I have no capability to buy it. I have not asked anybody about the price. I have no need to know as I cannot afford. I do not know if it is either cheap or costly. (Male respondent 18)

4.2.3 Kitchen facilities

Most of the households have a basic kitchen placed outside the house; most of the households use bamboo and straw to form the walls of the kitchen and a small number of households use corrugated iron sheets. Generally, there is no roof to the kitchen. People cannot afford to repair it due to shortage of money. In the rainy season they suffer a lot

and food cannot be cooked until the rain has stopped. On the other hand, some households are solvent; women do not have to cook outside the house or under an open sky as they can repair the kitchen.

My kitchen is half broken. I do not have a roof in the kitchen and I have to cook in the open space. I just cover the cooker with thick paper to protect from water.

When it will rain or storm I shall not be able to cook. I have to wait in the house with the children till the rain stops. (Female respondent 05)

In Bangladesh, rain sometimes continues for several days and women have to cook in the rain with umbrellas to feed the family members, otherwise they would not eat. Fuelwood and burners become half wet at that time and they have to struggle a lot to create ignition and flames for cooking. When rain is very heavy and women have no opportunity to cook, perhaps for one or two days, family members eat puffed rice (dry food) to survive at that time.

Water enters from the top at rainy season. I cook with umbrella at that time. I cover the burner with hard paper. (Female respondent 09)

A significant number of households do not have kitchens; they cook outside the house in an open space. In the rainy season women have to cook inside the house. Women who cook inside the house claimed that they found the process onerous since the house and their clothes become dirty. Cooking inside the house is not safe as smoke and fumes make the house darker and sometimes fires may break out. Indoor cooking not only pollutes the household environment, it also reduces the life expectancy of the house structure and fabric.

I cook inside the house. It creates huge smoke and affects the house. The house becomes dirty with ashes. I sweep to clean. Corrugated sheets are affected and we have to repair house earlier than the normal time. (Female respondent 10)

All households have to use fuelwood in the rainy season because almost all other fuels cannot be used at that time because it is not possible to dry cow dung cake or coal. It is difficult to ignite with those fuels even those have the stock in houses as those become damp in the rainy season. The household either has to purchase fuelwood from market or keep a stock of wood in the house as the only way to manage cooking.

I cook with fuelwood in the rainy season. It is not possible to cook by coal in the rainy season (Female respondent 15).

If people have the ability to construct a kitchen, they build it with corrugated iron sheets or sometimes bricks. They do not have to face problems throughout the year in cooking, except from smoke and dirt.

I have a kitchen made with bricks beside my building. I have a brick-made oven and I cook there also in the rainy season. (Female respondent 24)

4.2.4 Cooking Experience

Cooking is exclusively done by women and so the experience of cooking with the above fuels is the experience of women.

It is harder to cook. Straw and leaves create more smoke than fuelwood but goi creates the highest level of smoke. Leaves ignite quickly but goi takes more time and smoke spreads in all directions. (Female respondent 13)

Women generally ignite the fire using straw and put it inside the burner. To expedite the firing some women use kerosene if it is available in their houses. Women feel that ignition is the hardest part of cooking.

First I use straw and ignite fire with a matchbox. It is hard as it produces a huge amount of smoke. (Female respondent 01)

To ensure the fuel catches fire and develops a continuous flame, women use hollow pipes which they place inside the cooker and blow into by mouth. Smoke affects their eyes, causes eye irritation and tears; it also enters into their mouth and affects their body.

It is difficult to ignite as it produces smoke. My eyes are irritated and I get tears from blowing air to maintain the flames. (Female respondent 05)

A few women blow inside the cooker directly by mouth and face severe consequences from smoke that is more than the aforesaid women using hollow pipes.

I feel huge problems and pains in my heart because I have to blow by mouth to keep the flame continuous. I do not have hollow a stick and I directly blow by mouth. I have to do it continuously. (Female respondent 08)



Plate 4.6 initial stage of cooking with Cow dung cake (goi)



Plate 4.7 last stage of cooking with cow dung cake (goi)

The initial firing process is same for goi or coal; this fuel is laid on the platform made by steel stakes in the cooker in a process that is slightly different from the cooker using fuelwood discussed earlier. Huge amounts of smoke and fumes are produced during the initial stages; it is very difficult to produce continuous flames with goi because it needs more time to produce flames. For the first five to 10 minutes it produces smoke only and then flames are produced. It should be noted here that goi creates the highest amount of smoke for the maximum duration of time in comparison to any other fuel throughout the cooking process. Some of the goi users blow with a haatpakha (manually operated hand fan) to produce and maintain the flames.

I ignite the fire with the help of straw and leaves. To develop flames quickly I add some kerosene. I put goi there and a huge amount of smoke is produced. I put goi in the stakes and straw and leaves are put under the stakes. Ten to 15 minutes are required for producing flame. (Female respondent 11)

In the case of goi, women have to wait to start cooking until the smoke is reduced and continuous flames are developed in order to avoid the odour of cow dung in the cooked food.

If you start cooking within smoke it creates odours. After smoke, flame is produced and smoke is reduced, then cooking may be started. (Female Respondent 11)

Though coal generates less smoke and fumes than goi, cooking with coal provides the worst experience for women because it produces a severe heat that affects women severely. It is observed that unbearable heat is produced in the surroundings of the cooking area and it is difficult to stay in the cooking place even in the winter season; even men have recognized that it is the worst fuel to use.

We have to put coal in the middle and kerosene has to be added for ignition. When ignition starts it produces too much heat as it will burn the top sheets [roof] of the house. We have to keep the burner apart from the house. (Female respondent 16)

It is worse than any other fuels but we are poor, nothing we can do. (Male respondent 16)

Straw or dry leaves produce a huge amount of smoke throughout the cooking time and women have to blow continuously to keep the flames constant. Chohol is used with straw or dry leaves to reduce the volume of straw or dry leaves needed for cooking.



Plate 4.8 Cooking with straw and powder (chohol)

In cases of using fuelwood, after the initial ignition the fuelwood is added into the burner and sometimes continuous flames are developed. If the fuelwood is dry it is relatively easy to produce continuous flames compared to the use of other fuels, especially from goi.



Plate 4.9 Cooking with fuel wood (girls helping her mother)

Cooking with fuelwood produces less adverse side effects than the above-mentioned fuels as women work with relatively less smoke and maintaining continuous flames requires less effort from the women in aerating the fuel in the cooker with puffs of breath.

4.2.5 Indoor air pollution and health effects

Women who mainly cook with cow dung cake as the sole biomass fuel suffer from all the aforesaid diseases; smoke created during cooking enters into the women's bodies through mouths and noses and jeopardizes women's health. Most of the women in the fieldwork area claimed to be suffering from respiratory problems, heart disease, eye irritation, swollen eyes, headaches, coughs, chest pains, and they have claimed that cooking with this primitive fuel is the cause of their diseases.

I feel respiratory problems, gas in my belly and throat pain; my eyes are severely irritated and feel as if pepper is sprayed in my eyes. I have a gallbladder stone as well. (Female respondent 13)

It is very painful. Smoke enters through my mouth and nose. Smoke enters into my nose and it feels as if huge gas is inside my body. I feel breathing problems, eye irritation and headaches, with a sore cough. (Female respondent 09)

Some men have recognized that cooking with these primitive fuels is a problem for women's health, but they cannot help their wives due to lack of money to afford modern fuel.

Cooking creates respiratory problem, heart disease and eye irritation. But I have no capability to bring improved cooker. She has to face problems. (Male respondent 12)

Some other men on the other hand do not consider cooking with this primitive fuel is a problem; they said diseases are the consequence of surrounding environments, not from cooking.

It is not a problem though she has headaches and respiratory problems. There are dust and fumes around our house; one side has a house and other sides are open,

and the brickfield is close to us. The diseases may be more from dust and heat around us (Respondent 13).

Though most of the husbands and male community leaders recognize that the use of indigenous fuel is a problem for women's health, a female community leader also did not consider it a problem.

It is not a problem but smoke creates some problems. Women have to cook with these fuels but they do not face health problems significantly. (Community leader 03)

Besides women and children, elderly people living in the households where biomass fuel is used have a higher chance to be affected by asthma than elderly people living in houses using clean fuels (Mishra, 2003). This finding is very pertinent in relation to Bangladesh as the elderly people are living in households using indigenous fuel, similar to other developing countries.

4.2.6 Children and cooking fuel

A. Fuel collection

Children, especially young girls, help their mothers to collect fuel; they remain absent from school and thus their education is hampered (Practical action, 2010, Parikh, 2011). Some women interviewed during the fieldwork reported that girls help them during the weekend when school is closed, but the community leader advised that children remain absent from class for the purpose of collecting fuel. During observation, it was noticeable that children are collecting fuelwood at the roadside and from vagar [abandoned places].

My daughter helps me to collect fuelwood once in a week when her school is closed. (Female respondent 13)

Children collect the branches of trees and leaves, and remain absent from school. They collect fuelwood from the bamboo bush and give it to their mother; mothers cook with this fuel. (Community leader 01)

The scenario is worse in the cases of girls who collect burned coal or scrap fuelwood from brickfields because women normally do not go to the brickfield area to collect such things. It is laborious for young girls as they have to walk more than half an hour to reach the brickfield and collect burned coal or fuelwood around the burning area. Girls put the scavenged material on their heads and carry it back home by covering the same distance. Normally two to four hours is required for the whole trip.

My daughter Maria collects coal from the brickfield. She gathers it in a sack and brings it on her head; she is only 10 years old. As we are poor, the factory owner gives us the burned coal. We also collect fuelwood from the road sides. We do not buy anything. (Female respondent 20)

B. Health effects

Children, especially infants, are vulnerable to indoor air pollution and affected by biomass combustion as infants are kept with their mothers. It was observed that infants were in their mother's lap at the time of cooking. Children remain in the houses which have no ventilation. They suffer from acute respiratory infections, mainly pneumonia, which can lead to the death of children, especially those who are under five years of age (IEA, 2006). Burning of biomass fuel can lead to infections in the respiratory system (pneumonia) among children (Smith et al., 2006).

Women in the study area claimed that children are affected by smoke created during cooking. Fly ash, smoke and fumes enter into their bodies through respiration and cause respiratory diseases and also affect their digestive systems; this may lead to long-term

illness and health problems in women and children as well. Smoke and dust endangers the health of their children.

It creates smoke which affects my children and me as well. As the food is contaminated by ashes, it affects the children's digestive system. It creates diarrhoea in my children. Children cannot be cured from disease. I face respiration problems. (Female respondent 05)

It creates irritation in the children. I have to bring them to the doctor. (Male respondent 03)

4.2.7 Opportunity costs and cooking fuel

Opportunity cost refers to the issue that there is not only the financial cost of fuel but also the loss of other possibilities may be involved e.g. time lost, pleasure. The use of indigenous fuel may involve different types of opportunity costs. Pachauri and Spreng (2003) argued that using indigenous fuel may not have monetary value but there is the 'opportunity cost' for the time that women spend in collection of fuel.

a. Comfort

Women in the study area experience much hardship when cooking with indigenous fuel. They have a desire to cook with gas or modern stoves and think this will be helpful for them. They consider that gas or modern stoves will remove the drudgery related to searching for and/or obtaining fuel because they do not have to collect and/or prepare fuel for use in cooking. Moreover, they envisage it will reduce their workload for cooking and their work will be easy and simple, thus they can cook happily.

I could cook easily and no black ink would be in my hand. I do not have to struggle and I could be happy. (Female respondent 04)

We have to search more to get fuelwood, huge pain. (Female respondent 07)

Cooking would be faster and easier if they could cook with gas or modern cooking burners. Sometimes, women avoid cooking due to scarcity of cooking fuel and the drudgery related to cooking. If they could cook with modern stoves or gas they had not to face smoke and fumes so that they could cook and eat fresh food as required especially in summer. It should be mentioned that in summer, they have to eat panthavat (water is added to cooked rice and eaten in the next meal) and earlier cooked curry; sometimes it becomes sour when reheated for the next meal and wasted.

I could eat properly; I could eat fresh meal. Curry is sometimes wasted due to hot weather. Gas can remove my pain. (Female respondent 17)

b. Cleanliness

Cooking with indigenous fuel produces fly ash which dirties clothes makes the household environment dirty. Interviewees feel that it increases the family need to spend more time and money for washing clothes because they have to spend more on soap and detergent and more time and human effort is required for washing as this task is done manually by women. They think that a modern cooking system may reduce the dirtiness and thus require less money for washing clothes as it would alleviate fly ash and smoke from the home.

Clothes would not be as dirty as present. Cooking with fuelwood makes the dress dirtier, needs more soap and detergent that ultimately increase expenditure. (Female respondent 07)

c. House renovation

Smoke reduces the life of the building and people have to renovate their houses earlier than the normal time of refurbishment. Most of the houses are made with corrugated iron

sheets; the life expectancy of those houses is at least 10 years but in the fieldwork village many of the houses have to be repaired earlier than the expected time.

Fuel wood produces smoke and makes the house dirty. It reduces the life of the house. (Male respondent 25)

Renovation incurs a significant amount of money; the price of one bun² corrugated sheet is GBP 90.00 and for a very small house at least two bun corrugated sheet is required that amounting GBP 180.00. If they could use clean fuel, they could not have to spend the additional cost for renovation earlier than the normal time. This is especially a problem for burned coal users whose houses need repairing earlier than other fuel users.

House remains good 5 to 6 years, maximum 7 years. Our house has to repair earlier and have to spend more money than others. (Women respondent 09)

It creates smoke and affects our house; the sides of house are burnt. We have to change these after one to one and half year. Thus we have to spend additional money of 4000 taka (GBP 35.00) for renovation. (Men respondent 19)

d. Health and medication costs

Health affects for using the indigenous fuel have already been discussed in section 2.9.

Women feel that their health problems such as heart disease, respiratory problems, gastric upsets, eye irritation and coughs will be cured or removed if they could use modern cookers with clean fuel.

If I get gas, my heart disease may be reduced (Female respondent 02);

² seven pieces of corrugated sheets (10ft by 2 ½ ft per sheet)

I can overcome gastric, eye irritation and respiratory problem will be reduced
(Female respondent 13)

The advantage is I can save myself from eye irritation and pain. I do not have to blow for flame. (Female respondent 21)

Fuelwood produces smoke and I feel respiratory problem; if there were gas I would be fine. (Female respondent 24)

Some husbands also recognize that health problems would be reduced and that they would have to spend less for doctors and medicine.

At least, the cost of doctor would be reduced due to [removal of] dust and dirt.
(Male respondent 03)

As discussed above, children's health is also affected by smoke and lack of freshly prepared food. Sometimes, men do not want to bring their children to the doctor due to shortage of money and consequently this creates tension and quarrels between husband and wife.

Panthavaat [cold, previously prepared food] brings cough and cold for my kids. We have huge pain; we have to bring the kids to the hospital. It again needs money. When any child becomes ill, we husband and wife quarrel between us. I say to him, 'the child is ill; why you do not take him to a doctor. (Female respondent 05)

e. Safety

Indigenous fuel may be dangerous to use because fire may break out at any time if somebody is careless. Fire may take place for using gas or modern burners but the chance of occurring fire is less as compared to these primitive fuels. It is a challenging job to extinguish any fires as the houses are mostly built of straw and corrugated sheets that are

more vulnerable to fire than buildings of brick or stone, and the fire service is far away, at least 20 kilometres from this village.

Sometimes fire has burnt houses and crop fields in this area. The fire is extinguished by water from buckets and sometimes by water lifted by motors [machine]. Accidents may occur but gas has less chance [of causing fires] if everybody is careful. If you switch off the key, then gas is no problem (Male respondent 20).

f. Productivity

Modern cookers may reduce the time spent on cooking activities by women, allowing them to spend this time on other work, leading to enhanced productivity in women.

“It also would save my time and I could do other work at that time” (Female respondent 06).

Modern cooking system may reduce the work load of women; women can use their saving time in income generating activity that will improve women’s economic potential (Practical Action, 2010). It has a positive impact on gender development as women’s income can improve their participation in household decision (Cecelski and CRGGE, 2005; World Bank, 2007).

g. Fuel cost

If there was a supply line providing gas as an alternative fuel in the area studied households would spend less money for cooking fuel than is currently spent on fuelwood. In addition the price of fuelwood would be reduced. Women respondents think that fuelwood is now sold at an inflated price as there is a high demand and supply is limited;

people have to buy fuelwood at a higher price due to the absence of alternative forms of fuel such as gas.

“If it [gas] were available like in other areas where the bill is fixed and it is 500 taka, I could use only gas” (Male respondent 13)

“It will also control the price of fuelwood as [fuel supplies are scarce] due to lack of gas” (Female respondent 07).

“Fuel is costly, moreover it is difficult to bring and ignite” (Male respondent 15).

Men think if they could pay less money for fuel from now, they could spend this money to meet other important needs; such as for their children’s education and wellbeing.

“I can save the expense for fuelwood... I have a child study in school; I can give this money for private tuition, so that his result will be better. I cannot give clothes to my children.” (Male respondent 04)

“The money saved from fuel purchase could be used for other purposes. I could save money after a year. Now everything is spent.” (Male respondent 19)

h. Income opportunities

Male interviewees think that they could earn extra money by letting houses and shops to newcomers as people do in the adjacent areas where the gas supply line is available. They believe that migrating workers from outside would need to rent a house, but due to lack of a gas supply do not stay in the area. Instead they rent property in Sorail (it is a upazilla under which the village situated) where gas is available and have to spend time and significant amounts of money for transportation though they could rent a house at less cost in the study village. If the inhabitants could let their houses, they could build new

houses and shops for business as in Sorail and their economic capability could be improved, but due to the lack of gas they cannot create this opportunity.

“In this area we cannot rent properties as we do not have gas.... I can easily earn GBP 90.00 (10000 taka) per month. How much gas will burn? I could save seven to eight thousand taka and I can keep my family easily with this income” (Male respondent 25).

“We could develop ourselves and this area would be developed. People will also give us value. Public do not want to come and stay here” (Male respondent 25).

Due to the lack of a gas supply people are not interested in building industries in this area, though the infrastructure and cheap labour are available. Though there are some brickfields and a female-based sewing factory located in the area, entrepreneurs do not come here to establish factories.

“Nobody tries to build industry due to lack of gas” (Male respondent 25)

i. Honour and prestige

People argued that they are now in a humiliating position in their villages due to lack of a gas supply line. As there is no gas in the area, parents do not wish their daughters to enter into any marital relationships with men from villages here as they do not want to put their girls into the drudgery of cooking with indigenous fuel.

“They say, ‘we are not interested to give [daughters in] marriage in that area. Our daughter will not be able to cook without gas. We shall not give [approval for] marriage.’ We get shame there. Now gas becomes a matter of prestige for us”
(Male respondent 24)

k. Migration

Many people in this locality wish to move to the neighbouring towns, especially those

who have relatives living in the town or have enough money; women encourage their husbands to migrate to the town to remove them from the drudgery and smoke involved in cooking with primitive fuel. If there were clean fuel, people might have fewer tendencies to migrate to towns.

“It is injurious to health. My wife wants to go and live in town to get rid of smoke. If we get gas, it would be fine” (Male respondent 23)

1. Children’s education

Children education is disturbed as they remain absent from school for the collection of fuelwood to help their mother for cooking, as discussed in section 1.9. If there were modern cooking arrangements, children’s education might not be hampered.

“It would be helpful for children [if there were access to modern energy services] as they help me in time of [fuel] collection” (Female respondent 12).

Though opportunity costs affect the households, women have to face more adverse consequences in the case of comfort, cleanliness and medications. Women normally stay more time in the houses than men; they face more cooling and heating need in time of summer and winter respectively. Dirtiness has more adverse affects for women as they have to give more effort than normal; they have to clean clothes manually more than usual need and sweep the house more than once everyday. Women’s income opportunity is more curbed than men; men normally work outside the house but women could earn by working at home if conditions were better.

4.2.8 Perceptions about indigenous fuel

People have different perceptions about the cooking fuel commonly used in the fieldwork area; most of them recognize it as a problem but they accept the situation as they do not

have alternatives. Some who have the ability to afford a modern cooking system have different feelings; some feel that using primitive fuel is not a problem and others recognize it as a problem but they use such fuel in order to save money. Women who are responsible for the collection of fuel and cooking have the desire to cook with modern cookers.

Most of the women, men and community leaders consider that cooking with the existing sources of fuel is a problem for women, but they have accepted it mentally as they have no other economic sources of energy and no alternative way.

“It is a problem for women to cook with the existing energy source but women have become habituated with this system; how then can we escape it? They have no alternative way. They have to do it with hardship” (Community leader 02)

A few households have the capability to use an improved burner, solar cooker or bottled gas but the men do not recognize using primitive fuel as a problem. They think as such practices were carried out by their predecessors it should continue for their wives.

“It is not a problem; we are using this from our predecessors’ period and become habituated with this. Smoke is produced but it does not matter. It does not affect eyes as it becomes a habit. We can sit easily in the smoke and it does not matter. Women do not have diseases” (Male respondent 24).

4.3 Lighting

This section discusses lighting which is the second essential energy service stipulated by the TEA framework. As good quality lighting requires electricity, it starts with discussion of electrical supply and connection. It then discusses alternative means of lighting, costs, quality issues and opportunity costs of poor lighting for women and other household

members.

4.3.1 Electricity and lighting

Electric lighting can help to achieve Millennium Development Goals; it can reduce poverty as well as hunger by creating opportunities to work at night (MDG 1), improve educational opportunities of children (MDG 2), reduce danger related to children and women (MDG 3 to 5), improve health care facilities (MDG 6) and reduce carbon emissions (MDG 7) (GNESD, 2007; IEA, 2010; Practical Action, 2010).

In Bangladesh, rural areas are electrified through extension of the grid by rural electricity cooperatives managed by the Rural Electricity Board (Palit and Chaurey 2011). About 42% of the total population of Bangladesh has access to electricity whereas 28% of the rural people have electricity coverage (IEA, 2010). The scenario of electrification of Bangladesh is improving at a good pace; now the rate of electrification is about 60% and nearly 38% of rural people have access to electricity (Power cell, 2016). In the field work area there is mostly grid coverage but everyone household has no electricity connection. It is to be mentioned no solar panel was found in the field work area. The households of the fieldwork area use electricity, kerosene lamps, candles and/or charger lights (charged from the grid electricity when power supply is available) for lighting

A. Electricity connection

As in other rural areas of Bangladesh, the ‘Bangladesh Rural Electrification Board’ (REB) is responsible for electricity distribution in the fieldwork area through grid extension; to use electricity households need to take connections from REB. Households have to pay connection costs and provide a record of their entitlement and possession of

the house (known as the 'Record of Right' (ROR)) of the applicant to the REB. It is a document issued by the Assistant Commissioner of the land office of that area under the Ministry of Land in favour of the land owner; it is the proof of entitlement and possession of the above-mentioned land.

Access to electricity depends on affordability. To obtain a connection to the electricity supply the household has to pay GBP 40.00; it includes the price of a meter, wiring and management fee. A significant number of households cannot afford this amount of money because they are poor farmers or day labourers and can earn only GBP 2.00 to 3.00 per day. They feel it is difficult for them to gather and pay this amount of money to take a connection.

“People cannot use electricity because of the initial cost of meter connection, as I cannot” (Male respondent 05).

“I cannot take a meter as it needs a huge amount of money at one time” (Female respondent 17).

The problem is not always affordability; people cannot access electricity due to no electricity network in some areas. A residential area has been developed in the fieldwork area in the last couple of years where people have the capability to take electricity connections, in that they can afford the cost that would be incurred, but they have no accessibility because REB has not extended their lines yet.

“We are not getting electricity connection after applying to REB. We have buildings in this side and we all have capability” (Male respondent 14).

Besides affordability and accessibility, negotiation with family and community members is important to access an electricity supply. It is observed that cultivable lands are distributed but house holding is not separated among the successors. According to the

connection guidelines of REB, one holding needs one meter. Living in the same holding number is an opportunity for the co-sharers; households can share the connection costs on a pro rata basis and can pay less for connections by sharing the bill in the same way.

“We have electricity connection that is taken by three families collectively”

(Female respondent 11)

On the other hand, every co-sharer may not have the financial capacity to pay pro rata amounts for connection; some households have sufficient finance but cannot access electricity due to the inability of the other households to pay their share of the cost.

“How can I arrange the expenses? This land has four co-sharers as it is the property of my father and uncles. It will be difficult to show the ROR of this land which is essential for electricity connection. They do not have the capability”

(Male respondent 11)

Conversely, there may be disputes among the co-sharers of holdings. At the time of inheritance property distribution there could be conflicts of interest, where everybody wants to get the best cultivable land and house that lead to quarrels and tension among them. If someone is more influential, he could take the maximum portion of the facilities or not give a proper share to others. It may lead to conflict among them and they cannot negotiate amicably to take an electricity connection collectively despite the ability of the household(s) to pay for a connection.

Poor households who are not able to afford connection costs can access electricity from their neighbours if they have good relationships and have negotiation skills; they can take extension lines from them on a monthly rental basis. But, rent is not possible if the neighbour has no electricity connection or declines to give access to an extension line.

Though REB gets revenue, it is not a legitimate connection.

“I have taken connection from my neighbour and am using electricity” (Female respondent 10).

B. Security and reliability of electricity supply

Accessibility, affordability and relationships and negotiation with community members may ensure the provision of an electricity connection but an uninterrupted supply of electricity is not guaranteed. People have experienced ‘black outs’ which is termed as ‘load shedding’ managed by REB due to huge ‘demand gaps’ as the demand for electricity throughout the country is higher than supply (production). ‘Load shedding’ refers to the discontinuity of electricity supply for a certain period, normally one to two hours in a particular area, and all areas, both rural and urban, have to experience load shedding by rotation; it frequently happens in the evening when the demand for electricity is at a peak, though sometimes people experience it in the day time.

Taking rental electricity from neighbours is illegal; therefore there is no guarantee of continuous use as it may be disconnected at any time, either by REB or by the provider households. REB officials will disconnect extension lines at times of inspection and the inspection team may come at any time. Moreover, REB will fine the provider household for allowing this illegal connection, or may disconnect the provider’s line. Sometimes, provider households disconnect the rental line from fear of receiving fines.

“I have taken electricity connection from neighbour. If officials come, they will disconnect it” (Female respondent 10)

4.3.2 Kerosene use for lighting

There is a debate whether kerosene should be classified as a clean fuel or not (Lam et al., 2012; Pal et al., 2004; WHO 2005) but it is suggested for use as replacement for biomass

fuel where clean fuel is not available. The quality and effectiveness of kerosene for lighting is inferior to electricity, and it is poisonous and explosive in nature (WHO 2005). The use of kerosene in traditional devices causes emissions of carbon monoxide (CO), nitrogen oxide (NO_x) and sulfur dioxide (SO₂) which may cause lung disease, TB, cancer and asthma (Lam et al., 2012). Though kerosene burnt in traditional lamps gives poor lighting with non-uniform service, it is found that the efficiency and effectiveness of lighting can be improved by improved kerosene lamps which also give off reduced carbon emissions (Pal et al., 2004).

People use kerosene lamps instead of electricity when they cannot afford the connection cost for lighting or cannot take a connection from their neighbours, or there is no electricity in their area. Moreover, some households are not willing to take a rental connection because they feel that they do not have the capability to pay a large amount of money once a month for electricity. These households do not have monthly or weekly fixed incomes and they cannot save money because when they do obtain money, they have to meet other priority expenditures like food, clothes, medicine, rather than electricity. They use kerosene because they can purchase it in a piecemeal system; they buy small amounts if they have money, if not they remain in the dark.

“I use kerosene as I can buy it at any amount at 5 taka to 20 taka (4 pence to 16 pence) depends on my daily income.....Electricity is advantageous in all respects. You can use fan and light as well” (Male respondent 05)

Households who can afford to will use kerosene to provide light for four to five hours per day. Others cannot afford to use kerosene as much as they wish and so restrict to two to three hours of lighting, mostly for their children’s study. Some households cannot afford to buy kerosene regularly and so their usage is very limited. They normally try to take

dinner as early as possible; in the evening they only use light to take their meal, they put out the light as quickly as possible and go to bed to cut down the kerosene cost.

“Normally we illuminate depends on the availability of kerosene. When kerosene is in house we illuminate, if not then we live in darkness” (Female respondent 03).

4.3.3 Lighting mix

Households who are able to both access and afford electricity primarily use electricity for lighting, but due to load shedding (blackouts) they cannot rely only on this. During blackouts they have to use candles, chargers or kerosene lamps for lighting.

We use electricity. We have two fans and three lights. Power failures are frequent; see, current is off just now. In the evening, black out is a regular phenomenon. We use a kerosene lamp in times of black out. We need 1 kg kerosene for three to four days when power failures are very frequent (Female respondent 25).

4.3.4 Cost structure

The average electricity bill for one light is 60 taka (50 pence) per month for five hours per day of lighting; sometimes it may be higher depending on the usage. Electricity users with rented lines from neighbouring households are paying more than the original bills pro rata for their usage; the provider households exploit the opportunity and recover extra money from them (typically 30%–50%).

Load shedding increases the cost for lighting for all electricity users because they have to use kerosene to supplement lighting at that time; to provide one hour of light the cost of electricity is less than that of a kerosene lamp. In summer, the electricity supply is disrupted more and people have to spend more extra money for kerosene at that time than during the winter.

I have to pay 60 taka [per month] for lighting. If load shedding occurs at night we have to use a kerosene lamp; it costs 5 taka per day and 150 taka per month on an average. It is extra expenditure, especially in summer and we have no way to escape this additional expenditure. In December (winter) I had to spend 50 taka for kerosene, as the load shedding was nominal (Female respondent 07).

Electricity bill for one light and one fan is 200 taka [per month]. In addition, I need 2 to 3 kg kerosene costs per month for black out. I need to spend at least 100 taka for kerosene. (Female respondent 14)

Poor people who have no access to electricity are paying more for lighting than electricity users. The average electricity bill for one light is 60 taka per month; even the households who use a rented electricity line from a neighbour have to pay a maximum 100 taka per month. But the poorer households have to spend between 300 to 600 taka for kerosene if they want to provide illumination for two to three hours at night.

“I need 15 to 20 taka’s kerosene everyday on an average (taka 450 to 600 per month). Price of kerosene is higher, I only get 250 gram by 15 taka” (Female respondent 08).

4.3.5 Quality of lighting

A kerosene lamp provides 11 lumen which is very low in comparison with lighting by electricity because a 100 watt bulb can provide 1300 lumen in addition the insufficient level of lighting of kerosene lamp is not safe for study, work or amusement (Practical Action, 2010).

Accessibility and affordability do not ensure lighting by electricity at all times; almost every household including electricity users has to use kerosene to some extent for lighting due to blackouts. The households with their own connections can use electricity according to their demand except during load shedding time. But, rental electricity users

cannot use lighting as per their demand and choice. Supplier households set up guidelines for use and poor households have to follow their instructions.

“[The provider from whom] I have taken connection; he asks me not to use light more. He says ‘do you keep lighting till the morning?’ They want to me to switch off as early as possible” (Female respondent 09)

People using only kerosene for lighting are unhappy, both for the insufficient level of lighting quality and the quantity of lighting hours and argue that they are living with darkness or insufficient light and their children cannot study properly.

“How can I be happy? Children study and I have to sit with them. We feel dark”
(Female respondent 03)

“I am not happy with this lighting; it is painful as the light is insufficient and not bright for children to study. Kerosene is not good but [I have] no way [out] as Allah put us in this position” (Female respondent 08).

4.3.6 Other limitations

Sometimes electricity bills create tension; inhabitants complain that bills are not sent regularly; REB sends bills after two to four months. When an aggregated bill is sent it becomes a burden for some people. Moreover, people have to pay at a higher rate for the aggregate bill because aggregated bills normally come to more than 500 units; for over 500 units of usage the electricity rate is higher. If the bill is sent every month it would be less than 500 units and people would not have to pay more.

People have to pay 5 taka per unit up to 500 units If the bill comes after some months, the total unit becomes more than 500 units and public have to pay 8 to 10 taka per unit; they have to pay more which is another burden. This is the irresponsibility of power department but people have to pay extra (Community leaders 01).

When the accumulated bill is sent, households cannot pay the aggregated and inflated bill in a timely manner and the power department takes action to sue the meter owner. It is a big problem which causes much annoyance.

Sometimes REB claims for extra units on the bill without checking the meter reading; people go to the office and tell them to correct the bill. But, the meter reader does not come to their residence and the bill is not corrected. People are compelled to pay the bill, otherwise REB will disconnect the line and take legal action against non-payers.

“If we go with the problem as public representative, they say pay the bill first. The question is, ‘why shall we pay the extra bill?’ They say pay bill, they will see later. No way to reduce the bill which has already been given to you”
(Community leader 01).

“My husband purchase bamboo and produce products with it. After, we switch off the light.” (Female respondent 12)

4.3.7 Lighting and opportunity costs

a. Children’s education

Electricity can improve children’s education after evening (IEA, 2010). Now their education is hampered without electricity. Children cannot see properly with the insufficient light of kerosene. Children living in electricity using households are also partly affected in times of load shedding.

“If we could get electricity, everything will be seen as crystal clear. Children can study properly. Using the light of a lamp, children are not able to see the letters properly now” (Women respondent 03).

b. Other housework

Clothes and houses might be less dirty if they could use electricity because kerosene produces fly ash and makes clothes dirty. As noted earlier, this adds to cleaning time and expenses.

“Clothes and buildings might be less dirty if we had electricity. If I use a clean shirt, it will be dirty and have black spots due to the lamp” (Male respondent 14)

In addition, interviewees said that clear lighting would enable women to cook at night and eat warm food at dinner.

“If I had my own meter [electricity connection], I could use light all the time and could cook at night; now I have to cook at daytime for dinner” (Female respondent 09).

c. Economic activity

Electricity after evening can improve women’s economic activity (IEA, 2010; Practical Action, 2010). If people could access electricity at night without load shedding, they could undertake work to generate income; women could sew clothes, and men could make sofas and agricultural products. They could earn some money that could improve their economic position.

“We could sew clothes in electricity at night and could earn and spend more. But in kerosene I could not see clearly and cannot sew at night.” (Female respondent 15)

“I cannot do anything with insufficient light. I could make something with bamboo and I could earn. In daytime I have to do other work” (Male respondent 18)

d. Safety

Electric lighting could improve the safety and security of the households; people could see their surroundings clearly and could move fearlessly. Moreover, thieves could not easily enter the houses at night.

“If we could get more electricity, we could illuminate outside the house and we can see clearly inside and outside the house. If a snake comes in the dark, we cannot see. There is a risk of snakes in this area.” (Male respondent 12)

“If we get more lighting we could move freely” (Male respondent 21)

4.4 Space heating

Space heating is identified as one of the six modern energy services by Total Energy Access (TEA) where a minimum daytime indoor temperature of 12 degrees Celsius is recommended, but a minimum night-time air temperature is not suggested. The importance of heating is observed from the winter experience of the people of Bangladesh

A. Heating arrangements

Heating can promote gender equity and empowerments (MDG 3), reduce child mortality through improved maternal health (MDGs 4 and 5), reduce child mortality, support universal primary education (MDGs 2 and 4) and contribute to environmental sustainability (MDG 7) (Practical Action, 2010). But in the fieldwork area houses do not have arrangements to keep the houses warm. Moreover, people feel colder as chilled air enters and pours through the holes of the houses. People feel if they had electricity and heaters, they could keep their houses warm, although the structure of the houses would

mean that heat retention was still a problem.

“How can we keep warm in our house? We have nothing. If you have current and heater, you can.” (Male respondent 03)

“We have nothing to keep our house warm.” (Female respondent 14)

Families rarely use heaters to keep their house warm. These are electric heaters used as open coil and power of the heaters is normally 1 to 2 kilo watt. If anything like clothes or paper comes in contact of it produces fire. Using this type of appliance for heating inside the house is very risky because children may be burnt if they put their hands in it or if there is any type of negligence at the time of use, fires may break out and houses may be burnt.

“I have a heater which is normally used for cooking in the town. I switch it on and the house becomes warm. I keep them [children] apart from this. I also can warm clothes, food or cook” (Male respondent 10).

4.4.1 Winter experience

Despite being a tropical country, Bangladesh has cool temperatures in winter especially in higher regions. The daytime average temperature is 15-20 degree Celsius and night time temperature is 10 to 15 degree Celsius (BMD, 2016). This temperature seems to be comfortable for the people living in European countries but in Bangladesh winter is short, only for two months. The rest of the time people observe 25-38 degree Celsius. When suddenly winter comes they feel colder. Their houses do not have insulation being made by bamboo and corrugated sheet. During the field work, sometimes it felt that in the night the feeling was as if staying outside the house.

People wear warm clothes to protect them from winter temperatures; most of them buy warm clothes from street stalls.

“I purchase old clothes from the shops and wear those. I try to overcome cold with these old and porous cloths. The cloths are sold in the road and I purchased these from there.” (Male respondent 03)

Women use long clothes to wrap their body if they do not have good jumpers to put on. A good number of households do not have mattresses, duvets or sufficient blankets to protect them at night during the winter; they use katha (made by stitching old cloths) to supplement blankets.

“In daytime some people use jumpers. We cannot afford jumpers. I cover my body with long cloths. I do not bother whether it protects me in the winter; as something has to be put on, I use them.” (Female respondent 01)

The roofs houses are mostly made of corrugated sheets and the walls the houses are made with bamboo and straw, and the conditions of the houses are not good. As there are holes in the walls and roof, cool air easily enters in the house. Some houses are half broken; people are not able to repair the houses due to shortage of money. Air enters easily and people feel cold at night.

“Our house is half broken [poorly made] and cool air enters very easily. I cannot sleep because of the intensity of chilled air.” (Female respondent 08)

I. Daytime experience

a. Men’s experience

Most of the men in the study area are farmers and farming is mostly undertaken in the winter. Nowadays most of the farmers cultivate land by machine; they plough land by tractors and water by pump. But there are still a few poor farmers who do the agricultural

work manually, they plough, water, prepare the land and plant by hand. They have to start work in the very early morning and they try to complete the work before noon to avoid the heat of sun. When they start work it is still dark; they feel very cold due to chilled air and lower temperature of the early morning.

“We pass winter with hardship. I go to work for others, feel very cold, my body jerks for cold. What should I do? I have to do this for survival!” (Male respondent 01)

Day labourers and farmers often have to work in mud and cold water; they remain wet throughout the working time and take showers with cold water after returning home, because they do not have the capability to heat water; according to their testimony consequently sometimes they become ill. People feel colder when they use chilled water, especially in the morning and think if they could use warm water, it would be more comfortable for them.

I think the whole day our body remains wet in winter. We have to work with mud and sediment. Our dress up to the leg and knee is full of mud and the full body becomes wet due to the spray of dirt. I normally suffer from colds and have to go to the doctor.” (Male respondent 04)

“My hands and legs are twisted for cold... Those who have the capability can use warm water; they can warm water but I have no capability.” (Male respondent 16)

On the other hand, brickfield workers like winter because they can work comfortably near the burner; at that time they do not need jumpers or warm clothes to protect themselves from winter cold. A few men work as drivers, shop keepers and construction workers and have a good income so can buy good warm clothes; they do not feel any problem from cold in the daytime.

“I wake up early in the morning at 6 a.m. I go out for work, I enjoy winter. I use warm clothes like a jacket, jumper. I do not feel cold is a problem.” (Male respondent 18)

b. Women’s experience

Though only some men who are involved in manual work feel colder in the mornings, most of the women experience cold in the mornings. Morning is treated as the colder part of daytime by women. Women have to wake up early in the morning to prepare breakfast for their husbands because farmers, day labourers, construction workers, drivers and rickshaw pullers have to go out to start their jobs early in the morning. Women normally start work in the later part of night when the sky remains dark. The intensity of cold is higher too at that time and women have to deal with cold water as most of the households do not have enough energy or fuel to boil water. Some households have sufficient indigenous fuel but it is too time consuming to warm water with it so they use cold water. As most of the houses are made by corrugated sheets or straw, these houses cannot absorb heat from sunlight, and are cooler than brick built buildings. The room temperature of these houses is the same as the outside temperature, which is often less than 10 degrees early in the morning. Women indicate that they become more ill in winter than in summer.

“In the early morning when I use water of the tube well, I feel it like ice. I do not warm water; it could be comfortable but I have fuel problem and it takes more time” (Female respondent 17).

“I use cold water in morning and evening so that I catch cold, cough and sometimes fever. I go to doctor for medicine.” (Female respondent 24)

When the sun rises, the intensity of cold is reduced; women sit in the sun with their

children to feel comfortable.

“In daytime it is better as the sunlight is available at that time. I bring my children outside the house and sit in the sunlight.” (Female respondent 05)

II. Night experience

Unlike daytime, the night experience is same for everybody living in the household. In the evening, households make fires with straw and leaves outside the houses to get some warmth but they feel colder after the fire is put out. Some households cannot arrange this temporary warmth due to the shortage of straw and leaves.

“Before sleeping we make fire with straw and leaves to get warm in hands and body. After that we go to sleep. Fire cannot be made inside the house, we do it outside. Then we come back and sleep.” (Female respondent 05)

“We cannot arrange fire to get warm outside as we do not have enough fuelwood, straw and leaves.” (Female respondent 07)

Unlike in the summer, men do not stay and gossip in the market after evening. They come back home in the evening, take food and go to bed as early as possible.

“You will see people gossip in the market in summer but in winter you will not find a single person there. Everybody returns to home and goes to sleep early with blankets, duvets or katha.” (Male respondent 02)

Most of the householders do not have duvets, blankets, mattresses and beds. They lay on the floor on chatai (made by bamboo slices), placing straw under it to get some warmth and cover their bodies with katha.

“We do not have money to protect us from winter cold; just sleep on the floor by covering body with old katha.” (Male respondent 02)

More wealthy people who live in brick or concrete buildings rather than houses with

bamboo and straw walls feel less cold than others because the construction of the house is better. They also have blankets and duvets, and feel relatively better.

“We live in a building and we have duvet and blankets; we feel less cold inside the house. We sleep at 10 to 11 p.m. We feel colder. After sleeping I do not feel too cold.” (Female respondent 21)

Children and old people need more warmth but they wear the same cheaper or older warm clothes as the young people living in the same houses with them, as a result, they feel colder than young men and women. Sleeping on the floor, children become more ill than adults as they have less immunity.

“Old people and children are more vulnerable to winter.” (Community leader 02)

“Children feel colder; they wear old clothes. In winter children usually become sick.” (Female respondent 14)

“It is difficult to sleep on the floor. Kids are easily caught by cold; I also caught by cold. We have heavy hardship in winter season.” (Female respondent 05)

4.5 Cooling

Cooling can reduce child mortality and improve maternal health, prevent the spread of malaria, HIV/AIDS and other diseases (MDG 4 to 6) and help to achieve MDGs (Practical Action, 2010). There are no facilities for cooling arrangements in the study area households; even the provision of an uninterrupted supply of electricity has not been ensured yet. People are experiencing load shedding and not able to use fans continuously to keep them comfortable; room cooling is not possible in this situation. People have no idea or expectations for room cooling. Space cooling is less prioritized; it is mentioned in terms of a ‘cooling’ service for food and medicine and an indoor air temperature is

suggested as a maximum 30 degrees. There is little literature on summer experiences of the people of tropical countries. The summer experience of people in Bangladesh may expose the necessity and effectiveness of space cooling in cases of tropical countries.

4.5.1 Summer

In summer, the temperature of Bangladesh is 30–40 degrees Celsius. At that time temperature and humidity is so high that it is difficult to stay at home, even open places without shade. To become comfortable people need thin comfortable clothes, shade and electricity to operate fans and houses with ventilation.

Households in the study area use electric fans to keep them comfortable but the supply of electricity is interrupted frequently. People keep the doors of the houses open at daytime in order to get some air; the chance of theft is very low in daylight as people know each other. Most of the houses have no windows; if there is a window, they cannot be opened at night in order to protect from theft.

“Air normally enters into the room very little; in the daytime the door remains open, but at evening we close it” (Female respondent 08).

In addition, the population has increased sharply, new houses are built and thus the free spaces have been occupied to accommodate the new generation. These buildings also block the free flow of air; houses the inhabitants of houses that are built clustered together feel more humidity, even at night.

“People have no way when electricity supply is interrupted. People become helpless; what should they do? Nowadays there is much less open space and we do not have available trees. People suffer a lot in hot weather.” (Community leader 01)

“There is a building in front of our house that hinders the air flow. We do not get air after the building is erected.” (Female respondent 16)

I. Daytime experience

a. Men’s experience

Men are mostly involved in farming in this area; in summer they do not have work and have enough free time to stay home during daytime. The houses have electrically operated fans, and when load shedding begins the men start operating manual fans, though sometimes they become too tired to spin a manual fan and stop operating it. At that time people feel too hot and humid and almost all men go outside the houses and sit along the roadsides, in open spaces, or under the trees in order to get shade and air flow. They also walk on the riverside in the afternoon when the intensity of heat is reduced.

“If I stay at home I use hand fan and also operate it for my children. It is difficult to spin it for a long time. When I feel it is hard, I stop it and go outside and sit under the tree and feel better; in this way I pass time” (Male respondent 10).

“Especially at noon, I just sit beside the road. When I feel cool I sleep there; wind comes in the road” (Male respondent 01).

Men and children leave the houses and return when the electricity supply is back on. But the electricity supply is intermittent, and men and children go outside again.

We are talking, power is off; we both are feeling uncomfortable. I open the door and windows; if I could put off my shirt I would feel better. Let us go outside the house; you will find people are sitting without anything on top with the hope of air flow. This is a very common scene in summer (Community leader 02).

Some houses have no electricity; the men of these households stay outside throughout the day till night except for taking meals in the houses. A number of households have rental

electricity connections but they are not able to use fans as they cannot afford to pay for the extra electricity use the men in such houses also stay outside throughout the day like the aforesaid males.

“If I use a fan I have to pay 150 taka more for fan; that’s why we do not use fan. When I go home, I feel it difficult to take lunch due to humidity.” (Male respondent 08)

Men working in the brickfields feel more uncomfortable due to the excessive heat of the burner; heat generated in the chamber is much higher than that of the cooker used for cooking in the households. In addition, fly ash and sand produced in the brickfield area irritates their skin if they remove their shirts. Excessive heat and humidity lead to sweating and their clothes become wet at that time. They take a rest sometimes in the open air; when they cool off and feel comfortable, they start work again. As a result of these arduous working conditions they sometimes become sick and cannot go to work.

Better off people also have to suffer in summer due to load shedding or inaccessibility of electricity. Men take a rest under shade and on the riverside in the daytime whereas women have to stay at home.

“The roof becomes too hot at noon. We have big fans on stands and use those to feel comfortable. If power fails we go outside the building and sit.” (Male respondent 23)

b. Women’s experience

Women have to cook in this hot and humid weather and feel more uncomfortable than men. At the time of cooking they feel suffocated; they become wet from sweating because primitive fuel generates excessive heat and humidity in comparison with modern fuel and intensifies temperature and humidity abruptly, especially during the midday

cooking period and sometimes they become ill. A few women take showers several times a day to overcome excessive heat; they splash water on their head and face in the daytime, especially at noon.

“Today I boil rice and feel very uncomfortable with the hot weather, as if I will die. I have to work by enduring the heat,” (Female respondent 11)

“When I cook, I sweat; every day two hours are needed to cook at noon. At that time I become wet due to sweating.” (Female respondent 18)

“When I cook, I feel too much pain. I feel severely hot due to the heat of fuel and smoke. It creates many diseases.” (Female respondent 19)

If the women in the study area do not have household work, they go to the yards or under trees adjacent to yards to escape from the heat but they cannot go and stay in the open places like roads and riversides like men. Women have to stay in houses and yards and remain fully clothed. Moreover, some households do not have electricity to provide space cooling; in families who have electricity the women are able to get some comfort when the electricity supply becomes normal.

“I sit in front of our house. I feel too hot in the house as we do not have electricity and thus no fan. Though I do not feel comfortable outside the house, I feel better mentally.” (Female respondent 08)

In some households there are some trees in the vicinity of the houses; women have the opportunity to sit under the trees to feel better and they go to there when they feel too hot and return home when they feel better.

“In daytime I sit in a place where air flows and there is shade. I sit under the tree. After eating in the noon I sit there again for 10 minutes to half an hour. If feel hotter I move around and use hand fan. I do this up to the afternoon.” (Female respondent 13)

c. Children's experience

Children, especially infants, feel uncomfortable due to the excessive heat. They face different types of illness like diarrhoea or dysentery at that time; sometimes the baby cries continually and mothers feel helpless to appease their children. Sweating is very common in summer, even sitting under the fan.

“In summer we feel discomfort. Babies cry at that time.” (Female respondent 05)

Most of the children, especially boys, go outside when they feel hot. Like men, they sit under trees, roadsides and on the banks of the river to get shade and airflow.

II. Night experience

Though women and men have different daytime experiences at night everybody experiences the same discomfort, especially at sleeping time. In the evening men normally stay in the market, open spaces and the roadsides to get fresh air in order to stay comfortable and women sit outside the houses in time of black out.

In time of black out, people cannot sleep inside closed doors due to the humidity; they sit outside the houses and wait for the electric supply to resume; during this time they use hand fans to get some comfort. The blackout becomes part of their lives and they accept it mentally; people become happy if the supply of electricity is normal at night.

“If they sleep with open doors, mobiles may be stolen so windows remain closed. People sweat and go outside and come back when electricity comes back.”

(Community leader 01)

“It is useless to tell about the electric supply in the evening. It is guaranteed to black out but there is no guarantee the electricity will come back. Electricity plays with us and we have to sleep with suffering.” (Community leader 02)

People's sleeping time also depends on the power supply. They can sleep early if it is normal otherwise people walk around or wait for the electricity by sitting outside the houses. Sometimes the power supply remains off into the night; they go to bed and have to close the door.

“If it is too hot, I have to walk up to 9 p.m. to 12 a.m. If power supply is normal we can sleep earlier.” (Male respondent 20)

Due to risk of theft at night, households close the doors and windows and feel suffocated if there is no electricity supply to provide space cooling. When people feel too hot, they open the windows to get some air. When they feel better, they close the window and sleep. But, they feel hot after some time and open the windows again. They repeat the process until they can sleep comfortably.

A few families sleep on the soil with mats using straw or thick paper to lay on in order to get some sort of comfort, as the soil is comparatively cooler than a bed.

“I sleep on the soil by using thick paper under us and get some comfort.” (Female respondent 13)

4.5.2 Other Food and water related services

A. Food preservation

Food preservation helps to achieve Millennium Development Goals; it can reduce poverty and hunger by saving perishable goods from decomposition (Practical Action, 2010); it can also reduce the wastage of cooked food (MDG 1). Bangladesh is a tropical country with a long summer, monsoon season and a short winter. The average temperature in summer is 30–40 degree Celsius whereas average winter temperature is 10 degrees Celsius. Due to hot and humid weather, food (rice and curry) decomposes or

becomes sour within a few hours if it is not kept in refrigerator. If the households have sufficient cooking fuel they cook three times a day and eat after cooking. However, most of the women in the fieldwork area cook twice a day to reduce the cost associated with cooking fuel. They normally cook in the morning and noon, and the remaining food from the midday meal is eaten at night.

“I cook food twice a day due to the lack of fuel. We eat cold rice to avoid ignition of fire.” (Female respondent 07)

Women normally keep food in the meat safe which is a very primitive system, it can only protect food from flies and mice but it cannot help them to save their food from decomposition.

A few households have fridges but it does not help woman to cook less than three times a day. Women want to keep cooked food in the fridge and warm it for the next meal to reduce their drudgery of cooking, but husbands and other family members do not want to take previously cooked food; they want freshly cooked food. Some husbands agree to eat precooked curry preserved in the fridge but they want freshly cooked rice in every meal, so women have to bear the inconvenience of cooking at every mealtime. Surprisingly, these women from more affluent households have to accept the difficulty of cooking every meal whereas poor households cook twice a day in order to save money on fuel.

“I cook for three times a day. We have fridge but husband and mother-in-law want hot food. They do not like earlier cooked food. We preserve uncooked food in the fridge.” (Female respondent 21)

The fridge for those who have it is only used to preserve the uncooked food and drink which reduces the husbands' work; they need to go to the shops once in a week rather than to go every day like other men.

Power supply disruption hampers the food preservation process. If the supply of electricity is disrupted frequently, women have to take out uncooked fish and meat from the fridge and cook at that time and warm them later to save from the food from decomposition.

Women living in the households without fridges try to cook food in an optimum amount so that it is not wasted. If food remains, rice is kept as it is and curry is warmed properly so that it can be eaten in the next meal. If the temperature and humidity is too high, especially in summer, food sometimes becomes sour and decomposes. To avoid the wastage of cooked rice in summer, women add water to the rice and it is known as pantha that is taken in the next meal. People do not like to eat cold rice or pantha but they have to eat it in order to save fuel.

“If I had the better cooker I could cook at night and eat fresh. I am scared as the summer is coming, we have to eat panthavat two times a day and we can only take the warm food at lunch” (Female respondent 05).

B. Kitchen equipment

Labour-saving equipment for food preparation can reduce some of the work for women. Energy accessibility as measured according to TEA is improved to some extent if households have instruments that give mechanical advantages; but no instrument can completely reduce women’s efforts. Previously a lever (operated by leg known as a ‘dheki’) was used to prepare rice. Nowadays the tool is not available in this area as it has been replaced by machine. Some women use hand levers (chahait), to crush rice which requires increased effort as its use is more laborious than dheki (leg lever). Powder is produced from crushed rice in order to make rice cake; people eat this food in winter as

breakfast and it has a demand in festivals, especially in Eid festival and wedding.

“I use chahait (hand lever) to crush rice in order to prepare cake.” (Female respondent 23)

C. Water supply

Without mechanized water supply, drinking water is collected from a tube well. Nearly every household has their own tube well and for the few households who do not, water must be collected from the tube well of a neighbour. This can cause embarrassment and irritation. Water is mainly collected by the women who collect water by jug or bucket to meet their needs. Some women have to travel a long way to collect water. These women also collect water from the river to supply water to meet the needs of other households for use of things such as shower and toilet. They have to devote a long time for water collection for this purpose every day.

“I have to spend most of the day time for collecting water. Sometimes I have to go for a long distance. We do not have tube well as we are poor household. I also go to the ponds of different households. Those who have tube well can collect water easily.” (Female respondent 03)

Some households have a motor and overhead tank; the women of these households do not have to collect water from tube wells like others. It saves their time and effort related to water collection. If this service can be introduced, it will save women physical effort and save their time as well. A few interviewee told that these could remove their work load if they had this service because they have to bring water several times a day.

Energy services for food preparation and water supply was felt important to include to TEA standard because women's drudgery was highlighted by the women respondents and also observed significant, but these are not in the TEA model.

4.6 Information and communication

Information and communication technology (ICT) can help to improve socioeconomic conditions and health, and thus help to achieve Millennium Development Goals (MDGs). It can reduce poverty and hunger through economic growth that will fulfil MDG 1. ICT can reduce child mortality, improve maternal health and combat HIV/AIDS by raising awareness of health issues through information sharing and thus achieve the targets of MDGs 4, 5 and 6 (Practical Action, 2010). ICT includes modern equipment such as a mobile phone, radio, television, computer, or laptop. Access to mobile phones, radio and television is considered as the minimum requirement of modern energy services guidelines in TEA. To examine the energy profile of the people of the fieldwork area, the usage of mobile phones, radio and television by men and women has been inspected and compared.

4.6.1 Mobile phones

Nobody uses this mobile except me. It is always with me. My wife does not touch it. If I leave it at home anyway and go outside, if phone rings, ringing continues till I come back and answer. Sometimes phone will be disconnected after ringing but she will not answer the phone in any way. I answer my phone. If someone calls from her home I answer the phone and tell her, 'this phone call is from your home or your known person calls you then she will talk, otherwise not.' She will never answer the phone (Male respondent 04).

Irrespective of income most of the men have a mobile in the fieldwork area, even the poor rickshaw puller or day labourer who does not have a regular income uses mobiles in this locality. The few men who do not have mobiles talk on mobiles owned by others or rent mobile phones from the mobile shops.

“Even they [men] who do not have food to eat regularly have a mobile. It becomes a fashion.” (Community leader 02)

A few women who are the wives from rich households possess their own mobiles. They can operate mobiles by themselves and charge the mobiles in their houses by electricity. But, the majority of the women living in this area do not have mobiles. Households may have a mobile phone but the situation for a man and woman is different within the household. Husbands mostly own the mobile but women have limited access to it. Most of the husbands keep their mobiles with them when they are outside the house. When husbands return home, they put the mobile in a place where they may observe it and monitor its use. If women ask their husbands to let them to use their mobile to talk, sometimes they are allowed to do so by their husbands, but sometimes not; on many occasions husbands will say that their mobile does not have enough credit.

“I have no mobile but my husband has a mobile. He keeps it with him. If he connects, I can talk when I need.” (Female respondent 25)

A large number of women do not know how to make a call. Their husbands tap in the phone number to make the connection and their wives can talk. Husbands allow their wives to talk if their parents, brothers and sisters call their wives and they remain in the house; they first receive the call and allow the women to talk. If the husbands are outside the house on receiving a call, they tell the caller to call back in the evening; very few husbands return a call to the wife’s family on returning home. Some husbands do not allow their wives to use their mobile, or even touch it. It is to be mentioned that mobiles are charged by electricity; people who have electricity charge the mobile in their homes, and if not either in a neighbour’s house or in shops where they take tea or purchase goods.

“I do not have a mobile. My husband has a mobile and he keeps it with him. I do not know how to use it. He does not give it me to use it, even does not allow me to touch it. He charges the mobile in his brother’s house by electricity.” (Female respondent 20)

A few families do not have mobiles; in that case women will try to borrow a mobile from their husbands’ family members or from the neighbours who have mobiles. It is not easy to gain the use of a mobile; women repeatedly request them, and sometimes they are allowed and sometimes not. If anybody allows the use of their mobile then women have to deposit money to that mobile. The frequency of women making calls on mobiles is once in 15 days to 3 months. The purpose of the phone call is to remove their anxiety about the women’s family members, especially of their parents. They feel telephone calls give them peace of mind and they consider it as a substitute to physical presence.

I request continuously to others to use the mobile and after talking with my relatives I feel mental peace. If I had a mobile I could communicate properly with my father and brothers. I communicate with them once in three months. If I could talk regularly it may substitute for my physical meeting. (Female respondent 05)

People have a limited idea about the usage of mobile phones. Most people have very ordinary and cheap mobiles, using mainly voice service, and do not know how to use SMS and MMS services possible on ordinary mobiles. It is not possible to access internet services on these mobiles. Moreover, people have very little or no literacy to use internet if it were available.

“I have a mobile. I only talk by mobile. I do not have internet and do not send SMS” (Male respondent 14).

A. Mobile phones and accessing health information

As most of the women do not possess mobiles, they do not get health-related information by this form of communication. Though a few women have mobiles, they do not have access to health information. Surprisingly, women in this area do not know the meaning of ‘health-related information’. When interview respondents were advised that this term related to maintaining a healthy life style and good health, and what they should do when they become ill, all the women asserted that they have no idea where they could obtain such information, or from whom, especially relating to diseases and health care. But the women confirmed that they would go to a doctor due to illness if they have money.

“I have never heard any information about health service. I go to doctor if necessary, that’s it” (Female respondent 02); *“I have no idea about health information. From where can I get the information? I don’t know what to do in time of disease”* (Female respondent 03); *“It will be better if I get health-related information”* (Female respondent 01).

Like women, men also do not have any idea about ‘health-related information’ though they mostly have mobiles. It should be noted here that all mobile operators have access to the health service where doctors give advice through mobiles any time of the day and night (24/7) but the majority of the people rarely know this. This service has not become popular in the rural areas.

“There are operators in the mobile companies to serve the people but it is not popular yet. People do not become very aware to take information by mobile.”
(Community leader 02)

A few people have some knowledge of this service but they do not use its resources as they have no idea about the effectiveness of this service. Moreover, the calling charge for taking this service is almost six to seven times that of a voice call.

“I have a mobile and I know health information is possible to get via mobile but I have not taken the service. This service is available from different mobile operators like Robi, Grameen phone. Those who are aware they know it.” (Male respondent 21)

Possession of a mobile and knowledge of how to access health-related information is not sufficient; the attitudes of information providers play a significant role in encouraging access. There is a community health clinic in this area and a few knowledgeable people know the phone number of that clinic. Interviewees sometimes try to talk with the health clinic staff by mobile but people claim that the clinic staff are less interested in delivering information by mobile. They said if anybody wants to get the information the staff are not very helpful in attending to their queries.

I have a mobile; they [clinic] have also mobile numbers, I have tried but I have not found any information. They said why call us, call the doctor. Do you want to get free medicine? Many people have the idea [of calling for help] but I have not heard that anybody got service. They don't care about us. (Male respondent 22)

Health visitors' service does not meet the expectation of the inhabitants though it has improved from earlier times. A good number of women have never seen them and have no idea that health visitors may deliver health-related information; a few women have met the health assistants. NGOs have limited activity relating to health-related services, mainly dealing with microcredit; only BRAC delivers some health related information especially for pregnant women.

4.6.2 Television/Radio

Television helps to disseminate necessary information related to education, current affairs, environment, health care, social and political issues and thus plays a significant role for developing consciousness in the viewers. In the case of Nepal, women observing television regularly understood that they were not being treated equally to men and did not want to remain in a subordinate status (Barnett, 2000).

Access to electricity is a precondition to watch television, though a few households watch television for a limited time in some areas where electricity is not available by charging a battery. The households with their own electricity connection can watch television, but households using the electricity via a rented line have no certainty of energy accessibility to watch it; a few have tried to watch television but they have been restrained by the electricity connection providers. Rental electricity user households do not purchase TVs as they feel their access to electricity is a temporary arrangement which may be disconnected by the provider or the power supply authority at any time.

“Previously I watched in the house by taking neighbour’s line but they disconnected electricity” (Male respondent 17).

A few households have televisions, so a small number of women can observe it in this study area. Some of the television owner households also arrange cable connections and enjoy home and imported dramas and movies. A few women like to watch mostly news, talk shows, health and education programmes. These women have an idea about the current issues of the locality and national issues as well that is similar to the women in the study conducted in Nepal. They are conscious and communicate their ideas in a better way.

Women need more food in pregnancy as she is carrying a child at that time, I heard it from TV but husbands take as much food as they need while eating, do not think whether something is left for their wives. Wives cannot say anything for shame; eating less food wives gradually become weak and suddenly become ill
(Female respondent 13).

However, having a TV in their homes does not ensure women will have the opportunity to watch programmes of their choice. Men watch television programmes to suit their convenience with regard to time and choice of viewing and women can observe with them. Husbands also take control over the TV to reduce the electricity bill. Households normally watch a TV for a limited time, especially if it is operated by battery due to unavailability of electricity, as battery charging is expensive; it needs Taka 480.00 to 600.00 (GBP 4.00 to 5.00) per month which encourages husbands to control the TV watching time.

“We have 21 inch TV and we operate it with a battery. My wife is crazy for Indian drama serial. I do not give more time to watch, I control the TV; if they watch more it will be wastage of money. TV has a remote; I keep it under lock and key. When I come back home, we use it for 1.5 to 2 hour and then turn it off again.”
(Male respondent 14)

A large number of women have no opportunity to watch television as they do not have legitimate electricity connection; some households do not have capability to buy TV. Though there are some TVs in the neighbours' houses, women do not go there to watch them. One decade ago women went to other houses to gossip and pass time; people had the same economic status as most of the families were farmers who travelled together to the cultivable land with oxen in the morning, to work and gossip, and came back home jointly at afternoon. In the course of time some families became rich as their family

members went abroad and sent money back for them regularly; some families set up a business in town which generated a large amount of money. Their economic status was improved; they are now living in buildings, using TVs with dish antenna. They do not want to mix with the poorer neighbours. Some women view programmes in the houses of neighbours, but not on a regular basis. Most women feel that they should not hamper the privacy of others.

“Previously people go to other houses but now nobody is going to other houses. Nowadays people watch TV in their own houses. If anybody goes, people feel disturbed and quarrel,” (Female respondent 05)

Unlike women, men watch television regularly irrespective of whether there is a TV in their households. They mainly watch television in the tea stalls and shops located in the market place in the evening; they complete their work in the afternoon and return home, have a meal and go to the market for recreation. People take tea and smoke cigarettes in the shops, gossip and watch television. Women are aware that their husbands’ gossip in the shops and tea stalls, spend money and watch television there.

“I return from work at evening. Then I go to CMB [market] and watch TV there. I do not have radio or television, I have nothing” (Male respondent 01).

“We do not have any radio or television. My husband watches TV in the tea stall. He drinks tea and watches TV there” (Female respondent 06).

Radio is rarely used in this locality. It is not found and observed anywhere and no respondents say that they see or use it. It should be noted here that the radio is not popular even in the cities and towns in this region of Bangladesh.

A. TV, development and health information

As most of the men have the opportunity to watch television either in their houses or in the wider community such as the markets and shops, they have the opportunity to gather information. Television helps to enhance the knowledge of men; they learn how to rear poultry, engage in animal husbandry, to generate income; they also become conscious about their children's health and education and social well-being through the television news and programmes. As few women can watch television, most of the women have no or little opportunity to acquire knowledge and information like men.

“Nothing is in the house, radio or TV. I watch TV in the shops close to our house. They keep TV there. I watch children's programmes, drama, different types of poultry and animal husbandry programmes there.” (Male respondent 03)

Men also get health-related information via television because it is provided through news, health and education programmes. Men have knowledge of health and immunization programmes and they know what type of services they can get from the hospital but most of the women cannot access the information as the majority of the households do not possess television.

“I usually sit in the shop and watch news on the TV. It is shown that immunization of the baby and vaccination is given in the government hospital.” (Male respondent 03)

Overall, Men and women have different energy poverty profiles based on the access to mobiles, radio and television though living in the households; thus women have very little opportunity to access information and communication technology services in comparison to men and thus they have less knowledge about socioeconomic and health-related information and they have limited or no opportunity for entertainment through

television.

4.7 Earning a living

TEA has a guideline which indicates that access to energy should be sufficient to allow people to earn a living; the minimum standard is explained as the access should provide sufficient energy that will help to set up a financially sustainable energy efficient enterprise, but the households in the fieldwork area do not have that level of energy access. Both men and women have no or little opportunity to generate income as they have limited access to electricity due to load shedding.

People mostly are interested in setting up a poultry farm, but for this enterprise it is essential to have 24-hour electricity because fans have to operate all the time to provide comfortable conditions for the poultry, especially in summer, to get eggs regularly and to save birds from dying.

“A 24-hour electricity supply is essential for a poultry farm. It needs lights and fans continuously. We could go for this business and I could earn 4 to 5 thousand taka per month from it” (Male respondent 10).

The supply of electricity has created some opportunity for the inhabitants of the study area to work at night, for those who can afford the electrical connection. In the daytime men remain busy with outside work. After evening they have free time; a few of them work at night to generate income. But most of the people argued that due to load shedding they do not try to work at night. (see section 4.2.7 h, 4.3.7 C and 6.2)

4.8 Comments about the space heating and cooling standards

In the case of space heating, TEA suggested the daytime room temperature should be at least 12 degrees, but no night time minimum temperature is suggested. But, it is found from the interviews that people need more heating at night than during the daytime to combat the cold night temperatures. So, a night-time ambient temperature needs to be suggested. According to WHO, the minimum room temperature should be 18-21 degree Celsius. It is also to be mentioned here that National Health Service (NHS) in the UK has suggested that the room temperature for a newborn baby should be 18–22 degrees (NHS, not dated). In the study area, it would be better to maintain heating throughout the night as the houses have no insulation. Ideally low-cost houses should be built with proper insulation in order to keep the houses warm with minimum space heating to optimize energy usage and minimizes cost.

Though, TEA model is suggested by Practical Action (2010, in a later part of their discussion it stated this maximum temperature may be 24 degrees Celsius and also invited other opinion of the different standards of TEA. It is to be noted here that comfort does not depend only on temperature; humidity should also be taken care of. If the humidity is not controlled, a lower temperature cannot give comfort. For comfortable conditions for a room temperature of 18 to 20 degree Celsius the relative humidity may be ranges from 60%-70% (Althouse, 2003)). If 24 degrees Celsius is considered as the room cooling temperature (which may be more appropriate for the warm summer climate of Bangladesh) than relative humidity should be suggested along with this guideline.

4.9 Conclusion

Households are all in energy poverty according to the TEA measure, because they don't have sufficient levels of all these energy services. Houses mostly use indigenous fuel for cooking and the minimum standard of cooking of TEA is not met i.e., they do not have access to improved wood or charcoal stoves or they cannot purchase LPG gas.

Though a few households use bottled gas, they use it in combination with indigenous fuel to reduce their energy costs. Besides, most of the households' lighting minimum standard of 100 lumens is not met. For some they cannot afford electricity access at all. For others they can only afford limited electricity and also their ability to buy other fuel is limited (kerosene and firewood). For everyone, even people who can afford quite a lot of electricity, load shedding which means that they don't have sufficient energy services at all times. In addition, all households cannot meet space heating standard of 12 degree Celsius as they do not have room heating facilities. They also do not have space cooling facilities. A few households have refrigerator to preserve food. If those houses had the heating and cooling equipments, it might not be effective because electricity supply is not uninterrupted and houses are made of corrugated sheets and bamboo which do not have heat insulation capability. Moreover, the information and communication minimum standard is not met for most of the households. People do not have the access to electronic information as they mostly do not have internet connection, computer or laptop. Though a few have smart phone with internet connection, they mostly have no access to information due to illiteracy. A few households have access to electronic media through television. In case of 'earning a living' no household met the minimum standards as they do not have sufficient access to energy services to start up enterprises.

The effects of energy poverty are similar for men and women in some aspects. In the case of lighting, most of the households have access to electricity; they either have their own or rented electricity connections but load shedding in the evening is a regular phenomenon and people have to use kerosene at that time. This produces a poor quality of lighting during the time of load shedding that affects men and women equally.

However, the other aspects of energy services the affects of energy poverty are different for men and women. Women are more affected by energy poverty than men in the case of cooking and water heating, information and communication, cooling, space heating and earning a living. Women's experience is worse than men because of their labour duties and their daily routine; and also because of their social position meaning that they don't go outside the house for example, in the evening. In case of cooking, households do not have modern cooking fuel or improved stoves. Women have to collect, manage and cook with indigenous fuel, which is not only laborious, it also affects their health due to smoke and excessive heat and pollutes the indoor environment. But men are rarely involved in fuel collection and management; they do not have to experience the effects of smoke as they normally do not stay in the house at the time of cooking. Besides, women have less access to information and communication services mentioned in TEA than men. Most of the men have mobiles irrespective of their income, but only a few women of rich households also have mobiles. Husbands keep their mobiles with them when they stay outside; when they remain in the houses, they control the use of the mobile of their wives. Most of the houses do not have television; the women of these households do not have the opportunity to watch television and thus they have no opportunity to access information and entertainment as well. On the other hand, husbands watch television in

the market and besides entertainment they get information about health, education and income. For cooling, a good number of rural households do not have refrigerators or ovens and women need to cook more than once in a day. Some households have refrigerator but having it does not reduce the drudgery of women for cooking; moreover, women of those households have to cook three times a day as their husbands do not like to eat earlier cooked food. On the other hand, possession of a fridge reduces men's work as it is used for uncooked food storage; the men of these households go to the food market once a week instead of every day like others. Besides, there is no room cooling in the houses due to insufficient electric supply and lack of affordability of the households to buy AC and pay energy bill. In addition, there is no facility to cool the temperatures around the burners like exhaust fan. In summer, women feel less comfortable than men in the daytime as women have to cook in the hot and humid weather. Moreover, during times of load shedding, women cannot go and stay in the open places, roads and river sides where air flows like men. In comparison with women, a few men working in the brickfields have to suffer more due to excessive heat generated from the burner of the brickfield. Alternatively, in winter, women have to work with cold water in the morning for cooking and washing because they do not have modern cooking arrangement. They have limited fuel stock of indigenous fuel; moreover 15 to 30 minute requires boiling water with these fuels. As a result, they believe that they suffer from colds and coughs. Alternatively, most of the men, including labourers working in the brickfield, drivers and construction workers feel better at that time, except a few men engaged in manual farming who need to deal with cold water and mud, experience more hardship than women. In case of 'earning a living', men and women have different energy poverty

profile though it is same within the household. At household level people cannot access sufficient energy to set up enterprises, thus financially sustainable energy efficient enterprise has not been developed yet. But outside the house men are mostly doing agricultural mechanised agricultural works. Shopkeepers are doing business in the evening with lighting either by grid supply or generator service. It isn't energy to start a new enterprise but it does help to reduce their labour in their existing occupation and therefore increases their potential productivity. Table 4.1 summarises the affect of energy poverty on men and women based on TEA energy services standards:

TEA Energy service	TEA minimum standard	Achieved for men	Achieved for women	Related issues regarding men	Related issues regarding women
Cooking and water heating	1 kg fuelwood/ 0.30 kg charcoal/0.04 kg LPG/ 0.20 litres of kerosene or ethanol per person per day, taking 30 minutes per household per day to obtain.	No	No	This does not affect men as they do not do it. They are less concerned about the issue.	Women have to collect and sometimes prepare (cow dung cake) fuel as they are fully responsible for cooking. They suffer from different diseases like respiratory diseases, headache, eye irritation for indoor air pollution.
Lighting	Three hundred lumen at household level	Not fully. Though most of have electricity either own or rented grid electricity. Load shedding in the evening is a common phenomenon.	Not fully. Though most of have electricity either own or rented grid electricity. Load shedding in the evening is common phenomenon.	In summer men stay outside the house (especially in the market and shop) in the evening where rental electricity service is available.	Women stay at home and use kerosene lamp or candle in times of load shedding.
Space	Minimum daytime	No. Though	No. Though	Men remain outside in	Women work with

Heating	indoor air temperature of 12 degrees Celsius	cooking heater is rarely used in the houses not more than an hour. But room is cool after some minutes as those houses are mostly made by bamboo and corrugated sheets. Small holes are formed within some years. Air enters easily inside the houses feel colder than expected and those rooms have no insulation	cooking heater is rarely used in the houses not more than an hour. But room is cool after some minutes as those houses are mostly made by bamboo and corrugated sheets. Small holes are formed within some years. Air enters easily inside the houses feel colder than expected and rooms have no insulation	the daytime. It is the farming season; men feel colder in the open space. A few do manual farming, they feel colder than others when put water in their lands or plough with oxen. They feel colder at night as the house has no insulation. Toilets are outside the houses. People avoid it at night.	cold water for cooking, washing and other activities. At night they have same experience as men.
Cooling	Maximum indoor air temperature of 30 degrees Celsius	No cooling facilities	No cooling facilities	Men stay home as no agricultural work at that time. if electricity goes, they go outside to the open places and take shelter under tree or shade. At night walk around the houses.	Women stay home even in load shedding. They cook in the hot and humid place as no kitchen has fan. They sit in the yard in day and night if they do not work.
Information and communication	People can communicate electronic information beyond the	Largely yes. Mostly have mobile and	Mostly no. Women mostly do not have	Mostly have mobiles that have only voice call facilities. No internet	Most of them have limited access to mobile when their

ication	locality in which they live. People can access electronic media relevant to their lives.	television access even if household has no TV	mobiles and no access to TV.	connectivity. Though they do not have TV in the household, men mostly watch TV in shops in the market. They have social, political, health, education related knowledge to some extent.	husbands' stay home and allow them to use it. Most of them cannot watch TV and do not have any information including health
Earning a living	Access to energy is sufficient to start up any enterprise. The proportion of operating costs for energy consumption in energy efficient enterprises is financially sustainable	Not fully	No	No arrangement in the household level but men use energy services for mechanised cultivation and shopkeepers use lighting in the evening. Though it is not same as the standard for business but helps to reduce workload and improve productivity	All women do not have the opportunity in this standard.

Table 4.1 summary of the affect of energy poverty on men and women based on TEA energy services standards

In general TEA minimum standards are good. However, among six energy services of the TEA minimum standards of three services may be reviewed in order to make it more effective; these are lighting, space heating and cooling. Firstly, in case of lighting, TEA states the minimum standard is 300 lumens at household level but this poor lighting is not sufficient for study and work; the author observed that at least a 100 watt bulb needs to be used that is equal to 1300 lumens. Secondly, for space heating, a daytime indoor minimum air temperature is mentioned as 12 degrees Celsius whereas night-time indoor minimum air temperature is not stated. But people (both men and women) have expressed that they feel more discomfort at night-time in winter from cold and it is observed the night is colder than daytime. It is thought that a minimum night-time temperature needs to be added in the model and suggests that the recommended minimum temperature should be 18 degrees Celsius because children and old people are also living in the same houses with young men and women and they need more warmth. Thirdly, in case of cooling, the model suggested the room temperature should be a maximum of 30 degrees which is not a comfortable temperature; in the last stage of fieldwork the average room temperature was 27 degrees which was not felt to be comfortable even under a fan. Practical Action (2010) has already suggested that for cooling the maximum temperature should be 24 degrees Celsius. But, 'relative humidity' (RH) has not been considered either in TEA. This element needs to be considered because comfort depends on two factors, temperature and humidity. Beside temperature RH may be maintained 60% in the case of indoor cooling. It is to be mentioned, houses need relatively more energy to maintain space heating and cooling if they are not properly built; a low cost improved housing model needs to be developed to save energy usage for space heating and cooling.

Finally, energy poverty definitions lack acknowledgement of different socio economic factors that need to be reviewed. Energy poverty is defined as the lack of affordability, accessibility and/or reliability but access is complex and not just availability. In spite of affordability, people may not use modern energy and services if they feel it is not economic in comparison with indigenous fuel. In addition, women may not choose modern energy if the households have abundant indigenous fuel; they may feel their free fuel will remain unused. They have to spend money to purchase modern fuel which is wastage of money as they do not feel there is a problem with indigenous fuel. Also, some husbands and their parents living in the households may be unwilling to incur extra costs for fuel. Husbands may think that cooking by indigenous fuel is not a problem as their predecessors used such fuels for cooking and had not experienced problems. Moreover, some families may not want to use clean fuel as ‘security of supply’ has not been established; they think they will have to wait for some period of time to get a gas refill. Furthermore, some households do not have proper information about clean fuel. Moreover, in the case of lighting, there is no ‘security of supply’ for electricity as load shedding may take place at any time, especially in the evening. In addition, rental electricity users feel that they have no ‘reliability of supply’ as this temporary electricity connection may be disconnected at any time.

Thus, ‘energy poverty’ can be defined as the lack of accessibility, affordability, economy, choice, willingness, information, mindset, security of supply or reliability of supply to modern energy services and technologies. It affects on health due to indoor air pollution, altogether with education and income; consequently it increases medical costs and dwelling renovation expenditure, and reduces income opportunities.

From this chapter it can be inferred that energy needs of women and men are not identical. As well, household energy poverty affects women and men differently.

Women need clean cooking fuel or modern burners and cooking appliances in order to alleviate their drudgery and health problems caused by cooking with indigenous fuel, but men do not have to face the direct consequences of this fuel use. Men mainly need energy services for their work in agriculture, shop keeping, working in brick fields and driving, outside of the household. As the energy usage behaviour of men and women is not the same, it is important to assess energy needs for men and women separately, based on their work and activities.

The research also identified that applying the TEA model can capture the energy experience of women, but it does not fully capture the extent of men's access to energy services when they are spending time outside of the house. The qualitative research tried to capture more fully men's energy experience inside and outside the home and found that men have better energy service access than that assessed at household level, as they access energy for their work and leisure in different locations, outside the home. From the findings discussed in this chapter it can be argued that energy poverty in terms of adequate access to energy services needs to be measured at the individual level not at the household level. A further important finding to emerge from the qualitative work is that improving the energy service access of the household does not always remove the energy poverty of women. Energy poverty has a relationship with social position, custom and practice. For example, in many of the households, the husband has a mobile but women have only limited use of it, when family members call them and if the husband is at home

at the time. Energy poverty needs to be approached through multiple disciplines in order to understand it fully, not only considered as an economic or technical phenomenon.

From the interviewees' narratives it can also be concluded that the energy access of rural women is not the same as for women living in the town. Rural women cannot access modern cookers, solar cookers or line gas. They also have less access to bottled gas, and less access to information about energy services and other services. As well, frequent load shedding takes place in the evenings and daytime in summer. From the interviews it was found that the intensity and frequency of power failure is higher in rural areas than in towns. It is important therefore to scrutinise whether the inadequate access to energy services is due to lack of 'fair' distribution of energy resources and to examine whether policy recognises the energy needs of rural women and whether procedural justice is ensured to address women energy need. Women's opportunity to participate in energy decisions at community level need to be examined, as well as the extent to which women's energy needs are cared about or recognised at the household level whether they are able to participate in household energy decisions. These issues are related to the 'energy justice' concept, and the concerns are related to different scales (from household, to community and national level). Therefore, the next chapter will discuss energy justice as it relates to women, at different scales, and its relation to the energy poverty they experience.

Chapter 5

Energy poverty and women's energy justice status

5.1 Introduction

The previous empirical chapter illustrated that the energy poverty experienced by women in rural Bangladesh is not only limited by affordability; there are other factors affecting their energy use and access to energy services, such as choice, custom, and the dictates of husbands and family members. Women in these circumstances have the little or no access to clean fuel, receive poor quality of lighting due to frequent load shedding and low voltage electricity supply, have limited or no opportunity to use mobile phones and watch television, no scope for heating and cooling in winter and summer respectively and have only rare opportunities to utilise energy services to generate income. Rural women's lack of access to modern energy services may be related to improper distribution of energy resources, to a lack of recognition of women's rights for modern energy services and technologies from household to national level, and/or to their lack of acknowledgement and involvement in policy formulation and implementation. These are all aspects of energy justice, which is the focus of this chapter.

Following broader theories of environmental justice (Schlosberg 2007; Walker 2012), energy justice is generally held to involve three aspects of justice: these are distributional justice, justice as recognition and procedural justice (McCauley et Al 2013; Walker and Day 2012). The meanings of these are drawn from political philosophy and social justice theory. The fair distribution of goods and resources is the central idea of 'distributive justice' (Barry, 1973; Dobson, 2009) (see section 2.6.1). Rawls' (1971) 'equality

principle' relates to 'justice as fairness'; this principle is divided into two sub principles (a) fair equality of opportunity that focuses on an effective equal chance individuals to hold positions of authority and power and (b) the 'difference principle' that argues that unequal distributions of resources are allowable under the condition that the least advantaged groups in society obtain more benefit.

Recognition means the acknowledgement of a social group's existence, rights and needs. Lack of recognition can result in marginalisation and oppression. Where there is a lack of justice as recognition, this can create grievances in times of distribution of goods (Young, 1990). Thus, fair distribution of goods along with recognition and respect of every group in a society are important to establish justice (Fraser, 1998) (see section 2.6.2)

Procedural justice refers to the need to follow fair procedures in policy making and decision making and it can help to establish the fair distribution of resources.

*“[T]here is a correct or fair procedure such that the outcome is likewise correct or fair, whatever it is, provided that the procedure has been properly followed”
(Rawls, 1971: p 75).*

According to the Aarhus convention on environmental matters, procedural justice has three pillars, these are: 'access to information', 'access to meaningful participation' and 'access to [restorative] justice' (UNCE, 1998, 2006). Procedural justice is sometimes termed as participatory justice as it focuses on the participation of different social and economic groups in a society (Walker and Day, 2012). There is a relationship between 'recognition' and 'participation' because recognition of a group means they should be included or represented in decision-making processes that allow the sharing of opinions which is important for fruitful decision-making (Hunold and Young, 1998). As procedural justice

and recognition are closely connected, three pillars of procedural justice along with ‘recognition’ need to be established to achieve the target of fair distribution of resources. (See section 2.6.3).

‘Energy justice’ places emphasis on the distribution of equitable benefit (or fair loss) of energy services and technologies to all groups of society. It highlights the necessity for the recognition and participation of every group in the decision-making process in order to achieve fair distribution of energy resources. This chapter addresses energy justice and gender, focusing on women, at the household, community and national scales. It first discusses the distribution of energy resources and energy services within rural households in the fieldwork region, and extent of women’s involvement in energy related decision making in the household. Second, it discusses women’s recognition, consultation and participation at the community level and in the Union Parishad, the lowest level of local government. Finally it addresses the distribution of energy resources at the national scale and the links between this and rural women’s energy poverty, as well as procedural justice concerning women with regard to the provision of information through official channels, and women’s involvement and recognition in national energy policy making.

5.2 Energy justice with respect to women at household level

The majority of women living in rural areas in Bangladesh have no or little education and little opportunity to generate income. Traditionally there is a division of labour in rural communities on a ‘gender’ basis; women are assigned responsibility to accomplish household work and take care of the children and men are responsible for the generation of income. In comparison to men, women have much less opportunity to become

involved in economic activity, or leisure and social activity. As women are not able to generate income from their household work, their efforts are rarely valued in the households and society. This is very different from the position of women in urban areas in Bangladesh. Urban women have access to education, can go outside their houses and are able to mix with people socially and can compete with men in most spheres of life, including the job market to some extent. However, women in rural communities neither receive the same opportunities as men nor are equally benefitted as urban women. Thus, rural women can be considered as a marginalised group of society, economically and socially.

Turning to energy justice, if Rawls' (1971) 'difference principle' argument is considered as a basis for just distribution, it can be argued that rural women should be given more access to energy services and technologies than any other sections of society as they are in a more disadvantaged position overall than men and urban women as well.

But, gender bias was observed in the fieldwork area in the case of distribution of energy resources, where men mostly benefit from the introduction of energy services and technologies. Most of the men are farmers who had previously used oxen to plough. Nowadays while they still plough and water manually, cultivation is mostly undertaken by powered tractors and irrigation pumps used to water crops, so lessening the men's tasks and reducing their labour.

When there was no machine I used to water by 'doon' [two sets of rope are connected to a water box and two men fill the box with water from source and put it into the field]. Previously there was a lot of suffering, sometimes there was swelling in my hands, now it is much more easy and comfortable though it needs more money (Male respondent 03).

“Tractor is available in this area; they [tractor owners] plough land” (Male respondent 25).

The volume and labour of men’s work has been drastically reduced; previously they started work before sunrise, working whole days and returning home in the evening. The introduction of machinery has increased leisure time available to men; they have extra time to gather social and economic knowledge through gossiping and watching television. This creates an opportunity to generate extra income, similar to that experienced by the men of Tamil Nadu India (Rengasamy et al., 2001). On the other hand, rural women have to use poor quality fuel and have to face the consequences of its use, including suffering from different types of health problems as discussed at length in the previous chapter. Electricity does not reduce the volume of work for women as most of them have no access to modern household appliances; it does not even reduce the labour associated with the cooking of those women who have fridges, as their husbands do not want to eat precooked food kept in the fridge. Almost every household has at least one mobile phone that is normally used by the husbands, but only a few rich women have their own mobile. Husbands keep their mobiles with them; they allow women to talk if anybody from her family calls if he is home at that time; normally men stay outside in the daytime. Most of the households have no television, but men watch television in the market and women have no chance to see it as they remain in the home. Moreover, women do not have access to powered water pumping facilities like men that reduce the labour of collecting water, as they have to collect water by jugs or buckets from tube wells several times a day.

Women’s energy needs are not recognised at the household level. Female interview respondents indicated that they are experiencing health problems due to smoke and heat

generated from the indigenous fuel and subsequently they become ill, but the family members, either husbands or father-in-law or mother-in-law generally do not recognise it as a problem. In contrast, the male interview respondents expressed the importance of using modern energy services to carry out farming, but in the case of women failed to recognise the importance of their modern energy requirements. They argued that every woman is cooking with this primitive fuel in the same way and they do not have problems. Husbands suggested that their wives should adjust to the consequences of using this fuel. A few husbands are more reactive; they do not like to hear any complaints against traditional fuel and sometimes rebuke their wives if they raise the issue.

“To whom should I talk? My husband does not want to hear” (Female respondent 04); *“If I tell to my husband, he says, ‘if you cook by this burner you have to bear the smoke’”* (Female respondent 08.).

“If I tell my husband he does not try to understand the problem. Moreover, he quarrels with me and says, ‘you cannot cook! People are doing much more work than you like earth cutting!’ He scolds me” (Female respondent 07)

A large number of husbands do not want to hear their wives complain of diseases because of use of this fuel. A few husbands become annoyed if their wives become ill and ask for medicine; they think their wives have less immunity to diseases in comparison with other women.

“I tell my husband [about illness] but he says, ‘why are you suffering from so many diseases? Others do not have so many diseases’. Suddenly he becomes angry with me.” (Female respondent 15)

A few women have tried in a different way to motivate their husbands to avoid this primitive fuel; they tell their husbands that gas will reduce the cost of medicine and the doctor. But husbands have an idea of the comparative cost of bottled gas, medicine and

doctor's visit and can calculate which one is less costly. They found it is better to obtain medicine for their wives as the summation of costs relating to primitive cooking fuel and medicine is less than the cost of gas and thus decline to bring bottled gas for use by their wives.

“My husband knows the price [gas] that is why he declined; it is less than the combination of medicine and straw cost. If he does not bring gas, what should I do?” (Female respondent 15)

On the other hand, husbands raised a different logic to oppose women's dislike of indigenous fuel. A large number of husbands have a preconceived idea that indigenous fuel is not the cause of any disease. Most of them argued that if it is a problem, then how could their predecessors (mostly their mother and aunts) work with this indigenous fuel without suffering like them (wives); some of the men tell their wives to adjust to the use of this fuel.

“Smoke is not a problem. If you cook, it will produce, very natural. I have seen it throughout my life. Our predecessors work with lakri [fuelwood] and cow dung. Why cannot she [wife]?” (Male respondent 21)

Moreover, some husbands claim that they are suffering more than their wives from different diseases and that if cooking with these fuels is a problem, the ill health of their wives should be exacerbated. Some husbands think everybody has some diseases, and that this also applies to their wives.

“My wife does not have respiratory problem or heart problem. I have some problems.” (Male respondent 05)

The mindset of husbands and parental influence on them is the main barrier to recognition or consideration of their wives' arguments. A few husbands show a closed-

minded condemnation of any opinion of their wives. On some occasions, the fathers- and mothers-in-law of the women have a great influence on their husbands. In this society, the son generally does not argue with his parents if there is no major issue that incurs his personal loss. Society does not take it in a positive way if the husband gives preference to his wife over his parents. Generally mothers-in-law claimed that they cooked with this indigenous fuel and experienced no health problems. In order to save money they tell their sons the claims of the women are worthless and consequently influence the household's energy decisions.

“He says no, if I tell him anything. If I repeat, he quarrels with me. If my mother-in-law would say my husband could bring it [modern fuel]; he does not argue with his mother” (Female respondent 21).

A few women from the interview group do not want to talk to their husbands about obtaining modern fuel because their husbands become angry if they hear there are problems related to fuel. These women feel that their position is vulnerable in the household and they do not expect recognition.

“[my husband would say] If you cannot cook with these [fuels] leave my house” (Female respondent 07).

5.2.1 Participation in energy decisions in households

Most of the wives try to take part in the household decision-making process; they want to share their opinions and experience with husbands to help with decisions on energy like choice of cooking fuel, lighting arrangements but husbands typically do not want to hear their wives. Most of the women from the interview group indicated that their husbands make the decisions on fuel and energy matters in the household.

“My husband takes decisions” (Female respondent 3); *“I always cook with cow dung cake (goi) and the decision has been taken by my husband”* (Female respondent 11).

In spite of husbands’ unwillingness to hear opinions related to energy, some women try repeatedly to give their opinion until their husbands become angry and repeat the process in the following days in an attempt to convince their husbands. These women are educated and aware; some of them are trained by BRAC (NGO) and are involved in economic activity. In interviews they related that it is good to keep pursuing the topic with their husbands with the expectation that after some days the men may understand their needs and opinions; they claimed that the situation has been improved.

“I always try to express my opinion. If he does not give importance to my views, I remain silent. If I show my anger, it will not work. I try to tell him every day. I tell for betterment; if he understands that’s fine, if not then no problem. I tell whether he cares or not. It is my own judgment to tell continuously. I also tell others to do the same. If you try, he may hear after two to three days; if not then no problem.”
(Female respondent 13)

On the other hand, some women never try to participate in energy decisions in order to avoid confrontation. They refrain from trying to put their views to their husbands in order to avoid negative consequences. Some husbands quarrel and/or physically assault their wives if they become angry, or tell them either to contribute money or to leave the house if they cannot adjust to the situation of using traditional fuel.

“I never try to give my opinion and do not tell if it is good or bad” (Female respondent 12).

“If I say repeatedly, he quarrels, even beats me. After that he tells me to go to my father’s house. He says, ‘leave my house’. He wants to send me back to my father’s house” (Female respondent 07)

In some households women make household decisions including energy as their husbands do not want to take responsibility for their family. Women normally cook with the fuel that is gathered at no cost. If those women are not able to manage free fuel and ask their husbands to purchase fuel, for example kerosene for lighting, they become angry with their wives. Thus, taking decisions does not mean those women are empowered in the households, their position is worse than the women who have no chance to take decisions. These husbands think it is the responsibility of the wives to manage fuelwood and cook food on time. This description is consistent with one community leader's opinion. He said that some husbands are indifferent to take the responsibility of their families. Community leaders also said that in some households husbands do not know how wives are managing fuel and cooking food. A few husbands do not consider lighting is a problem as they stay outside in the evening; they come into the house at night, sometimes eat, sometimes not and go to bed.³

Due to different reasons, most of the husbands do not want to hear the opinions of their wives at the time of taking decisions. The men think that it is their money, they run the family by their income and they feel wives have no right to consult with them.

“He says, ‘I bring, I pay; you do not have any right to say anything’” (Female respondent 10).

A considerable number of husbands think that they know what they should do; if they have money and feel something is essential, they buy it. They do not feel it is important

³ This behaviour is mostly exhibited by those husbands who think their wives are not attractive to look at or who are middle aged with children. I asked those husbands off the record why are they doing so. All of them said *“I don't like her; she is not beautiful to look at.”* Another observation is those husbands are involved in gambling in the market at night.

to discuss decisions with their wives as they believe they know the energy needs of the family.

“I take the decision. I have to purchase kerosene when it is not available in the house. Black out is very common in evening and it lasts for one hour. I also use four candles a month.” (Male respondent 10)

Hearing wives has little real effect in energy and appliance purchase decisions. Women would like to purchase chargeable lights to use in times of load shedding; ovens and hotpots to avoid the inconvenience of igniting burners; and fridges to preserve food. Some husbands ask their wives for their opinions and some of them show attention to their wives by listening closely, but husbands make decisions according to their choice and understanding of what they think fit; they do not consider their wives' opinions when they make their decisions relating to energy use.

“All the time he buys things according to his choice, he does not even hear one or two of my opinions.” (Female respondent 08)

A few households think it is futile to make any decisions on energy use as they are very poor and unable to buy the necessities of life. Wives tell their husbands to buy kerosene if the households have no kerosene for lighting and husbands buy kerosene after purchasing food if they have money; if not they live in the dark. In that case they eat before evening and go to bed, wake up early in the morning and manage their work in daylight.

“I do not take decisions as I have no money. What is the benefit of taking decisions?” (Male respondent 09)

Women interviewees mostly said that they have no opportunity to take part in decisions and generally the statements of husbands and community leaders have supported this. Community leaders however also stated that in recent times women's participation in

household decision-making has been improved. A female community leader suggested that women should pursue their husbands in order to improve the situation; her statement is similar, to some extent, to one of the aforementioned female interviewees.

“Most people take decisions following discussion” (Community leader 01);

“Husband takes 100% of the decisions” (Community leader 02).

Women have to make their husbands understand but not in heated arguments.

After taking a meal when they are calm, women have to tell at that time. If it does not work for the first time she has to try to make him understand next time with a cool head. (Community leader 03)

Depending on the circumstances, a few women can consult with their husbands and their opinions are valued in the decision-making process; these households take decisions jointly after consultation. Where women have an income and can contribute to the costs of the energy bill, their opinions are valued by their husbands (see chapter 6). In such cases the husbands consult with wives in the expectation that she will share the connection cost and monthly bill if they agree to access electricity.

“We take decisions collectively after discussion.” (Female respondent 13)

The minority of husbands living in the houses of their fathers-in-law also tend to take decisions after consultation with their wives. In that case, husbands might support wives to take any advantage from their wives’ families. This situation is observed in cases of rental electricity connections.

“My wife has taken a decision to have the electricity connection after talking to her brothers and I give consent. One kg kerosene needs 80 taka and it is not enough for one month. I need many lamps but now one light is workable.” (Male respondent 11)

A few husbands do ask for advice and share their ideas with their wives, taking decisions jointly after discussion, even when their wives have no income or they do not live in the homes of the fathers-in-law. These ones are generally young husbands (aged between 20 to 25 years) working outside the villages as drivers or motor mechanics, with significant incomes. In the course of their profession they regularly go to the towns and cities and as such have knowledge about the lifestyle of urban households and the current world.

“I always value her opinion because these are our needs.” (Male respondent 22)

On some occasions, a man living abroad sending remittance for the family is the decision maker; he may be the father, son or brother of a joint family. Such men also tend to value their wives’ opinion at the time of taking decisions. Wives express their views over mobile phones to their husbands and after consultation with wives they instruct the person who maintains the family (generally another man) to execute decisions.

“My sons are the decision makers, they are working abroad. I hear them and their wives. My sons send money and I buy whatever we need. We have everything in our house including TV, fridge, mobile and electricity.” (Male respondent 24)

In summary, women mostly are not able to claim their energy needs with their husbands. Most of the husbands think they earn and meet the expenditure of the family, they know what they should do. A few women who have financial capability or who are living in fathers’ houses are able to claim their energy need and husbands take decisions after consultation. Besides, a few young and educated husbands who have the connection with town for their jobs consult with their wives for energy decisions though their wives are not financially capable.

5.3 Energy justice at the community scale

5.3.1 Consultation of women in the community

Consultation is a process by which stakeholders' opinions, needs and desires can be communicated in a way that helps to improve the transparency, effectiveness and efficiency of a group, organisation or society. It is a two-way process where an exchange of views helps to explore the effective way to address needs and settle disputes (Shannon, 2014). Women living in the fieldwork area want to share their experience and ideas on energy use but they have not been given the opportunity to take part in any type of consultation or discussion.

“I have not participated in any discussion and I have not expressed my opinion anywhere” (Female respondent 20).

The reason for not taking part in community consultation is there is no appropriate forum where women can share their energy needs and expectations and express their opinion related to energy access and services; nobody invites them to take part in community consultation yet. Moreover, most women have no idea about what is involved in community consultation as nobody has approached them soliciting their views.

“I have opinion but no place to express my views” (Female respondent 23);

“Nobody calls me to join in any programme. These are not happening in this area.” (Female respondent 03)

“Nobody has discussed this yet. I have not got opportunity to say what I think.” (Female respondent 14)

Moreover, women from the interview group have claimed that there are no community development activities in this area for women more generally, and they have not gathered to discuss any aspects of community development, nor even self-development.

“Nobody wants to know my opinion about what will be good or bad. I have not tried to say anything to anybody. To whom should I express my views? There is no cooperative here” (Female respondent 17).

Though there is no formal association of women for community consultation or development, some women work voluntarily to help the community. One interviewee works as a midwife to help the community and earn some money as well. Another woman provides training related to female development, especially what to do in cases of violence against women.

“I tell the women when they come to me what I have learnt from the training. I tell them about female development. I have learnt many things related to violence against women” (Female respondent 19).

A few women have tried to consult with their neighbours in an informal way; their discussions are mainly concentrated on the economic improvement of the households and they have not benefitted from these discussions as they do not have money.

“I have tried to talk with the women besides my house. We discuss and share views how we can live better with children but can not do anything due to lack of money” (Female respondent 03).

Though there is no association, some cooperatives were formed in this area and women have had a bitter experience with the cooperatives. Earlier, some women came here from a distant locality and built a cooperative; they told the women who joined that they would receive a bonus after some months. In good faith, the women deposited their small

collection of money by working hard. But after some time and before paying anything out the newcomers departed with the money they had gathered.

“Some people tell to pay for insurance and after some months they will give bonus but I do not trust on it. Many people were involved in this and lost their money”
(Female respondent 22).

5.3.2 Participation of women in local government

In a democratic society every citizen should have equal opportunity to participate in decision-making (Schlosberg, 2003; Davies, 2005). It is a process of integration and assimilation of ideas from different groups so that the needs, wishes and expectations of any group will not be excluded from the decision-making process. To ensure women participate at community level and thus take part in the decision-making process, women representatives are included in every local government institution. In Bangladesh, every Union Parishad (the smallest unit of local government) has different committees, including health and sanitation, and in theory women have the opportunity to share their opinions and provide suggestions. It is to be noted here that chairman and ward members appoint the members of the committees and there are options to invite inhabitants including men and women in those committees to know their views. Bangladesh's Local Government Ministry encourages inviting women to those committees and the Union Parishad has the obligation to show that women were present in those meetings. But, elected local government representatives said (in community leader interviews) that they invite rich and educated women; they do not invite energy poverty affected women. All community leaders said in the interviews that women are little interested in attending such meetings. They said a few women who attend rarely participate actively and give their opinion in times of decision-making; their participation is limited to attendance.

Most of them remain silent in the meetings. These women attend those meetings in order to show others that they are elite among the women, as the Union Parishad requested them to join in the meeting, and they can mention it to other women in that locality to show their status.

Those [rich and educated women] who come just sit and hear and very rarely one or two speak which is very insignificant. Those who speak are educated but they are few in numbers (Community leader 01).

We select those women who are educated and intelligent. They talk less in the meeting and rarely give their opinion. The ward member is the chairperson of that meeting. Those who are economically and socially powerful speak for the rights of the distressed women (Community leader 02).

Power relations influence the participatory process (Mosse, 1994; Agarwal, 2001; Yenneti and Day, 2015). In this locality there is a power relationship between community leaders and women from poor households where community leaders are holding the power and the women are submissive. Leaders think that the uneducated and poor women are not capable of taking part in decisions; essentially, they have no trust in the potential of the poor women. It was found in the fieldwork area that wealthier and educated women sometimes attend meetings of the Union Parishad (local government agency) relating to economic, education, environment (includes energy) and health care. These wealthy and educated women are not representative of the poor and uneducated women as their experience is not the same as energy-poor women who are the majority of the women of this locality. Wealthier women have better access to energy services for lighting, fans, fridges, mobiles and television and they also are living in buildings with ventilation and warm clothes and therefore feel less need for cooling and heating. Thus, this group is not a legitimate representation of energy-poor women. Moreover, these

women are also not able to speak in the public meeting. Traditionally women in rural Bangladesh feel discomfort in sitting and talking with men in a common place. It is to be mentioned, rural society is very conservative. Women normally cover their face in front of a man who is not their relatives or close to them. They normally talk little even with their brothers in law and father in law. Socially women cannot mix and talk with men; they feel shy to talk with men even when their husbands allow them to talk as they are accustomed in keeping a distance from men. This power relation not only affects meaningful participation it also invites misrecognition.

Good participatory processes need to take account of power relations and these need to be designed so that people feel able to speak. In this processes it is ideally possible to gather people who have better knowledge about the situation, that may be difficult for the experts to find out, to discuss the problems and suggest solutions (Ockwell et al, 2009). Energy poverty affected women know the reality. If they are included in the discussion, they may explain it in a better way than the experts. Good participatory processes can enhance knowledge through collective thinking and may suggest what measures need to be taken to solve the problems (Capek, 1993; Reason and Bradbury, 2008; Hunold and Young, 1998). These energy poor women may suggest better solutions through brain storming in the discussion groups. Women only discussion groups may improve women's opportunity to speak freely. In time of field work, the researcher had the opportunity to present in a yard meeting of a small group of women (normally once in a month the meeting is held in any of the women member's yard) and women were discussing freely among themselves. However participation may not be effective if women are considered as a single group, because experiences may differ.

GAD approaches started to acknowledge that women are not all the same and gender needs to be considered alongside other divisions such as class and caste (see chapter 2). Rich and educated women may not give equal chances to poor women to participate in that discussion. It is therefore better to organise a separate discussion group for poor and energy poverty affected women.

Yenneti and Day (2015) state that local participatory process can improve women's participation in energy decisions. That research was related to land acquisition and solar energy project implementation where the lower level of local government in India (Panchayat) was directly involved for this action. People can discuss with them directly and it is possible to arrange sufficient meetings with people. But, the situation is not as easy if it is related to an issue that is controlled by central government. According to the administrative system of Bangladesh, rural women are living in the lower tier of local Government. The Bangladeshi administrative system is divided in two systems: central government and local government. Local government has three tiers: District, Upazilla and Union Parishad. A District consists of some Upazilla. Under every Upazilla there are some Union Parishad which is the smallest local government unit, under which there are some wards and rural women are living in those wards. If women should be involved in participatory meetings, a model needs to be designed to ensure their participation has influence with the Energy Ministry. Later in this chapter, a scheme is proposed to ensure women's direct participation from local government to central government in the case of energy policy formulation (see figure 5.1 in section 5.5.3).

5.4 National scale energy justice issues

5.4.1 Distributional injustice in access to energy resources

Energy poverty in terms of access to clean, affordable and reliable energy services prevails in this locality; almost every household including the rich are facing a cooking fuel problem. Bottled gas is available but it is not affordable to all. Rich households have the ability to purchase bottled gas but think it is not economic and use it in combination with indigenous fuel to keep costs down, because the price of bottled gas is more than double that of fuelwood. There are in general some alternative solutions to cooking fuel like a solar cooker, or improved burner, or access to a gas supply line, but solar cookers and improved burners are not available in this fieldwork area and people have no information about them. People do have information about mainline gas, as it is available in towns around this area and they know that gas supplied in this way is cheaper than fuelwood. It should be noted that rural households have to spend more money for cooking fuel than urban households with mainline gas do. The price of gas up to August, 2015 was 450 taka (GBP 3.80) per month; though recently (September, 2015) the price of gas has been increased to 650 taka (GBP 5.50) per month, it is still very much lower than the cost of fuelwood and it does not produce smoke.

People in the fieldwork area think that gas from the gas pipeline is the obvious solution to the provision of affordable cooking fuel. People wish to access a gas line to help them with the problems of fuel acquisition.

“The most heartfelt demand of the people in this area is to get the supply of gas so that fuel needs shall be mitigated easily.” (Community leader 01)

People living in this area feel deprived because the largest gas producing field of Bangladesh (Bangladesh Gas Field Company Ltd (BGFCL)), from which gas is produced and distributed throughout the country, is situated at close proximity to the village, but they are not able to access the gas. When the gas field was constructed and set up, some of the lands of inhabitants in the fieldwork area were acquired (this land was bought by the government under ‘The acquisition and requisition act, 1982’ by the government). At the time of interviewing it was told that cultivable land was acquired from some of the interviewees for installation of the gas field but they have not received a supply of gas. A distribution line was constructed in 1992–93 to some areas of the village, but no gas distribution has been started, or appears to be planned.

“The gas field is here. It is in my land” (Male respondent 24);

“What is the benefit of having an adjacent gas field? There is no gas connection here” (Male respondent 01).

It is a great sorrow for us that gas is supplied throughout the country and most of the industries from here [Brammanbaria district] but we are deprived of this gas supply. Gas is available in many areas of Brammanbaria, Shahbazpur is an educated area but we are not getting gas (Community leader 02).

Humphrey (2003) states that if a group of people is not able to access any social benefits due to scarcity of resources, their economic loss that arises due to improper distribution has to be compensated. This idea may reduce disparity at some level, but some losses cannot be converted into numerals. In this case, consider for example, those women who use fuelwood due to inaccessibility of clean fuel and pay more money to buy it, then their extra expenditure may in theory be compensated for. However, there are long-term health

effects due to using primitive fuel: how can these be converted into terms of money and how can this compensation be paid?

Other energy services are also poor for the whole community: every rural household in this region experiences poor quality of lighting due to frequent load shedding. People living in towns use an Instant Power System (IPS). IPS is an electrical device that stores power when power supply is available. It can be used for lighting when load shedding takes place. People have to buy this device and install it in the houses. The minimum price is Taka18000 (GBP 150) and it can operate 2 lights and 2 fans for three hours. Many people in urban areas use it, but these devices are not available in this area as they are expensive and there is no market for them.

Thus the whole community experiences distributional energy injustice in the form of a lack of access to gas from the adjacent field whereas cities in this and other regions are able to access this gas. Regarding electricity supply load shedding is more frequent in rural areas than urban and there is a lack of availability of any alternative power source for lighting and other services. Women are subject to distributional energy injustice as part of the community. However the issues at community level result in worse problems for women than for men for reasons discussed in the previous chapter, e.g. they spend more time in the house and cannot leave the house to cool down in public areas as men can, or remove clothes and they cannot go to tea stalls and markets in the evening and so they may be at home without light.

5.4.1.1 Energy policy and people's perception

People in the fieldwork area have the perception that money and influence are essential to bring a gas supply line to their community. They need to communicate with the energy

authority and pursue officials in order to get permission to access gas and they need support from influential people. People have the perception that the government usually hears the demands of powerful citizens and that the poor are less likely to receive attention from the government. Residents have tried to consult with influential people; many businessmen, bureaucrats and politicians who are the permanent residents of this village living in the capital city who have power and influence. Many interviewees including men and community leaders claimed that those aforesaid influential people are reluctant to negotiate with government offices about this issue as they are not living in this area.

Governments generally listen less to general people. When the election comes, they [political leaders] say we shall give everything including gas, but after election they do not fulfil commitments. Nobody comes in this area after election. I have never seen any employee of the Gas Company in this area throughout my life. (Male respondent 16)

“Our opinion carries no value to the rich. They work in Dhaka and do not work for the village” (Male respondent 14).

Leadership with integrity is important when there is no scope for an opportunity for formal participation in the policy. Some inhabitants feel that they do not have the driver (initiator) who can take the responsibility to integrate the inhabitants, convince energy companies to supply gas in this area. Somebody has to shoulder the responsibility to gather funds from the people and deposit it to energy companies if gas distribution is sanctioned. These persons have to be trustworthy to village inhabitants. Normally local leaders may play the role of initiator but people do not have confidence in their local leaders; they think if people give them money they may not reclaim it at a later time if the initiative becomes unsuccessful. As a result no fruitful initiative can get started.

“If gas supply order is issued, the money can be gathered within a week. The problem is with whom you deposit the money, he will grab it. I have no trust of the leaders; all are taking bribes” (Male respondent 24).

If the institution does not pay attention to cultural respect and inclusion of a social group it may lead to misrecognition and misrepresentation of that group (Fraser, 1998; Honneth, 1994). Misrecognition and misrepresentation overlook the dignity of the people and may lead to feelings of deprivation in a group(s).

When people feel deprived and find no way to overcome it, they may become frustrated and feel neglected. From the interviewees’ statements it is found that feelings of deprivation may lead to demonstration, anarchy and sometime violent movements. The inhabitants of this area staged a demonstration and blockaded the highway to establish their rights in order to access the gas line. From interviews with the community leaders and men in the village it is found that to pacify public anger and dissatisfaction, sometimes the government makes some commitments on an ad-hoc basis but they are not carried out in the future. In this particular case, in June 16, 2014 people staged a procession in protest and blockaded the Dhaka to Sylhet highway which passes through this area to create pressure on administration and to inform the people of the country about their grievances through the media. It is to be noted, blockade is a common practice to show the grievances of the people in different issues. At that time leaders came into this area and a commitment was given by Upazilla Nirbahi Officer (Chief Executive of Sorail Upazilla administration under which this fieldwork area is situated) that the government will take care of this issue (of gas connection) soon, but their promise has not yet been fulfilled.

“The government representative has given us word to give gas but we have not got it yet after one year” (Male respondent 21).

5.4.2 Procedural justice and recognition for women in national energy policy

It is observed that the energy needs of rural women are not satisfied in the fieldwork area; women have not received a proper distribution of energy resources, especially for cooking fuel and quality of lighting. It is important to scrutinise whether a fair procedure has been maintained in the case of distribution of these energy resources. To examine the situation the aforesaid three pillars of procedural justice, along with recognition of these marginalised women, were considered.

I. Access to energy information

Sharing accurate information is important (Portman, 2009) so that in times of participation, all parties will be able to share their demands, knowledge and experience in order to facilitate meaningful participation. Information can be accessed in two ways; either by word of mouth or through print and electronic media (Kotler, 1999). Nowadays information can be accessed through information and communication technology (ICT) via the internet. The women in the fieldwork area have no access to information about energy services by word of mouth and they have no access to the internet. All female interviewees were asked the same question, that is: *“Have you ever met any official to discuss anything like cooking, watering and lighting or any other issue?”* In reply, everybody said that no official of the Energy Ministry (energy policy is formulated by central government) had ever visited the area to discuss access to cooking fuel and water with them, nor had they ever heard of anybody doing so.

The women interviews have a range of different age groups and different education level. It is assumed that elderly women have come into the field work area earlier after marriage and stayed for a longer time than the others; they may have seen and met officials and may have access to energy related information. However, interview with these officials reveal that they also never seen anybody to discuss energy access nor did have any knowledge of the issues involved. Another assumption is that uneducated or less educated women have little knowledge and they have little or no opportunity to access information. It was thought educated women in the interview group might have information about access to energy, but it was found that they have no idea about it and they also never seen any visitors from energy company or government officials distribution about energy.

“I have not heard anything yet and seen nobody of government office in this area” (All Female respondent (1-25))

On the other hand, men receive information related to their work which includes the use of machinery and modern energy as government organisations and NGOs deliver information to men about agriculture. The local agriculture office (working as part of the Agriculture Ministry) informs the farmers through their officials (extension workers and block supervisors) about seeds, fertilizers and irrigation process. They build a demonstration farm and give training to develop the skill of farmers. NGOs also have advocacy programmes about High Yielding Variety (HYV) crops, but women have not received any equivalent information or training from government nor from NGOs.

Unlike men, women in the field work area have no idea how they can access information about energy services, what steps need to be taken and the cost incurred. A few women

know from their husbands and neighbouring women who are using bottled gas that gas or improved burner may reduce smoke and enable to cook more easily and may also save their time formally spent on fuel collection, preparation and management, but most of them do not know the price of the modern fuel. Conversely, men interviewed perceive that the supply of gas from gas line of the potential solutions for modern cooking and are aware of the different steps and measures that need to be taken to access the gas line. They could explain why they are not able to access modern energy supplies. What the impediments are and what endeavours they have taken, but in contrast the women do not have any knowledge of the issues involved.

II. Participation at national level

Participation of the people is essential and their ‘voice’ has to be heard in the decision-making process in order to empower citizens (Burns et al., 1994; Soneryd, 2004). To increase the legitimacy of a policy the voice of the excluded group needs to be addressed in the decision-making process (Harvey, 1996; Leach et al., 2007). In the opinion of the researcher, participants should be chosen in a way that enables all sections of the society or organisation to have proper representation. As women living in this area never encountered any government official and nobody had told them about any energy-related services, they had no opportunity to consult with the officials. It is easily understood that women had no opportunity to express their opinion in energy policy formulation and their ‘voice’ is unheard in energy decisions.

“Nobody consults or advises us about those issues” (Female respondent 03).

“No government official has come yet to discuss anything like cooking, watering and lighting or any other issue” (Female respondent 07).

A. Review of Energy policy documents

To ascertain procedural justice, it is important to ensure participation of all groups in government policy and decision-making processes; social elites and cultural organisations are not sufficient to formulate an effective policy (Gould, 1996; Young, 1990). To ensure energy justice for women, recognition of women of different groups has to be ensured and their participation sought in energy policy formulation and the decision-making process, but in the case of Bangladesh, rural women had no participation in the following: Bangladesh National Energy Policy (BNEP) 2005, Renewable Energy Policy (2008), the Gas Act (2010) and the Gas Rule (2014) because policies are designed through a ‘top down approach’ where energy experts, media and businessmen were invited to share their opinion (this is known through personal experience working in the Energy Ministry in 2007-8: Acts and Rules are prepared based on the BNEP). It should be noted here that the energy policy documents different energy resources like gas, coal, mineral sands and solar, but only gas is distributed as fuel, though the solar cooker is being introduced slowly.

The policy outlined in BNEP (2005) is the guideline followed to develop the energy sector where women’s energy needs and desires have not been described separately, though its one objective is to give priority to providing rural people with access to modern energy and services. The BNEP (2005) recognised that energy resources and electricity have not been distributed uniformly throughout the country for balanced development. This policy agrees that adequate attention was not given to meet the energy needs of rural people. Inefficient use of fuels without proper planning degraded the environment and no rationality has been seen in the case of energy prices. The objectives

of this policy are to meet energy demands in every region of the country, rather than concentrating on the cities and it emphasises the rational use of all energy resources for sustainable development. This policy aims *“To integrate energy with rural development to boost rural economy”* and *“To ensure a reliable supply of energy to the people at reasonable and affordable prices.”* Though BNEP (2005) focuses attention on energy policy and provides a guideline for proper distribution of energy resources between rural and urban areas in order to ensure sustainable development, the gender dimension has not been analysed or discussed in this document.

Like BNEP (2005), Bangladesh Renewable Energy Policy (2008) aims to reduce the disparity between living standards in urban and rural areas through uniform distribution of energy. This policy aims to explore and utilise renewable energy to supplement the non-renewable energy sources like gas, coal and mineral sands. It emphasises the need to develop solar energy, and biogas plants to support people living outside the gas and electricity network. In addition, it focuses on reducing environmental pollution. This policy suggests providing ‘financial support’ to people living in the rural and remote areas in order to encourage them to purchase ‘renewable energy equipment’. This policy prescribes the development of ‘Rural Energy Master Plan (REMP)’ in order to ensure economic development and better living standards for rural people but this master plan has not been developed yet.

The Mines and Mineral Act, 1968 deals with stone and mineral sands but does not cover cooking fuel. It should be mentioned that another available energy is coal but a policy for coal has not been formulated yet; use of coal is limited to power production and it is not a clean fuel. Therefore, there is a concentration on gas as a cooking fuel for household use

and government and citizens are more focused on it. The objectives for rural development are explained in the BNEP (2005) but this idea is not explicit in the Gas Act (2010) which states that the government will regulate the gas supply; gas line construction, expansion and distribution will be ensured through rules announced from time to time.

According to section 5 of the Gas Act (2010) construction and distribution of gas will be supervised and controlled by the energy regulatory commission. This is a 'top down approach' where the government will instruct and control gas conservation and supply through an Energy Ministry. As directed by the Gas Act (2010) the Energy Ministry has published two rules to regulate gas line construction and distribution; these are (1) Gas Marketing Rule (domestic) 2014 and (2) Gas Marketing Rule (industries) 2014. The Gas Marketing Rule (domestic) 2014 is pertinent to this discussion. In the preamble it is stated that 'non-renewable' energy is not unlimited and the objective of this rule is to optimise use of gas in order to alleviate poverty by generating revenue. It is stated in the preface of the Gas Marketing Rule (domestic) 2014 that the gas connection and distribution procedure has been made easy for households but how rural people will be benefitted and whether the gas line will be extended or not has not been mentioned in that rule. This rule seems to support the vertical extension (permission of gas connection in those areas where a gas line is available, not the extension of the gas line area) and this assumption is reinforced in the annual reports for 2011–12 to 2014–15 of Titas Gas Transmission and Distribution (the government owned main gas supply company) which indicate that this organisation has not extended any gas line in the off-grid area.

Horizontal expansion of the supply line for gas distribution has not been considered by the gas company; the inhabitants of the field study area previously excluded from the gas

connection network have not received gas since the Gas Act (2010) and rule enactment. According to the new procedures, gas connections will be awarded to the residential area, hostel, laboratory, hospital, mosque, temple, or church in those areas where a gas distribution line already exists. This rule does not formulate how poverty will be alleviated except for the words 'revenue generation'. With any additional gas connection revenue is increased but how it will contribute to alleviate poverty is unclear. This rule mainly focuses on the new connections for towns and to increase revenue by facilitating legal action against the defaulter of a gas bill through a mobile court. The objective of the Energy Ministry is supplying gas to encourage industry growth and satisfy existing town household customers. There may be debate about natural gas scarcity and the optimum usage plan the government wishes to develop in the industrial sector to boost the economy by sacrificing the extension of the gas line to supply rural people. This is not a good reason for failure to extend the gas line because bottled gas as household cooking fuel is available throughout the country and bottling plants are becoming a good business nowadays. Moreover, the transportation system has been shifted to Compressed Natural Gas (CNG). Thus, it is clear that the use of gas has been increased in all ways though access for rural people has not been increased. This policy seems to support the supply of energy for rich and influential urban people and to increase industrialisation at the cost of ignoring the energy needs of local people. This conclusion illustrates the arguments of Harvey (1996) and McCarthy and Prudham (2004). Harvey (1996) states that money, power, resources and privileges influence the construction of a society that creates inequalities between groups. He indicates that in the case of market liberalisation, money is accorded more value than humanity, dignity, emptiness and misery. In support of his

statement it can be inferred that injustice and power relations have a positive relationship under economic liberalism (McCarthy and Prudham, 2004).

III. Access to courts to receive justice related to energy

All policy, acts and rules ignored women's participation in the decision-making process and no information has been shared with the women; it also overlooked the energy rights of rural women which is not consistent with the Bangladesh Constitution, 1972. The Constitution upheld the rights of women and undertook to ensure women's participation everywhere. Article 19(3) asserts that: "*The State shall endeavour to ensure equality of opportunity and participation of women in all spheres of national life.*" But, in energy policy, the gas act and rules have no separate provision for women and have not considered the gender dimension of energy need. It is important to uphold the legal rights of every citizen to ensure procedural justice. The energy demands of rural people have not been addressed in the Gas Rule (2014) which is against the spirit of the Bangladesh Constitution. The Bangladesh Constitution, 1972 upheld social justice through its fundamental principles and fundamental rights. In the 'Preamble' of this Constitution 'equality' and 'justice' for all citizens are prioritised along with other rights.

...It shall be a fundamental aim of the State to realise through the democratic process to socialist society, free from exploitation – a society in which the rule of law, fundamental human rights and freedom, equality and justice, political, economic and social, will be secured for all citizens.

Along with the rights of women, the Constitution prioritises rural development. Article 16 of the Constitution declares that it is the responsibility of the state to ensure rural development and proper distribution of wealth through agricultural promotion and rural electrification in order to remove disparity of living standards between urban and rural

people. Article 19 states that it is the duty of the state to create equal opportunities for every citizen. According to the spirit of the Constitution, the natural resources (including oil and gas) have to be distributed in such a way that every citizen of the state will receive equal benefit. However, the policy does not address how this is to be brought about for the major portion of society, the 80% of the people of Bangladesh who are living in rural areas.

Women have the right to enter into the legal process and can ask for the protection of law under constitutional commitment. In the preamble of the Constitution it is stated that it is the supreme law of the state; if any law contradicts with the spirit of the constitution it will automatically null and void. It is literally impossible in the present context for rural women to seek redress via law, as those women have no knowledge about modern energy services and they do not know how to access it. They also have no idea about the rights as they have never received information, advice suggestion about modern energy services. Moreover, they have never been consulted or their opinion sought on any issue related to energy. Above all, to enter into the legal procedure involves costs; the poor normally do not access courts as they do not have money.

5.5 Conclusion

5.5.1. Distributional justice

Rural women are observed as clearly a socially and economically disadvantaged group, they should therefore get more benefit from primary resource distribution according to Rawls (1971) difference principle. But, unjust distribution of energy resources was found at the household level and also in national level. Women are using indigenous fuel for

cooking as they are not yet able to access modern energy, but men have already gained the advantages of modern energy services and technologies in farming by using tractors and watering with irrigation pumps. As a result, the workloads of women remain the same and they experience health problems as usual, but the male workload is drastically reduced. Moreover, men get more leisure time that helps them to improve their economic and social capital through sharing more information from gossiping, television and socialising. Women have little or no access to mobile phones though almost every house has a mobile phone. Husbands control the use of mobiles and normally women cannot make a call by it; mostly they can talk when their husbands receive the incoming call and give them permission to talk. Men watch television in the markets but women cannot watch it as most houses have no television. Moreover, these rural women have no access to gas from a gas supply line or use of a solar cooker, but gas is available in the surrounding town and satellite town and the solar cooker is now being introduced in different areas of the country. Both men and women in rural villages receive poor quality of lighting due to frequent load shedding and low voltage as compared to urban areas. In the hot and humid summer, they cannot use fans especially at noon and evening to cool themselves due to load shedding. From the fieldwork it is found that women's position in the households is inferior to men and these marginalised rural women are experiencing 'unfair' distribution of energy resources in comparison with men. This finding corroborates with the previous literature where it is explained that marginalised group(s) have the highest chance to be deprived due to unfair distribution of resources (Yenneti and Day, 2015; Gross, 2007; Harvey, 1996).

Moving up a scale to the national level, we can see distributional injustice in the development of modern energy and its distribution in Bangladesh. The cooking fuel problem of the fieldwork locality, which affects women more than men, could be alleviated by the introduction of solar panels, improved burners or gas. As the solar cooker or improved burner is not available in this area and people have no information about these, they consider gas supplied via a pipeline as a solution to their energy problem. They think they have a right to access gas as they were directly affected during the establishment of the gas field very close to the village when some of the interviewees' land was acquired at the time of its construction. Besides the cooking fuel problem, the villagers experience poor quality of lighting due to more frequent load shedding than in the town, especially in the evening and they use kerosene lamps or candles at that time. Apart from cooking fuel and poor quality of lighting, the reason for inaccessibility of other energy services to households in this rural village like access to mobiles, televisions, fridges, or household energy appliances are due to their lack of affordability not from unavailability. It is to be noted here that rural women do not focus more on the aforesaid energy services and do not claim government intervention to access those facilities because these sectors are privatised where government has no responsibility for distribution. The national scale distributional injustice underpins and compounds the energy poverty of women and the distributional injustice they feel regarding energy services at the community and household level.

5.5.2 Justice as recognition

It is important to recognise all groups in a society for fair distribution of resources otherwise misrecognition may lead to mal-distribution (Fraser, 2000). Lack of

recognition may cause dissatisfaction of that group (Honneth 1995, 2001; Taylor, 1994). Marginalised groups in a society have to be included, respected and recognised. Cooke and Kothari (2001) claim that deliberate exclusion of a group is an 'illegitimate' and 'unjust' use of power because it is opposite to the promise of empowerment and development where participation of all groups needs to be secured; but rural poor women in Bangladesh are not considered as a group that need to participate in the different committees of the Union Parishad. Community leaders argued in the interviews that the reason for not inviting poor and uneducated women is that they are not active participants and remain silent in the meetings. In support of their argument they maintained that educated and intelligent women can play an effective role in the decision-making process and speak on behalf of distressed women. From the argument advanced by the community leaders, the importance of capacity building of uneducated women by training is self-evident, but it should also be realised that educated women cannot be a substitute, because for meaningful participation it is obvious that all groups need to participate. If the non-wealthy, energy-poor women could engage in meaningful participation their opinion derived from their experience may be heard, which may help to formulate effective decisions. From this research it is understood that besides recognition it is important to review whether some groups are missing from this participatory process and include the group(s) because marginal people may not have the consciousness to contact or negotiate to be included in this participatory process.

Though literature focuses on recognition of a group or groups in a society, it may be analysed in the household level where an individual may need recognition. Women's needs of modern energy services are not recognised in the rural households. A significant

number of husbands do not want to hear anything from their wives related to the fuel issue. They want to minimise the costs associated with cooking fuel in any way; husbands choose indigenous fuel for cooking because the cost of fuel plus cost of medicine is less than the cost of clean fuel (gas). They avoid women's modern energy demand with the argument that primitive fuel has traditionally been used for a long time and that most of the women have no problem caused by its use; only those who have less immunity become ill. Though, husbands are prepared to spend money for farming as they consider it an investment for crop production, but they are less concerned about cooking fuel as it does not generate income.

5.5.3 Procedural justice

I. Sharing information

Sharing information among the groups is one of the three pillars of procedural justice. Two ways information sharing is very important to make the communication effective. According to Portman (2009), sharing information with the people is the half portion of the process. It is obvious to give them feedback what actions were taken about their opinion. These rural women have no information about modern energy technologies and services. They have never heard of any energy-related information from anywhere. Officials of the Energy Ministry and companies have never met, informed and shared the government ideas, stance and objectives related to energy. Yenneti and Day (2015) argue that people should not only get the right of information and provide opinion, they also have to receive feedback whether their opinion is valued in the decision making process. It is fact that sometimes it is not possible to accommodate every opinion into the decisions. It is better to keep the people informed why their

opinion was not possible to be inserted. But, the reality in the developing countries is marginalised people are yet to access the energy information. People normally do not have symmetric access to information where education, age and access to internet play an important role to access energy information. Yenneti and Day (2015) also found in their work in rural India that young and educated people had better information than uneducated people. This was the case in their research as the information was related to land acquisition for the renewable energy project where information is disseminated from the local government office through public notice. But, energy related issues are centrally controlled in Bangladesh where local government offices have no opportunity to intervene. Moreover, community leaders also do not have information like rural women in these issues. Literacy and access to internet may help to gather information to some extent because the Energy Ministry and energy companies have websites where all information is displayed and updated. As the rural women have no or little education and no access to the internet, they have no information about modern energy services and the scenario is similar for men. A few women and men mostly have mobile but these mobiles have only feature to make voice call and send SMS. Even if they had the internet facilities in mobile or they had computers, most of them would not be able to access information as they are mostly uneducated. Moreover, women have no idea how they can access information but men have some knowledge related to energy; they gain knowledge by sharing information among themselves and gain some ideas from television.

II. Meaningful participation

Meaningful participation is the second pillar of procedural justice; it also helps to improve public trust and confidence in the government (Leach et al., 2005 and Renn et al,

1995). Participation of women in the decision making process can improve women's 'voice' and also help women's empowerment (see chapter 2.0). Most of the women in the fieldwork area have little or no scope to take part in decisions in households. They have less scope to consult with their husbands regarding their energy needs about relieving their drudgery and health effects associated with cooking. At the time of the interviews women have not discussed with their husbands their needs for other energy services like mobiles, television, cooling and heating. They have no or little scope to give opinions at the family level; if they can give opinions in any way, they are rarely reflected in the decision-making process. But, women who have access to resources play a significant role in decisions. Women who have significant income or are living in her father's house can take part in decisions and husbands value their opinion to get the economic benefit. In addition, young husbands (with an age range of 20–25 years) have an awareness of the mores and conventions of urban life or living abroad, they value their wives' opinions during times of taking decisions.

At the community level, the procedural injustice towards women continues. It is found that energy-poor women have limited opportunity of participation in decisions at the community level. They have no formal place where they can represent themselves. Power relations between community leaders and energy-poor women and lack of recognition are the key factors that restrict women from participating in decisions. Leaders of Union Parishad (a part of local government) have not considered the energy-poor women as participants and never invited them to any meeting. This is misrecognition of the group of energy-poor women because they are ignored in participation and their experience and needs have not been recognised in decisions. The Union Parishad Chairman (acting) and

members (including a female member) invite rich and educated women to fulfil the formality of female participation in every meeting. This type of participation is not effective because the wealthy women are not representative of the poor and energy poor women as they do not belong to the energy poverty affected group and have no experience about the women's distress for energy poverty. In addition, even the wealthy women are not able to participate fully anyway because of the wider social context and prevailing power relations and the forum is not designed in a way that ensures they can speak freely. It is important to arrange women only discussions where every group of women to participate in discussion.

Representation of every group in the decision-making process helps to ensure meaningful participation. In Bangladesh, policy formulation and implementation is a 'top down' approach where the concerned ministry plays a significant role in designing the procedure to formulate policy, normally consulting with influential groups; this process is similar to Day and Yenneti (2015)'s findings in the case of India. These influential groups are energy companies, industrialists, energy experts and social elites who have been consulted at the time of energy policy, acts and rule formation. Rural women have no opportunity to take part in decisions and this illustrates the prevailing inequalities in the society; this finding is similar to the conclusions drawn by Cooke and Kothari (2001) and Cornwall (2004). Absence of meaningful participation of the people in democratic decision-making may create mistrust and reduce public confidence. As a result, the public try to find alternative ways to solve their disputes and there may be a blame culture in place. People believe that the government hears the influential people who are living in the towns. Male interviewee and community leaders accuse the rich influential people

living in town in this locality of having the capacity to solve their energy problem but not caring to do so.

Rural women have no participation at national level because at the time of framing energy policy women were not invited for participation. They have no opportunity to share their experiences and cannot tell their needs, wishes and expectations and their needs are not addressed in the policy. It is to be mentioned urban and rural women are not a homogeneous group. Moreover the experiences of women whether urban or rural also differ based on income. So, rural poor and rich, urban poor and rich women should be treated as different groups and it is important to include all four (at least) groups in the decision making process. Women's energy needs have not been recognised in the policy as nothing is written about women and their energy needs.

BNEP (2005) did not consider that the energy needs and wishes of men and women may be different and it does not address the 'gender dimension' in energy policy. This finding is consistent with Clancy et al. (2007) and Oparaocha et al. (2011) as they argued energy policy and planning are 'gender blind'. Women's opinions, voices and needs have to be heard and addressed in the decision-making process in order to achieve the empowerment of women (Burns et al., 1994; World Bank, 2006). But, it is found that no women have the opportunity to declare anything about their energy needs thus, no voice was heard from the rural women at the time of policy formulation.

Representation of rural energy poverty affected women and information feedback is important in energy policy, acts and rules to establish their rights in decision making. A method of decision-making should be designed in such a way that all groups get an equal chance to speak and have the same voting right (if required). But, it is a complex task as

they are living far away from the policy makers. Participation only at local level will not be sufficient to address injustice which is embedded in structures and policies made at larger scales (Korf and Oughton, 2006). Below, a block diagram is designed (figure 5.1) based on the field work experience and 12 years working knowledge (field and ministry level experience) to ensure women's participation in energy decisions and the incorporation of their concerns from local to national level. Under this diagram different committees are suggested to be formed. Those are Ward committee, Union committee, Upazilla committee, District committee and National committee. Every ward should have a committee and all energy poverty affected women will be members in the committee. Women elected women NGO workers will also be members and women elected ward member (she is elected by the women member of that ward and the member of union parishad) can act as the coordinator. These committees will discuss about their energy needs and wants, and also make their suggestions or comments and coordinator will make the minutes of those meetings. Women and NGOs will select two members and one member respectively from them and they will be the members of the Union committee. Ward coordinators will also be members of the union committee. The Union committee may be coordinated by any of the women elected ward members. This committee will arrange and conduct participatory meetings. From every ward two rural woman, one ward member and one NGO worker will be selected by their respective groups for Upazilla committee. The coordinator of the Upazilla committee may be the women affairs officer of that Upazilla and women elected vice chairman will be the adviser of that committee. Coordinator will take notes of the proceeding and write minutes of the committee. The reason of including the women's affairs officer is to prepare minutes of the meeting that

may be treated as agenda for the district meeting. Elected public representatives normally do not have the experience to prepare minutes and no orientation of official system. From every Upazilla, two rural women, one ward member and one NGO official will be the member in District committee. District women welfare officer will be the coordinator who will ensure women's participation in the meeting and will prepare the minutes.

District women's affair officer will send the minutes to the national energy committee. In the National committee two rural women of every district committee will be the members and they will be selected by the other rural women of the district committee. In the National committee there should be one ward member and one NGO official from every district. It is important to include rural energy poverty affected women of every district; it will be helpful to incorporate local problems. District women affairs officer may raise the issues in the district coordination meeting chaired by deputy commissioner (Deputy Secretary to the government who is the CEO of that district appointed by government) if something is possible to solve in the district level as energy company officials are the member of that committee.

In those committees four types of women are considered as the members. One: energy poverty affected women who are the main persons of the committee. The objective of the committee is to hear their voice and deliver to the next upper committee. Other three types of women members will assist the women to establish their effective participation. Two: women elected ward members; they have leadership capability and know the field reality. They may help to explain women's views. Three: NGOs have work experience in the rural areas; they are educated and have analytical skills. They may explain the arguments raised by rural women. Four: Government officers are responsible for

women's affairs. They know official procedures to write minutes and send it to the women affairs ministry and energy ministry.

The objective of the model is to address the different concerns of meaningful participation. Firstly, it will ensure the representation of energy poverty affected women as they are the members of this committee. Secondly, it will remove the 'power relation' because they do not have to sit and speak with men so that they will not feel shy to speak. Though, there are elected women ward members, NGO officials and women affairs officer, according to 'Terms of reference (TOR)' of the committee these women will not be allowed to share their opinion except to help them to illustrate their opinion and write minutes. Thirdly, energy policy, acts and rules may incorporate this 'bottom up approach' and address the opinion of these marginalised women as an alternative or supplement to the existing 'top down approach' of energy ministries in formulating and implementing policy, acts and rules. Fourthly, it may alleviate the situation that energy policy is gender blind.

The block diagram will also be effective for sharing information and feedback. It will allow symmetric access of information to all of them. Energy ministry will share information through the committees as rural women cannot access information from websites as they are uneducated and have no access to the internet. The National Energy Committee will also provide feedback of the women's participation to the District Committee and it will be disseminated down to Ward Committee. Rural women will receive the feedback on their opinion and it may help to address women's claims related to energy.

Moreover, this forum will give women opportunities to discuss among themselves about their problems and better solution(s) may be come out from the brainstorming. This model will help to hear the ‘voice’ of these marginalised women in the decision making process that ultimately aids women’s empowerment.

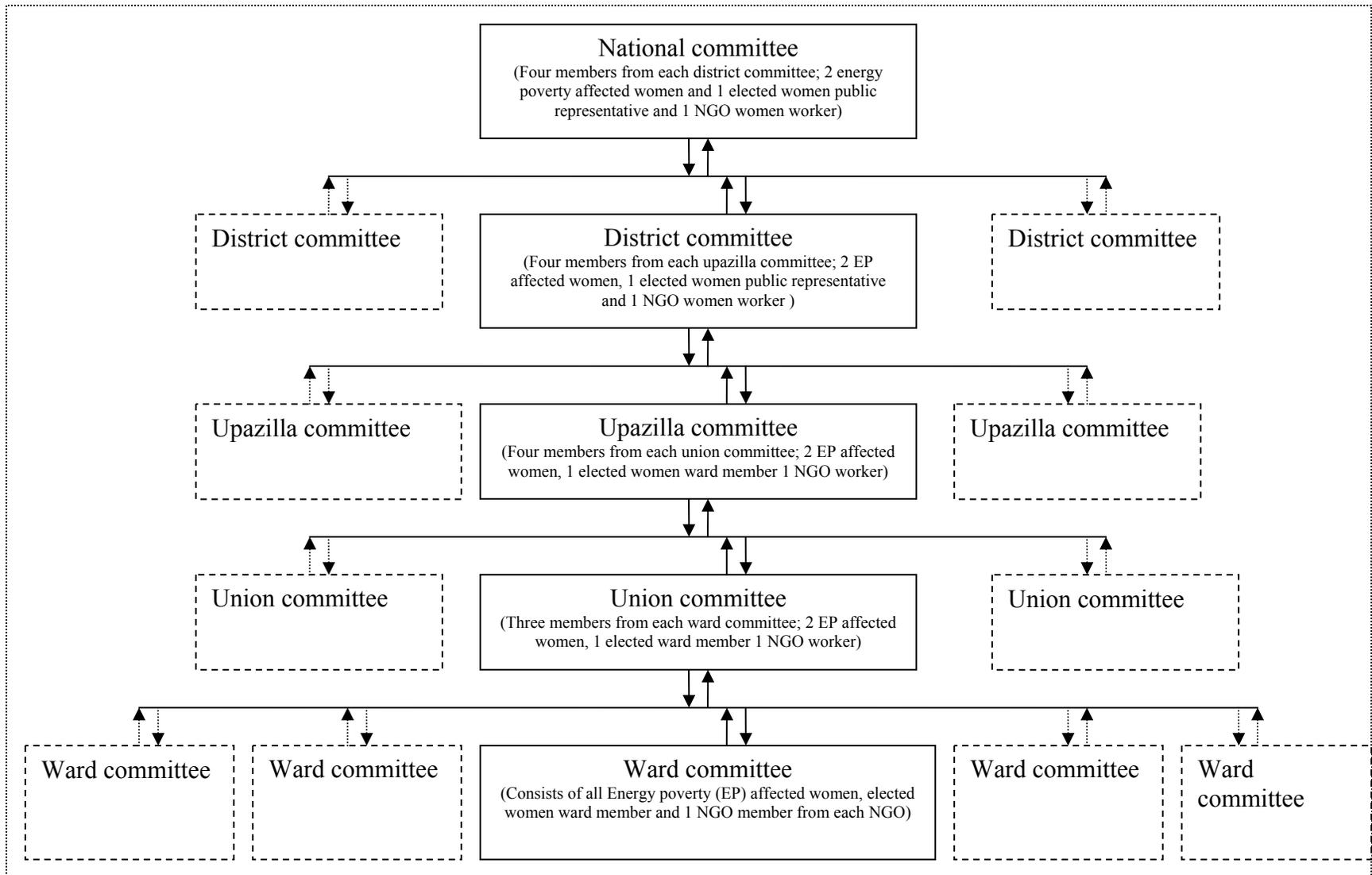


Figure 5.1 A diagram for participation and sharing information of energy poverty affected women in energy decision making process

5.5.4 Access to legal procedure

This is the third pillar of procedural justice. If people's rights are not upheld in process, they should have access to court to get their rights. The BNEP (2005), Gas marketing Rule (domestic) 2014 and Gas Marketing Rule (industries) 2014 are not consistent with the spirit of the constitution because women's participation is an obligation in every sphere of life and due consideration for women was not made at the time of energy policy formulation. According to the Constitution of Bangladesh, women's participation is ensured through participation in all spheres of life and the state has the responsibility to ensure women's rights, but in energy policy the rights of women have not been endorsed. The Constitution is the supreme law of the state and as this policy is not consistent with this, it should be overturned if women go to the court, but these marginalised, poor women have no money and idea about their energy rights, so they are not able to get the protection of the law.

This empirical chapter showed that women's energy poverty in terms of lack of access to energy services has a relationship with energy injustice. In the existing literature, energy justice is mainly discussed at the larger scale (national or community level), but this research showed that it should also be examined at the household level, as this is especially important in understanding the energy poverty of women. This research found that women do not receive energy justice at any level, from household to national. In the household, distribution of energy services to men and women is not equivalent; men and women do not have the same energy service access for their daily work. Men access modern energy services for farming whereas women work with indigenous fuel for cooking, which indicates distributional injustice in energy resource distribution. Women

living in urban areas have access to modern energy services but rural women experience the consequences of using indigenous fuel in everyday lives. They also do not receive a similar level of power supply to urban areas due to frequent load shedding. In addition, women are not receiving 'justice as recognition' from household to national level.

Women's energy needs are generally not recognised within the household and they have no or limited opportunity to participate in household energy related decisions. In this rural community, though there is no arrangement of community based energy or power supply, there is a formal committee in the union parishad where energy related meetings take place. Women living in energy poverty are not recognised as members of that committee. At national level, energy policy, acts and rules do not recognise women's energy needs and energy companies do not consider women's specific needs either.

Moreover, women's limited participation at household and community level, and the lack of consultation of any women's representatives in national energy policy making constitute a lack of procedural justice. This qualitative research also suggests that the GAD concept needs to be applied to improve the energy justice of women. Women's energy needs and situations are not all similar: based on social and economic strata, there is variation. It also argued that women of one socio-economic group cannot be adequate representatives of other socio-economic groups, and suggested that it is necessary to have direct representation of women living in energy poverty in time of taking energy related decisions, or developing energy policy.

This chapter also indicated that women's energy poverty has a connection with the financial capability of women. Access to modern fuel and power supply is not in itself enough if people cannot afford to purchase energy services. Moreover, to receive other

modern energy services like information and communication, cooling and heating, households' ability to pay is the precondition, because these are provided through the private sector. Anybody can purchase appliances such as a mobile, TV, fridge, oven, AC if s/he has money, though uninterrupted power supply is also an important factor to run those appliances effectively.

From this empirical chapter it is shown that women who can purchase energy service(s) or have the capability to contribute the household's ability to purchase them have the ability to take part in energy decisions in the household, and experience greater energy justice. It is therefore important to explore the financial capability of women living in the field work area and find out the dynamics (if any) that encourage, limit or hinder this capability. In the next empirical chapter, women's ability to contribute to the household's ability to purchase energy services is explored and the factors influencing their financial capability are also discussed.

Chapter 6

Energy poverty and factors influencing the financial capability of women

6.1 Introduction

The previous two empirical chapters (Chapter 4 and Chapter 5) established that the limited financial contributions of women to household finances restricts households' access to energy and is one of the reasons for women's energy poverty. But in most of the literature, 'energy poverty' is defined as households' inability to buy the minimum level of energy (Rao et al., 2012; Reddy, 2000; Boardman, 1991; Ailis and Cutler, 2004; Dendukuri and Mittal, 1993; Reddy and Srinivas, 2009). It may happen if the households have no income to buy energy or their energy budget is less than the amount needed to buy the minimum energy requirement to overcome energy poverty. (Krugmann and Goldemberg, 1983; Pachauri and Spreng, 2004; Foster et al., 2000; Saghir, 2005) (see chapter 2.2). According to the 'vicious circle of energy poverty (IDS, 2003) rural households may be entrapped in the energy poverty due to inability to afford modern energy services. If they do not have money, they will not be able to buy equipment which uses modern energy. It will compel them to work manually so that their efficiency and productivity will remain low and thus their income will not be enhanced; as a result they will not buy energy efficient equipment and they will remain in energy poverty (see section 2.4)

In many developing countries like Bangladesh, rural household income is mainly derived from the income of men, and women have no or little opportunity to generate income

because a strict division of labour exists in that society that defines the roles and responsibilities of women as being inside their homes. Women are mostly involved in household work such as cooking and housekeeping. The first empirical chapter (Chapter 04) established that the 'energy profile' of women is inferior to men living in the household. From the second empirical chapter (Chapter 05) it is found that most of the women have no or little opportunity to take part in energy decisions, except those few women who are financially able to share the costs of energy services with their husbands. These women can play a major role in energy decisions and their opinions are valued in the decision-making process by their husbands; this improves the energy justice experienced by these women to some extent.

It is important to investigate the economic capability of women because if women have economic potential, they can contribute to the household's ability to afford energy. However, research studies do not consider this aspect. The economic capability of a person depends on two factors: ability to access resources and/or earning capability. Firstly, a person can access resources by receiving property through inheritance. In rural areas women can access resources mainly by inheritance of properties from the deceased. Secondly, women can generate income through economic activity. Increased opportunities to work may be provided for women under various development projects; work opportunities may be created either by projects run by the government or NGOs and/or government-NGO collaboration. Development projects which attempt to improve women's economic status can be classified under three general approaches. The first approach of Women in Development (WID) is to design and launch special projects in order to create income opportunities for women (Everett and Charlton, 2014; Lansky,

2000). Second, the Women and Development (WAD) approach considered ‘women only’ projects to improve women’s economic status (Rathgeber, 1990; Parpart et al., 2000).

Third, Gender and Development (GAD) approach considered women’s economic position improvement is not enough to alleviate women’s position and benefit them equally to men; it focuses more on gender relations. It considers all women are not equal; there are strata of women based on class and/or caste and measures need to be taken for different strata in order to remove gender disparity and ensure social equity (see section 2.9.1 C).

First, this chapter discusses women’s access to the inheritance of resources scenario in the fieldwork area. Second, it explores the overall picture of women’s economic activity. Third, it attempts to uncover the opportunities and limitations experienced by women in generating income and also scrutinises whether energy poverty has any effects on women’s income opportunities. It also examines whether social, political and/or cultural factors may influence access to resources and/or economic activity of women. Finally, it considers whether a GAD approach can reduce women’s ‘energy poverty’

6.2 Inheritance resource distribution

Most of the women living in the fieldwork area are Muslim. In Bangladesh, the distribution of inherited property in Muslim families is based on Muslim Family law, 1961. According to Muslim law, three groups of family members have the right to receive a share of the property of the deceased. The first category is father/mother, the second is husband/wife and the third sons/daughters. This law is derived from the Surah Nisa Verses 11, 12 and 13 of the holy Qur’an, the holy book of Muslim religion.

Properties of the deceased are shared in two ways; one is according to the ‘Quranic share’ and the other is ‘residuary’. The ‘Quranic share’ is fixed and is distributed first and the recipients are the father, mother, husband and wife of the deceased; the father and mother will receive 1/6 share each, the husband or wife will receive 1/8 share. After distributing the Quranic share, the remaining resource is termed as ‘residuary’. The residual portion of the share of the property is distributed among the sons and daughters of the deceased person in the ratio of 2:1 to sons and daughters: that is a son receives double of a daughter. Under this law, a woman has the right to the property of her father, mother, husband, son and daughter after their death. But, the laws of Bangladesh ensure equal rights for men and women except for inheritance resource distribution. These laws uphold the spirit of Article 27 of the Bangladesh Constitution where it is stated that every citizen has an equal right to get the protection of law and shall not be discriminated against based on age, sex, race or religion. But, in the case of inheritance resource distribution, Bangladesh follows religious laws where the equal rights of men and women are not supported.

The women interviewees reported that most of them had not received their inheritance share upon the death of relatives. The present scenario is either women have not been given the share by their brothers, or women do not want to take their portion for different social reasons. Community leaders confirmed that most of the women living in the fieldwork area do not receive their correct share of inherited property.

Property is not distributed in this way [According to Muslim Law]. In most of the cases brothers enjoy the whole share of property. Women mostly do not get their share. Some women want and some do not want to take their share. Those who want to take, they get more or less some property (Community leader 01).

A considerable number of the women interviewed claimed that their brothers are not interested in giving an appropriate share of the property. The tradition is that brothers distribute property among them and ignore the rightful demands of the sisters. Brothers' mindset is mostly that it is their property and they believe that sisters' demands for property are unfair and an extra claim; they feel if they give property to their sisters their own share will be reduced. This type of attitude is developed from the social practice and beliefs inherited from their predecessors. It is based on the perception that families spend a significant amount of money for the sister's marriage in terms of dowry and wedding programme. In addition, brothers think that they work hard to earn money and run the family with their father, while women make no contribution to the family income. Moreover, they have to spend a significant amount of money to meet the expenses of bringing up their sister, and accordingly, they believe sisters should not make a claim for their father's property.

Brothers say, 'We give you [a dowry for] marriage, father does not spend money. Do not think property is your right'. They say 'you will not get anything. If we do not give you the marriage, father has to sell the properties. We keep this [property]. If your father sells this property, nothing would remain' (Female respondent 11).

Some brothers believe that only sons have the right to get the father's property and daughters have no right to access it; they argue with their sisters that they have no right to claim for the property. Some of them become violent if the sisters make a claim for property.

They [brothers] say we [sisters] shall not get these. They say daughters do not get the property; brothers only get these (Female respondent 04).

They say, 'you do not need to get, I shall not give you. We shall get all of our father's property. Why should the sisters get any?' Males think, they do not need to give, it is their property. They say, 'no need to give property to sisters' (Female respondent 15).

The widely held belief within society in this area is that after marriage a woman should stay in her husband's house and may come and visit her brother's house for few days, but that they should not make a claim for property. When brothers feel pressure to give the sisters their share, they try to waste time by raising emotional issues. For example, they could say to the sisters that it does not look good to distribute property shares before their mother's death because the mother will get upset if the property is shared out, but brothers distribute shares verbally among themselves and enjoy the property. It is to be noted here that mothers generally wish to distribute their daughters' share but they are frustrated as sons ignore their wishes.

"My elder brother said property would not be distributed before my mother's death. This property is enjoyed by my brothers. My mother says to take the share for everybody, but my brothers do not want to do it." (Female respondent 23)

Previously, women generally did not press to take their share of the property from their brothers as they felt it to be the brother's right. At that time, sisters along with their husbands were invited to return to the family home for couple of weeks, and honoured and entertained at least once in a year in a custom known as 'nayor' in the rural community. The price of property was less and the husband's family did not expect to receive this property share. Nowadays the density of population has increased rapidly over the last decades and property prices have increased at a sharp rate; husbands are now eager to get this share and insist their wives take it from their brothers.

“In our predecessors’ time, women do not take anything from their father’s property. They thought ‘I should not take it as it is my father and brothers’ property’. People’s mindset was such that the husband’s family did not like to take this share.” (Community leader 01)

Women also have limited opportunity to get help from their father’s family after marriage even while the father is alive. Most of the fathers think that they have no responsibility after their daughters’ marriage. Some of the daughters are dissatisfied with their father’s unwillingness to help them when they experience economic problems. According to some of the women in the interview group, their fathers are living a better life with their sons, but they are not taking care of their married daughters; they do not even want to hear from them.

“Father is living happily with them [brothers] but we [daughters] are getting nothing.” (Female respondent 05)

A few women reported that they do not want to receive a share of their father’s property from their brothers as the brothers are poor and would become poorer if the women take their share. Women believe that the Almighty will give them resources in the future for this sacrifice.

“My father has given me marriage by spending money [for the wedding and a dowry]. My family has very limited property, should we want anything from them [brothers]?” (Female respondent 12)

A considerable number of women do not claim their inherited share of the property from the belief that if a woman takes property from her brothers this will adversely affect her family and their future will be ruined. Women in this locality have a preconceived idea that if they want to live a better life they need ‘doa’ (good wishes from family members

but taking a share of property from brothers will annoy them and so they will not receive good wishes for their future lives.

“They [brothers] say, ‘if you take the property, your own family will be destroyed; why should you take the property?’ They say, ‘if you don’t take this, you will be happy and live better life” (Female respondent 14).

Women have heard this from childhood and act accordingly. This belief is deeply rooted in the society and men intentionally spread the idea in the community. This belief largely restrains women from taking the necessary steps for arbitration or legal action against brothers if they do not agree to give the due property share. This is a long-standing assumption which has no religious justification and nobody could explain the background of this viewpoint and how it became prevalent.

Another reason to keep cordial relations with brothers is that in social gatherings, especially for the weddings of sons or daughters, the presence of uncles and aunts is important and valued in the society. If a woman takes her property share, she fears her brothers will not come to her house, and ignore the marriage of her sons or daughters. This would create difficulty in arranging marriages as people are less interested in forming relations with a family who are not well connected to their relatives.

“I am not happy in this matter. But I have sons and daughters and I have to arrange marriage for them. That’s why I am not pressing. I am requesting but they are not responding” (Female respondent 03).

Women may also depend on brothers’ support and goodwill in times of need. If a woman is divorced or experiences violence in her husband’s house, she does not have any shelter except with her brothers; women cannot live individually as they have no income,

moreover society does not condone it. Thus, women wish to maintain good relationships to claim shelter in their brothers' houses if they experience any problems.

“If I have to go to my brother if any odd situation arises in future, they may not care for me; in this consideration I have not tried to get property. If I take [property], they will not care for me in my problems and will not give me shelter.”
(Female respondent 22)

On many occasions women found that property of the deceased had been appropriated by their brothers through land registration. According to Muslim law one third of the property share can be given to anyone as gift. In old age parents need proper care, medicine and company; sons may take care of them to impress their parents in order to get this one third share. Brothers also undertake illegal steps through misguiding their parents; they use a common trick, telling their parents it is necessary to go to the land registration office in order to update records of lands. In such cases the brother would deceive his parent/s to place a thumb print on a non-judicial stamp and transfer lands to his name. Brothers know this is not right and hide this action from their sisters; they will provide this document to verify their claim to the property if their sister makes a strong claim for the property and cannot be convinced to relinquish it.

They took my mother's property by registration. They took a thumb print cleverly by taking her to the registry office. They took all the things when my mother is alive so that we cannot claim anything after her death. I talked to my mother; she said 'I have not given them but they took all.' She had no power to do anything
(Female respondent 20).

My father had a heart attack. He cannot read. They [my brothers] take thumb print and say it is necessary for treatment but they take the property of my father in their name by this thumb print (Female respondent 17).

Women are not satisfied with the prevailing situation; they feel deprived and dishonoured. Initially they try to persuade their brothers to pass on their share of the property. When women fail to receive agreement they contact relatives to act on their behalf. On many occasions relatives decline to negotiate with the brothers; moreover, they advise the women not to take the property share. A few take initiatives for amicable settlement by consultation, but most of time brothers ignore this type of initiative.

After disputes arise, some women go to their neighbours and social elites who have money and influence in this locality, but they encounter patriarchal attitudes. Most of the neighbours are reluctant to support the women's claim for property and some of them try to explain that women should not make a claim for the property.

“Whoever I ask to help me, they say, you have been given marriage, that's it, why do you want a share? I said it is my right to get one third of the property but nobody cares.” (Women respondent 19)

It is to be noted women families have to give dowry in time of marriage. It is told as another reason not to give sister's inheritance share but according to the Muslim religion, dowry is prohibited; alternatively woman has the right to receive 'denmohor' (money from man) that is rarely paid by Muslim husbands at the time of marriage. Moreover, the husbands claim a dowry from the girls' parents which is similar to Hindu customs. It is to be noted, according to Hindu religion, the women of Bangladesh do not get a share of property through inheritance and this has also become popular in the Muslim society. It is due to cultural infusion; in Bangladesh Muslim and Hindu influences has taken place as people have been living in harmony for more than a century with the coexistence of different religions. Therefore, the custom, values and ideas of different religions are blended and integrated to some extent, but society shapes them in a way that favours

men. According to Wheeler and Kabeer (2003) patriarchy has an influence in constructing the society in such a way that endorses male benefit, but it may take place in different ways in different areas based on culture and policy which is reinforced from this finding.

Patriarchy is prominent in the society that restrains women from receiving their property share or discourages women from making a claim for their property. In this society the use of force is important to establish a person's right. In families, the brothers discount their sisters as weak and having no influence in their society, so they will not be able to put pressure on their brothers. If women try to get their property share through negotiation some brothers make a threat on the life of their sisters. Many brothers assert that they will not give property to sisters in any way and notify their sisters to try whatever they like to get property.

“They [brothers] say I am poor and I am bound to accept their wishes. They said who will come in favour of me? Who is the person to stand against them?”

(Female respondent 20)

When women fail to get their share through personal negotiation or from the intercession of relatives, many of them give up. A few women from the interview group reported that they had informal discussions with the community leaders following which the leaders they tried to resolve the disputes among brothers and sisters. Women have mixed experiences with the community leaders. Community leaders talk to both parties and try to settle disputes over property but the success rate is low. A few women complain in writing to the ‘village court’ in order to get their share (the village court is operated by the Union Parishad and the chairman of the Union Parishad acts as chairman). This court gives notice to both parties (brothers and sisters) and tries to arbitrate the disputes. In

some cases both parties agree and disputes are resolved but in most of the cases brothers decline to carry out the arbitration. People rarely carry out the decision as men know that they will not be penalised for non-compliance.

The community leaders arranged arbitration and told them [brothers] to give us our share; the brothers said 'We give them [sisters] marriage and spend money for them to be brought up and married. They will not get anything' (Female respondent 18).

Conversely, the majority of female interviewees indicated that community leaders avoid taking the initiative in arbitration and prefer to keep cordial relations with brothers because men are the voters in this community and their votes are important for the community leaders to be elected in local government and parliament elections, whereas women normally leave the locality after marriage. It is to be noted here that traditionally women are given in marriage to a husband and family who live in a distant place from the fieldwork locality.

We have consulted with the community leaders but they said your father had nothing; these properties are gathered by them [your brothers], you have no rights on this property. They gave you the marriage; you should not take this property (Female respondent 16).

In addition, some men are aggressive and dishonour community leaders if they come for negotiations, threatening the community leaders with violence to avoid negotiations.

The last resort is to solve the problem through the courts which is rarely used by women; economic and social reasons restrain them from applying for the protection of the court.

Firstly, women do not have enough money to sue for property as most of them are poor;

to file a case and maintain legal procedure women have to spend a significant amount of money for court fees, lawyer fees and conveyance.

“I need a huge amount of money to fight legally against them. I have no hope.”

(Female respondent 17)

Secondly, people living in the society have a negative perception about court; they feel family matters should be solved within households or at the community level. They consider it as a bad instance and are critical of the action if a woman goes to court to get her property right, though the people are not interested in taking initiatives to solve the disputes.

“I can’t go to court; if we sue people will say, look this woman has taken her property by suing against her brothers, so we drop it” (Female respondent 18)

Thirdly, the court is not able to play a significant role to recover women’s property as the legal procedure related to the inheritance of resources is time consuming and there is no provision for imprisonment for the violation of law. To get a judgment, the applicant has to wait for a long time, sometimes more than a decade. After the judgment, the brothers can appeal to the higher court and finally they can file a review petition to the appellate division that takes more time, sometimes it takes an extra couple of years. Brothers are not concerned if sisters go to the court because they can get the utility of the property until there is a court ruling. Moreover, they do not have to remain in custody even if they are guilty. Women avoid this legal procedure as they have to bear legal expenditure for several years for a judgment.

“It incurs cost; she has to spend money for lawyer, assistant and conveyance. For this reason most of them do not go to court” (Community leader 03)

Because of the limitations of this inheritance law, a few women take different strategies to get their share. To put pressure on their brothers, some women file criminal cases like physical assault or extortion under non-bailable section 325/326 or 386 of the 'Penal Code, 1960' respectively and the case may not be based on facts. When arrest warrants are issued against brothers from the court, they become scared and try to solve the litigation with their sisters by arbitration because brothers do not wish to remain in custody.

“As it [court verdict] takes more time, a sister sues against her brother under the violence against women law, or under section 386. To save the case from going to court they solve this by social arbitration. This issue also invites other social problems.”
(Community leader 01)

6.3 Women's economic activity

Women living in this area are not significantly involved in economic activity inside or outside their homes. A small number of women are engaged in activities such as katha⁴ stitching, sewing clothes, looking after poultry and cows on a small scale, or producing different types of food like puffed rice and sweets, running small shops and/or working in their neighbours' houses. To stitch a katha a woman needs to work for at least seven days per article but she gets GBP 2.50 per item.

“I sew katha and I get 200/300 taka per katha.” (Female respondent 06)

⁴ A katha is made by stitching two to three long cloths together (usually used bed sheets or saree) to cover the body during sleep (like a throw).

Some women are working either seasonally or permanently in their neighbours' houses. They work seasonally during harvest time, husking rice from paddy. At that time they have to separate paddy and straw, boil paddy and dry it in the sun, working with the women of the households. This is laborious work, women lift weights, boil paddy in the primitive cookers and dry paddy in the sun; they have to work for whole days but they do not get satisfactory payment as labour is cheap and freely available for this work. Women normally do not want to work in such jobs but are compelled to do so for their survival. Many of the husbands in the families living in the fieldwork area have no jobs or cultivable land, or do not want to work regularly, or do not want to take responsibility for the family.

I try to earn so I work for others. I boil rice for others but the payment is not good like in town. They give 2 kg rice or GBP 0.5 to 0.8 (50 to 100 taka) per day for that. My husband does not work regularly. It does not cover our food expenses (Female respondent 10).

Some women do household work for others throughout the year, like sweeping, child-rearing and cooking. But, their payment is not satisfactory and mostly paid in kind not in cash. They receive cooked food every day and an insignificant amount of money (GBP 2.00 to 5.00 per month).

"I work in a neighbour's house and get some money, 200 to 300 taka" (Female respondent 18).

Almost every house has four to five chickens from which families get eggs; sometimes they eat them and feed their children but mostly they sell eggs to get some money. They sell chickens when required and meet their needs with this money.

A substantial proportion of the women are not involved in economic activity as they do not have enough time after completing their household work. Female interviewees claimed that they have to spend significant time each day for cooking related activity. As they are cooking with indigenous fuel the women need time to collect fuel and prepare cow dung cake for cooking. It should be noted here that women have to cook two to three times a day. In addition, they have to do house keeping and take care of their children. They become free during the afternoon and most of them use this time to take some rest. Women are almost free of household duties in the evening and can work at night, but not if load shedding takes place because it is not possible to work with insufficient light like the kerosene lamp. Moreover, some women are not able to work as they have no skill and knowledge about possible available work.

“I do not get involved in any income activity; I do not know anything. If I knew tailoring or something I could earn money.” (Female respondent 09)

6.3.1 Credit from banks and NGOs

Women take loans from the bank or NGOs when money is necessary to buy items for their business such as a cow, or sewing machine, or to set up a shop in order to start economic activity. As in other rural areas of Bangladesh, Krishi Bank (a government owned bank which operates in rural areas to expedite agricultural economy) and different NGOs provide loans to women to generate income. Among NGOs, Grameen Bank, BRAC and Association for Social Advancement (ASA) play major roles in providing loans to rural women. Representatives of these agencies normally go door to door to disseminate information about starting small businesses involving poultry, animal husbandry, growing vegetables in household gardens, sewing and small enterprises, and

encourage women into self-employment. They provide loans without collateral securities in order to set up and expedite economic activity in the rural community for women. A few women in the fieldwork area have sewing machines; they sew clothes for women and children and have a better income in comparison with the other women in the area, with an income of about GBP 6.00 to 8.00 per week. Among them only one or two of the women purchase sewing machines out of their savings as most of them take loans from NGOs to buy the equipment for their business; they have to pay instalments to the NGO from which the loan originates. Normally the loan repayments amount to GBP 4.00 per week and they have only GBP 2 to 4 per week for their expenses. Women feel pressured to pay the instalments every week if they do not get sewing orders; in that case they have to repay the loans from the other sources.

“I cannot do anything except katha stitching. If I get order, I do it by hand. It needs sometimes 15 days and sometimes four days depending on the types of stitching.” (Female respondent 04)

A small number of women have cows; the cows give milk which is sold in the market or to neighbours by their husbands. Though, women purchase cows by taking loans from NGOs, and their husbands and children look after the livestock.

“I took a loan from Grameen Bank NGO and bought a cow. I pay the instalment by selling milk.” (Female respondent 14) *“I have bought sewing machine by instalment from Grameen Bank and repay the instalments by working. If I have no earning, I took from the family earning and continue the instalment. I have to return the loan with huge misery.”* (Female respondent 07)

A few women from the fieldwork area are working as small entrepreneurs. They are mainly shopkeepers or engage in food preparation. They have set up shops in their homes and sell the necessary items like food grain, washing liquids, biscuits, puffed rice, oil,

onion and garlic. Their customers are the neighbours and they are mostly women who purchase in small amounts when they feel they need something which is essential. Children also buy biscuits and crisps from these shops. Women go to these shops when male family members are out of the houses or husbands do not have enough time to go to the market. The women home shopkeepers have fewer profits in comparison to the small shops of the market.

“My husband is ill and I run a shop in my house and my customers are women and children” (Female respondent 16).

Some women in the fieldwork area are food producers; they prepare different types of food like puffed rice, sweets, or pickles. They sell the products from their houses or their husbands sell them to the local shops. These foods have a demand in the local market and the women involved in this business have a better income. Some of the women could make a significant contribution to family expenditure and also partly bear the cost of children's education with this income; moreover, they helped their husbands from their savings to pay for the dowries in the marriage of their daughters. But these products are now manufactured by renowned national companies and these companies have mostly captured the market as they have a low cost of production because they are producing in bulk amounts. Therefore, the companies can sell food products for lower prices in comparison with the local women. Moreover, the national companies have good marketing channels and strategies; they sell products on credit to the shop owners and take their money after the product has been sold by the shopkeepers to the consumer. As a result, women's businesses in this sector are now in downturn and female interviewees feel they should find alternative sources of income to retain former levels of profit. Formerly the women could run families with their income and could have some savings.

I fry puffed rice for income and sell it. Previously I had better income, now so many shops and they stock shops with the brand puffed rice. In the last three to four years my income is reduced. I have worked hard, run the family and gave money towards the costs of the marriage of my daughters (Female respondent 14).

Access to credit does not ensure that women are engaging in economic activity with this loan; a community leader reports that some women may use the fund to meet the costs of other work.

“NGOs give loan but the loan is not utilised in the proper way; it is not for that work the loan is given” (Community leader 01).

A considerable number of women take loans to help their husbands to generate income. They may meet primary needs, repay other loans, or purchase different goods like a TV, or a fridge. Among them, a few take loans to cover the costs of farming. Farmers need money to buy tractors to plough and normally hire someone to do this job; in addition, they use irrigation pumps in order to produce paddy. Some women take loans to set up small businesses for their husbands who normally set up small shops selling items such as vegetables, fish, grocery and pharmaceutical products with this amount of money.

“I have taken a loan from an NGO for my husband’s business” (Female respondent 18).

“I took loan from an NGO to set up my husband’s pharmacy. My husband is running the pharmacy and we are repaying the instalments” (Female respondent 17).

As the women are taking loans from NGOs, they have to make the instalment repayments. They take money from their husbands every week though sometimes husbands are unwilling to give their wives money every week because they do not have a satisfactory income on a regular basis. Women normally reserve some money in order to

repay the loan when husbands are not able to earn at a satisfactory level. The loan may also be used to buy food grain when there is no other food in their homes. It should be mentioned that poor families are living hand to mouth and do not have savings; they use the loans when they are not able to manage to earn sufficient money to safeguard their livelihood. The families may experience a lean period when men do not have income; this may occur especially in the spring when farmers have no work and the households' food stock is almost depleted and they have to wait for the next crop in the summer. Also, day labourers do not have work in the monsoon season and at that time, they have to buy food from the market. Normally they purchase food by making recourse to money borrowed through loans.

“She was involved with an NGO. We used this money for food because I became jobless for six months. She took a loan for a brick business and we returned this money later” (Male respondent 16).

Economic activity among interviewee families has also been hampered by illness of family members and the need to buy medical treatment. In cases where a member of a family-run business becomes ill the family may be forced to sell off part of their business assets, such as their cows, poultry, or sewing machines, which were purchased with loan money. They would then use the money they receive for medical treatment. In most of the cases the family do not get the correct price for their goods as everybody knows they are in a desperate situation and require money urgently; so they are forced to sell at a lower price than expected.

“We have taken credit from ASA NGO and bought a cow, but when she [wife] became seriously ill we sold it and spent the money for her treatment. I am paying the installments with huge hardship.” (Male respondent 11)

Social rituals also hamper the economic activity of women. When households arrange marriage for their daughters they have to spend a certain amount of money as it is customary to arrange a wedding party for the daughter's marriage. Moreover, the family of the bride have to give a dowry and this incurs a huge amount of money. A loan may be used to meet different expenditure like the cost of a wedding party and dowry as poor households have no savings.

Suppose one woman takes a loan for poultry; she spends it on her daughter's marriage or uses it in agriculture or to buy a product for the house. If she needs to buy a TV or fridge, she buys. Loans are not used according to the requirements of the project the loan was given for; people meet other demands with it (Community leader 01).

In cases where women have used the loan for things other than business related costs, they are not generating money from these loans. Under these circumstances they have to arrange alternative sources of money to repay the loan instalment. In such cases, households may take two different strategies; either they save money when they can earn income, or women take another loan from an alternative NGO to meet the loan repayments.

6.3.2 Co-operative lotteries

A considerable number of women in the interview group indicated that they believe NGOs create opportunities for women to generate income; they said if they had not received a loan they would not have been able to earn. On the other hand, a few women were not interested in taking credit from NGOs as they feel the rate of interest is too high and they would be under pressure to repay the instalments on a weekly basis. In order to

repay the instalment (consisting of principal and interest) women would have to earn a significant amount of money each week which would be difficult.

“I had taken loan of 5000 taka from Grameen Bank and had repaid it, but now I am not taking another loan; we have to repay an installment in every week and it is a pressure. I find it is difficult; this money has to be repaid at any cost” (Female respondent 11).

“Suppose a person dies after taking a loan today; money has to be repaid before they are buried. Who will pay? For this reason, I live somehow but do not take a loan” (Female respondent 23).

To avoid the repayment of a loan (principal with interest) from NGOs, a considerable number of women accumulate capital from cooperatives through participating in a lottery and winning prize money. Some of the cooperatives in this area with women members arrange a lottery among their members as a popular way to collect capital. Normally a cooperative is formed by 10 to 25 women and everybody deposits the same amount per week to the cooperative finances. Then a lottery is drawn among the members and the winner takes all of the money and uses it as capital. The winner has to continue the weekly payment to the cooperative but will not be able to take part in the lottery until the other members get a fair share of the proceeds. This money is normally spent on such things as purchasing a cow, setting up shops and also for paddy farming. Women like participating in a lottery as they can collect capital in this process without paying interest, whereas they have to pay interest if they take loans from any microcredit institutions.

“I have joined in a lottery. I get 50000 taka at a time and I am paying 2000 taka by selling the milk of my cows. If I take a loan, I have to pay interest or profit; suppose I take 5000 taka, I have to pay interest of 2 to 3 thousand taka” (Female respondent 11).

Informal arrangements may be a cheaper way to collect money but there are risks of losing the savings. The collection of money through a cooperative and distribution through a lottery may not be a safe way of acquiring capital; there is a chance of losing the total deposit. Although the money collected by the group is deposited to an organiser in good faith, there is a risk that she may leave the area with the money and the women may lose their small savings.

“The women make a cooperative; we are depositing money with a woman who is an inhabitant of this area. She takes the money and leaves the area. If we go to that house,, they [their family and relatives] say in reply, ‘do you deposit money to her [cashier of the cooperative] by informing us?’” (Female respondent 10)

Another way to deceive women that has happened in the village is by persuading them to take out a life insurance policy with a non-registered company where the employees are women from outside the area. The bogus callers introduced themselves as insurance workers and encouraged the local women to take out a policy so that they will get a handsome amount after maturity and their families will get a significant amount after their death. Women in good faith deposited money with the fraudulent insurance company but the fictitious employees ran away when they had collected a significant amount of money from this locality and women lost their savings.

6.3.3 Spending rights

The income of women is mostly taken by their husbands. Husbands think that it is their right to take this money as they are bearing the costs for the upkeep of their families, including their wives. However, the men spend the money as they choose and do not even ask their wives for their opinions when spending the money.

“This money is taken away by my husband. He shops with this money and meets some expenses. Why will he ask me? He spends this money according to his choice.” (Female respondent 04)

Women want to spend money by themselves but their husbands do not allow them to keep their money and spend it according to their choice. Thus, some women are not motivated to work though they have the opportunity to earn money, as they know they will not be able to save the money they earn or spend it as they wish.

“If I try I can accumulate 1000/2000 taka but my husband takes all. I cannot do anything by my choice as the money is taken by my husband” (Female respondent 05).

Among the interviewee women a few earn without informing their husbands; they stitch katha or sew clothes when their husbands are not at home. If the husbands see they are working, the women say that these things are prepared for their families. These women use this money as they wish, but the money is spent on their families. They normally purchase goods for themselves and also purchase clothes and food for their children. In many houses the husbands do not purchase kerosene for lighting and cooking fuel; they expect their families to remain in the dark during times of load shedding and wives have to purchase kerosene and cooking fuel for the families.

“I spend money for my family and my husband does not know it. I try to solve the problems; say for example there is no fuelwood for cooking, I buy fuelwood with this money.” (Female respondent 07)

6.3.4 Husband’s perceptions of women’s economic activity

The perception of most of the men about women’s income is not positive; most of the husbands do not recognise the women’s efforts and income as women cannot earn a

significant amount of money from their work. The husbands interviewed mostly said their wives do not earn; some of them indicated that the income was of a very small amount that does not help them. Most of the husbands said that besides household work women could generate some income but they are reluctant to work.

“My wife does not do anything except household work.” (Male respondent 1-9)

In addition, the perception of some husbands is that women should not work and they do not like the thought of their wives working. The men think that their wives should be happy with whatever the husbands can earn although it may be very insignificant.

“If I have only 5 taka (GBP 0.05) income, this is enough. I do not need wife’s income. It is my personal matter. It does not look good for me.” (Male respondent 21)

In rural society in this area, income from wives is generally considered as a sign of the husbands’ incapability to earn sufficient money and run the family properly; a few of the men interviewed think it is a humiliating situation for them. For that reason, some of the men previously preferred their wives to receive an income but now they think their wives should not work as the family already has a satisfactory income.

“I believe it is not right; I have no need of her income” (Male respondent 24).

“She wants to work but I say there is no need for you to work; we have enough. Why do you want to work?” (Male respondent 25)

6.3.5 Limits on women’s economic activity

The economic activity of women is inadequate for different reasons. Women have to spend most of their time and labour on cooking related activity as mentioned above and they get less opportunities to work for income in daytime; they get free time in the

afternoon and take a rest period. If they had modern cooking fuel and improved burners they could cook in comparatively less time than at present and could spend this saved time in sewing clothes, stitching katha or running small businesses. Women could work in the evening if there was no load shedding at that time and their productivity would be improved and economic capability would be enhanced. Moreover, women may set up a poultry farm if there is a continuous supply of electricity because an uninterrupted power supply is essential for poultry in order to cool the birds with fans in hot weather. In Bangladesh, the government encourages this sector by exempting it from taxes and giving credit to set up poultry farms, but the poultry industry has not been set up in this area as load shedding is frequent, especially in the hot and humid summer. The poultry farm owners of Bangladesh use standby generators as they have large farms but the poor women of this locality have no capability of using generators because of the huge initial investment and maintenance costs, and it is not cost effective in small-scale poultry farms.

“I have poultry but I do not think it is wise to develop a farm as there is no uninterrupted power supply. If the power supply was at a satisfactory level, I could set up a farm.” (Female respondent 11)

Besides an uninterrupted power supply, sufficient space is required to set up a poultry farm in order to build sheds for poultry. If someone also wishes to keep ducks she has to consider whether there is a water channel because water is essential for ducks. Some years ago, households were interested in keeping poultry and later sold them and earned some money. At that time spaces for poultry farms were available but nowadays the density of population has been increased and new spaces are occupied by houses to accommodate the new generation.

“I could not try for a poultry farm as it needs space.” (Female respondent 17)

Some women have an interest in looking after poultry like others, but their husbands become irritated with the poultry as they make the houses dirty and they think this may cause their children to become ill. Other women in the interview group reported that in their experience the poultry easily become sick and frequently die. Moreover, crows and other big birds take the chicks when they are exposed in the yards.

Lack of training and information about new work opportunities may reduce women's opportunities for income. A small number of women reported that many women are already engaged in sewing clothes and stitching katha and think it will not be profitable to try to start doing this work; they do not find any work to do and generate income so they do not take a loan. A woman community leader mentioned during interviews that there was some alternative work women could do in the households and earn money, but to do so training was essential.

“Women could prepare sweet box, shoe box, money bag and mosquito net but they do not have training.” (Community leader 03)

NGOs may be more interested in offering loans and collecting instalments per week than monitoring whether the loan is used in the particular work for which loan was given. It is important to monitor whether the loan is utilised for that specific purpose; if it is monitored closely the loan might not be diverted for use on other purposes. Community leaders argued that NGOs are less focused on monitoring the loan but rather on getting the return on investment by collection of instalments every week. They also claimed that NGOs have profit-making attitudes like other financial institutions and overlook the

diversion of funds. But the purpose of such loans is to make women self-reliant and as the projects do not exist, the loans are not able to produce self-reliant women.

Loans are not used for economic activity; NGOs are observing all the things. Why do they not stop the loan? They are thinking, we are giving the loan and getting profit, we do not have problems. They think if they get instalment, it is enough and they are taking care of instalments (Community leader 01).

The community leaders feel that women's economic activity may be increased if NGOs monitor the activity of the loan receiver; their observation is that NGO workers are focused on achieving their target (disbursal of loan and collection) set by their authority; if they cannot meet the target they may be treated as inefficient and may lose their jobs or benefits. To protect their jobs they pursue women to take loans and repay the instalments and they overlook the use of money; if they monitor use of loans properly many women may not be interested in taking out a loan.

Many NGO workers do not look after how the loan is used; the reason is if it is not properly done then action should be taken against her [the borrower], in that case 90% of the women will not come to take the loan as they cannot tell lies or cannot use money in her desired purpose. I think NGOs should be careful on this issue. (Community leader 02)

6.3.6 Income outside the home

Though women have some opportunities to work inside their homes, they are rarely found working outside the household. A small percentage of women are educated up to secondary level and a few of them are working as teachers in primary schools. Some educated women are involved in tuition in the neighbouring houses and earn some money.

“Educated women give some private tuition.” (Community leader 03)

In the town educated women are working mainly in offices, banks, or educational institutions and rarely in the shops and market places, but there are no offices in the rural areas. In Bangladesh, poor and uneducated women mostly work in mills and industries in the towns, especially in the garments industry, but uneducated or less educated women in this area have almost no scope to work outside, except in a carpet producing project in this locality which is about 1.5 kilometres from the fieldwork area.

“There is no industry or institution where women can work except in a carpet factory where 25 women can work and each of them gets 1500 to 2000 taka per month.” (Community leader 03)

The scarcity of factories in this area may be caused by entrepreneurs considering the locality unsuitable due to lack of infrastructure along with insufficient energy supply. Community leaders expect government intervention to set up mills and industries. They commented during interviews that mills and industries are mainly developed in the town areas but the government should consider rural areas for industrialisation.

“If the government thinks they will make the women self-sufficient, they will set up mills and industries in villages.” (Community leader 02)

Society and religious leaders also discourage women’s economic activity outside the home where a patriarchal attitude is mainly responsible in restraining women from working outside. This is due to the mindset of the rural people; society does not accept that women will work outside the home with men. This idea is so prominent that husbands believe women should not work outside the home; some husbands do not like women’s involvement in economic activity even inside the home. They think whatever they earn women should be satisfied with that income.

“A man does not like it; their perception is if women mix socially they will be bad. They can mix with the man and they may lose their character. It is one type of meanness.” (Community leader 01)

“Males do not think women should earn; society and environment are not ready to accept it. Suppose, if a woman can work in the shop of the market, where is the problem? But her husband, society and surrounding will tell her it is bad. It will hamper the prestige of the family.” (Community leader 02)

In addition, religious leaders discourage women from working outside the home; they assert it is husband’s responsibility to run the families and wives should be satisfied whatever the husbands bring for them. They say women should stay at home and take care of family matters like cooking, housekeeping, taking care of children and elderly family members. They even criticise the women for going to the market place for shopping.

“Mollas [religious leaders] said many things against this [going to road side or to the market] and talk at random [say good women do not do it].” (Community leader 02)

Government intervention in the form of women’s economic development programmes and initiatives are not found in the rural areas. According to community leaders and also as seen in the fieldwork area, some hard core poor women are engaged in earth cutting work under the project of 100 days work opportunity for hard core poor. Women get taka 200.00 (almost GBP 2.0) per day. They may purchase meals with this money but it does not help the women to improve their economic activity.

6.4 Conclusion

Households in the field work area are in energy poverty largely for lack of ability of to afford energy though their energy poverty is not exclusively due to affordability as discussed in Chapter 4. Women's greater ability to purchase energy or contribute to the household finances to afford energy could help to eradicate energy poverty to some extent at household level; however there are some barriers that squeeze women's financial capability. There is gender discrimination in access to inheritance resources, which is same as India and similar to other researchers' findings (Agarwal, 1994). It is due to inheritance Law of Bangladesh where equal rights of men and women are not protected. Muslim inheritance law (Muslim family ordinance, 1961) has originated from religious doctrine that may have some underlying reasons, but no published literature is available that explains the reason(s). However, the following two reasons may be cited for this unequal distribution: one is that a woman has the right to get 'denmohor' from her husband at the time of marriage; denmohor is a any amount of money she feels right to be paid by her husband. The other is that a woman has no responsibility to earn according to prevailing social mores; it is the responsibility of male family members (father, brother or husband depending on the situation) to arrange her food and lodging. However, women's equal rights are not protected by law in cases of resource distribution, similar to other developing countries (Haddad et al.1997).

Patriarchy is an adverse factor that hinders both women's access to inheritance resources and women's income opportunity. It is the main barrier that restricts women's opportunity to access inheritance resources. It shapes women's behaviour to uphold men's interest. Women sacrifice their share of property for two main reasons. One is

from the belief that taking the share from brothers will bring problems in future that will adversely affect their family, though there is no basis of this belief. The other is to maintain healthy relations with brothers so that they can get shelter if they fall in danger in future. Therefore, patriarchy controls and determines the behaviour of women to favour men: this echoes Bennett's (2006) finding. Moreover, patriarchy is not only the main reason of women's lack of access to inheritance resources, it is also one of the causes to curb women's earning opportunity inside or outside the house in the field work area because patriarchy has created 'division of labour'; women mostly stay inside the houses and do household work and cannot generate income. Findings about the impact of patriarchy in this locality are that it reduces women's income opportunities, and controls the mobility of women, which is similar to the finding of ADB (2001).

A 'vicious circle of energy poverty' (IDS, 2003) is observed in the field work area. It reduces women's income opportunity significantly. Because of energy poverty, women's time is limited and their ability to generate income is limited due to the labour required in using indigenous fuel and the lack of efficiency. Presently, most of the day women are involved in cooking related activities like the collection of indigenous fuel, the preparation and management of fuel and cooking for two to three meals. A considerable number of women cannot work as they do not have sufficient time after household work and taking care of children. If they had access to modern cooking fuel and appliances, they could save time and (if allowed) could undertake economic activity following completion of their domestic duties. Besides, lack of access to other services such as information and communication also reduces women's work opportunities as they do not have knowledge and information on how they could generate income. A few women are

generating income but they are doing similar patterns of work. They argued that they do not have sufficient work and income. In addition, poor quality of lighting in homes hampers economic activity as load shedding is frequent in the evening; if there were uniform power supply the women could work at night. Women could set up poultry farms if the supply of power was continuous because lighting and fans are essential for poultry farms. A continuous supply of electricity could help to reduce poverty and hunger by creating opportunities to work at night (MDG1) and this finding is similar to the conclusions of Practical Action (2010).

The vicious circle of energy poverty (IDS, 2003) explains the effect of energy poverty on earning opportunities at the household level but a lack of energy access in the field work area also squeezes women's income opportunity the houses. In urban areas uneducated and poor women work in labour intensive industries in the production of garments, knitting and weaving, but in rural areas mills and industries have not been established. To set up an industry, the infrastructure and a uniform energy and power supply are essential. Most of the industries need energy (gas or diesel and electricity) supplies but gas or diesel supply network is not available in this area and the quality of electricity supply is poor as compared to the town, due to frequent load shedding. So, a model is proposed to advance the idea from the vicious circle of energy poverty (IDS, 2003) from household to locality.

Energy accessibility in the household and the rural area can create opportunity to work inside and outside the houses. Women may become entrepreneurs. They can work inside the home if they save more time by using modern energy services and appliances or they can work in mills or industries if energy and power network is established in that area.

They can either purchase energy by their own income or can contribute to households' ability to purchase energy that will aid them to take part in energy decisions. It also improves their bargaining power inside the family that will reduce injustice to some extent. It will motivate women to work more and improve their financial capability that further helps to reduce energy poverty of women. Figure 6.1 expresses the importance of energy access to rural women's economic and social development

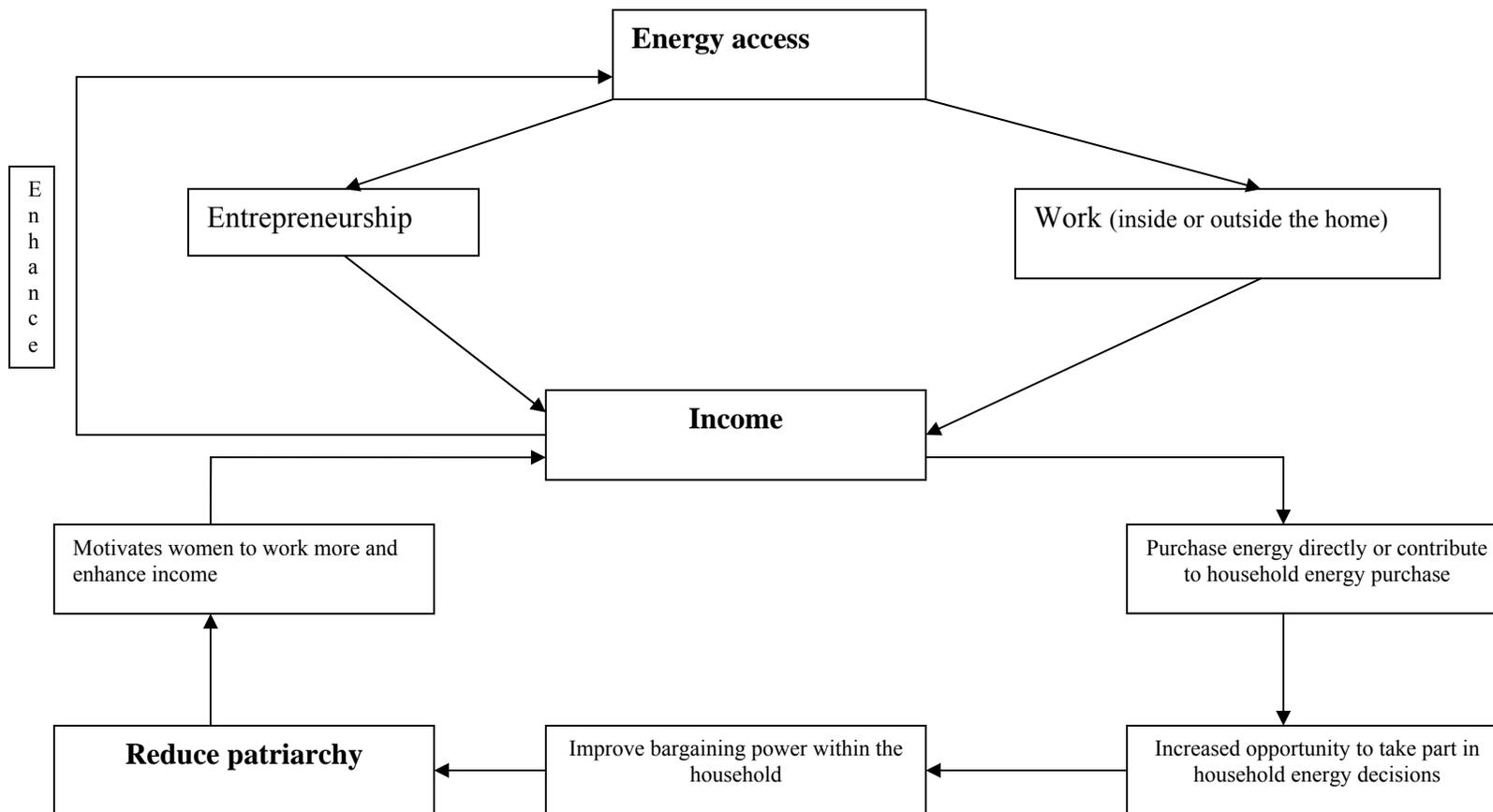


Figure 6.1 Importance of energy access to rural women's economic and social development (Source: author)

WID and WAD approaches focus on working opportunities for women's development. But, these are not enough for gender equity. Development projects for women help them to earn to some extent where patriarchy is so prominent that improves women position in the family and society. It helps to reduce patriarchal impact on women to a certain level but it is not enough to remove gender discrimination. It is observed that women who are earning for the family are in a better position than other women but they do not have equal status in the family to men. So there needs to be attention to the gender relations not just to what women are doing. It is important to focus on a GAD approach as it stresses on gender relation dynamics. Besides women's working opportunities, the consciousness of women needs to be improved. Energy services may also help them; women can get information like new job opportunities, healthcare, news and political situation of the country. Government (GO) and Non Government Organisations (NGOs) can play a significant role to improve gender awareness by training and motivation. It will improve women's knowledge, skills and attitude towards work. Besides, motivation programmes for men need to be designed in order to change their stance about women. In addition, energy companies, institutions and businessmen's behaviour needs to be gender friendly. They have to collect information from the women living in the rural areas about their energy needs and to address these in their policy and planning. They should scrutinise how energy services can reduce women's drudgery and save time, and create work opportunities for women.

Chapter 7

Conclusion

7.1 Introduction

This research examined the effects of energy poverty on women living in the area of Shahbazpur village, located in the Brahmanbaria district of Bangladesh, a country in South Asia. The researcher also attempted to uncover the reasons responsible for the energy poverty of women living in that rural area. This research focused on a relatively new area which has received little or no attention from researchers in the past. Existing literature analyses energy poverty as a household phenomenon, but this research showed the importance of scrutinising energy poverty based on gender. The concepts of ‘energy poverty’ and ‘energy justice’ are explained separately in the existing literature. Energy poverty is defined as the lack of affordable or accessible modern energy services at household level (Boardman, 1991; Reddy, 2000; Rao et al., 2012; IEA, 2010) and ‘energy justice’ is discussed in terms of three dimensions: distributional justice, recognition justice, and procedural justice. In this research study the author applied the concept of ‘energy justice’ to the prevailing ‘energy poverty’ of women and found injustice reduces the accessibility of modern energy services and reinforces women’s energy poverty in rural Bangladesh. The findings derived from this research have significance in literature and policy.

The following discussion section provides the overall empirical findings of this research with regard to the research questions. It synthesises the arguments provided in the chapters in order to converge with the objective of this research and answer the research

questions. Using the parameters of the TEA model it explains the energy experience of women and compares its effects with the experience of men (research question 1: chapter 4). It discusses energy justice and energy policy to ascertain whether women receive energy justice (research question 2: chapter 5). It also recognises the importance of women's contribution to the purchase of household energy services and identifies hindrances to the economic activity of women (research question 3: chapter 6).

7.2 Discussion

A. Research Question 01: How does energy poverty affect women's everyday lives compared to men in the household in east central rural Bangladesh?

The effect of 'energy poverty' is different for men and women and it is higher in the case of women. First, women in the field study area are not able to meet the TEA standard of cooking. It is to be mentioned TEA minimum standard is one Kg of fuelwood/ 0.30 kg charcoal /0.04 kg, LPG/ 0.20 litres of kerosene or ethanol/ person/ day, taking 30 minute/ household/ day to obtain (Practical Action 2010). Most women in Shahbazpur village do not have the access to modern cooking fuel; for cooking they have to collect, prepare and burn indigenous fuel . After burning huge smoke is produced and indoor air pollution is generated. It has multiple effects. This research found that women have to face the major consequences of using indigenous cooking fuel: women are affected by different types of diseases such as respiratory problems, asthma, and headaches. It also affects children's health and education, especially girls. Girls assist their mother in collecting fuel and remain absent from school to do so. As infants and girls stay in the houses, they are exposed to indoor air pollution during cooking and are vulnerable to diseases like their

mothers; this supports the findings of Practical Action (2010). On the other hand, husbands mostly do not have to bear the consequences of smoke and indoor air pollution as they remain outside during cooking and this may be a reason why the men overlook the need for modern cooking fuel. In addition, the use of indigenous fuel for cooking increases the medical costs of the household. Moreover, it is found that indoor air pollution reduces the lifespan of houses as smoke damage to house interiors incurs additional costs in renovating the houses earlier than usual. It is found from this research that women have limited choice of modern cooking fuel. They only have information about gas and they can access only bottled gas, though it is costly as they do not have access to gas supplied via a gas supply line which is a less costly form of gas. The introduction of improved burners or solar cookers may solve this problem, but people in the fieldwork area have no idea about these modern cooking systems.

Second, both men and women are affected by inadequate lighting. According to TEA, the minimum standard of lighting is three hundred lumens at household level. Though a good number of households have limited access to grid electricity whether they have legal electricity connection or not. Rural households experience a poor quality of lighting; with electricity being available with only limited reliability and security of supply. Two main reasons are responsible for this situation. First, most of the households do not have a legal connection for electricity as they have insufficient money to meet the initial expenditure to take a connection. They are using electricity by taking a supply line from a neighbour who has a legal connection, by paying a fixed amount for electricity which is higher than the exact bill. Moreover, their use of electricity is controlled by the line owner. This negotiated connection is vulnerable to disconnection either by the power supply company

or the owner of the legal connection. Another cause is that load shedding is common in the evening and inhabitants in the areas affected by power shortages experience poor quality of lighting at that time. Men mostly remain outside their homes during power cuts, some staying in the market where a generator is used for electricity at the time of load shedding. But women remain at home. During power shortages families have to use kerosene lamps or candles, which do not provide sufficient illumination. Students cannot study properly with this insufficient light. Sometimes women have to stay in the dark with their children if kerosene is not available in the house, or the household is not able to purchase kerosene.

Third, the minimum TEA standard for space heating is 12 degree Celsius but it is not fully achievable in this area. Though the average winter temperature is 15 degrees in daytime, nights are colder. Houses are mostly made by bamboo and corrugated sheets and small holes are formed in the corrugated sheet within some years. Air enters easily and the houses feel colder than expected and rooms have no insulation. It was felt in the field work period, the air inside the houses is equally chilled as outside. As a result, both men and women have the same experience in winter. Women use cold water for cooking purposes; the main reasons for this are the scarcity of fuel and the longer time required for boiling water. Women collect fuel from their surroundings and the fuel gathered is sometimes not enough for cooking. Moreover, boiling water with indigenous fuel is time consuming as ignition of primitive fuel takes more time than using modern fuel. They also have to wash clothes with cold water. On the other hand, men have to work in the agricultural field but the introduction of mechanised cultivation systems in the last decade mean that men pay for tractor and irrigation service; they do not have to work except

present there, and have less effect than women. A few men do manual farming and have to face hardship in comparison with women because they have to irrigate and plough with oxen.

Fourth, TEA minimum cooling standard is that the temperature of indoor air should be maximum 30 degree Celsius. In summer in the fieldwork area, room temperature is mostly more than 30 degrees but space cooling facilities are little available in the fieldwork area. Women are more affected than men by the absence of these facilities. In summer, when electricity supply is uninterrupted, people mostly use a fan and stay comfortable but people in the rural areas of Bangladesh experience frequent load shedding in the daytime, especially at noon. Men go outside the houses and stay under the trees in shade and sit on the roadsides and in open places to seek cool conditions. Some men such as rickshaw pullers and drivers experience more heat. But women stay at home and suffer more from hot conditions during cooking by using indigenous fuel that generates excessive heat and smoke. If the 24/7 electricity supply can be ensured without load shedding, women could stay more comfortable. A few men who work in the brickfields suffer more and face more hazardous conditions than the women, as they experience high temperatures and great amounts of dust released from the burner.

Fifth, it was found that women have limited access to information and communication (mobile and television) compared to TEA standards which is “people can communicate electronic information beyond the locality in which they live and people can access electronic media relevant to their lives and livelihoods.” On the other hand husbands mostly benefit from this technology. Most women do not have their own mobile but their husbands do. Women’s access to this mobile is limited due to their husbands’

authoritarian attitude. Husbands think they need a mobile for their work and women do not as they remain inside the home however, it was found that husbands did not use the mobile to develop any economic activities, but rather for social communication.

Husbands keep their mobiles with them; mobiles could be effective for women if they are allowed to use them freely when they stay at home. Women are allowed to respond to mobile calls if any relatives call them when their husbands are at home. Husbands normally do not allow their wives to make a call, and women generally do not know how to operate a mobile. Educated and/or young husbands allow their wives to use mobiles freely; they feel it helps their wives to connect with their families. Alternatively, a few women have own mobile and can operate it; these women have a significant income or their husbands are living abroad. From this research, it is found that mobiles do not help both men and women to access information for two reasons. The first reason is that the mobiles used in the fieldwork area do not have internet or email features; they can only be used to make voice calls. The second reason is that people are mostly uneducated; though a few of them have smart phones they are unable to use the internet or email with these.

Television disseminates information about such things as energy services, agriculture, and education but most of the women cannot receive information as the households do not have a television. Though some neighbours may have a TV there is limited social interaction between women which would allow opportunities to watch TV in a neighbour's house. But husbands watch TV in the evening at the tea stall and market. Access to information helps men to improve their knowledge about economic activity, politics, health, agriculture, and education. Men have gathered knowledge about small

and medium enterprises (SMEs) like poultry farming, animal husbandry, and sweet production from TV. They also have ideas about how to prevent different diseases from this source.

Lastly, TEA states 'earning a living' is possible if the people can set up energy efficient enterprises, but people in the fieldwork area cannot do this due to lack of access to energy. Women's productivity is also hindered due to poor quality of lighting; load shedding is frequent at night. Though men and women have same status inside the houses for this standard, men use energy services for mechanised cultivation systems. Shopkeepers use lighting in the evening for their business. It is not same as the standard for business but helps to reduce workload and improve their productivity.

Women's energy poverty experience in daily lives is higher compared to men in cooking, lighting, space heating, cooling, information and communication and earning a living. Only women are involved in cooking and experience the multiple affects of indigenous fuel including drudgery, smoke and consequently health affects for collection, preparation and cooking. They stay more time than men in the houses and face the consequences of poor lighting, and lack of space heating and cooling. Lighting mostly affects them because load shedding takes place in the evening when men stay in the market where lighting by generator is available. Though, energy for earning a living is same within the household men have the opportunity to get this service outside the houses to some extent (See table 4.1).

This research suggests that there are multidimensional reasons for energy poverty and feels the need to scrutinise the minimum standards of some indicators in the TEA model. The TEA suggested minimum daytime room temperature is 12 degrees Celsius, but in

some countries like Bangladesh the indoor air temperature of houses could become too cold at night; therefore, it would be beneficial to suggest a minimum night-time temperature in the model. In Bangladesh, people experience a long summer, monsoon and autumn and a short winter. People are accustomed to higher temperatures; to them 12 degrees is not a comfortable temperature in winter. It is suggested that the day and night-time temperature may be within the range of 18–21 degrees Celsius. The reason for suggesting the temperature range is that infants are living in some of the houses; World Health Organisation (WHO) (2005) recommends a minimum temperature of 18 degrees Celsius and ideally of 21 degrees Celsius if babies/elderly people are in the house. Moreover, in Bangladesh, houses have no insulation; if a household needs to maintain a certain warmth, heating has to be carried out at all times, which will incur a huge energy cost. Also, the TEA model suggested a maximum indoor air temperature of 30 degrees Celsius for summer, but this is not a comfortable temperature; Practical Action (2010) suggested 24 degrees Celsius and this level may be reviewed.

B. Research Question (2): To what extent are women in rural Bangladesh recipients of energy justice at household, community and national scales?

In this research it was found that women also have lack of access to modern energy services and technology. The research examined whether energy poverty has a relation with energy justice and considered distributional justice, justice as recognition and procedural justice. Distributional justice considers ‘justice as fairness’ (Rawls, 1971). On the basis of Rawls’ (1971) ‘difference principle’ concept it can be argued that if we think of energy in distributional justice terms, we can make a case why women as a disadvantaged group should be more supported in their energy needs rather than less.

But, rural women have not received advantages; they are excluded from modern energy service coverage. They are deprived of fair distribution of energy resources from household to national level. On the other hand, men are using modern energy services and equipment in their activity. In previous work practices, men ploughed land with oxen and watered crops with doon⁵ in processes that were laborious and time consuming. Now the men cultivate land with tractors and water with pumps and their human effort has been reduced drastically. They have enough free time to gossip and/or to explore new income opportunities so that their income may be enhanced.

On the other hand, women are working with the same fuel for cooking. Unlike other urban areas, solar cookers, improved burners, gas supplied by a gas line and other modern cooking facilities are not available in this area. Though bottled gas is available, people cannot afford it due to its higher cost. Women have to cook more than once a day as they do not have household appliances like a refrigerator, to keep previously cooked food cool, or an oven to reheat food.

Rural women are not able to access clean fuel like line gas but in urban areas clean fuel is available. It affects the rural community but it affects women more. In modern energy distribution, rural people are ignored in the energy policy and acts. If there were greater distributional energy justice, it may benefit rural communities. Women's health and drudgery would be reduced and they could be involved in earning with the saved time, that may help to alleviate energy poverty (see chapter 6.0).

Recognition of a group is important to consider their rights; it includes and respects the people in that group and helps to attain fair distribution of resources and remove

⁵ A bucket connected with two ropes in two corners; two men fill the bucket with water and empty it onto agricultural land.

grievances (Schlosberg, 2004; Young, 1990). It was found from this research that women's needs for energy services were not recognised, from household to national level. Husbands and elderly family members mostly do not feel that working with indigenous fuel is the cause of different diseases, nor accept that it affects women's health. Women have no or little opportunity to consult with their husbands because most of the husbands do not even want to hear their wives. Some women can share their energy needs with their husbands, but husbands mostly take decisions on choice of energy services according to their own judgment. A few women who share the energy costs of the household can influence energy decisions. At the community level a few rich and educated women can take part in the meetings of different committees of the Union Parishad to which rich and educated women are mostly invited, but the women normally do not take part in discussions and decisions. The reason behind this is that women are not accustomed to speak in a social gathering in front of men, as society thinks women should not speak freely in public. Moreover, women's energy needs are not recognised in energy policy; women and their energy needs have not been discussed and no guideline has been given to address women's energy needs.

Procedural justice means fair procedure has to be followed to ensure 'fair' distribution of resources (Rawls, 1971). There are three pillars of procedural justice (a) access to information (b) meaningful participation and (c) access to legal procedures and court (UNCE, 1998, 2006). This research scrutinised procedural justice based on these three pillars and found procedural justice was not established in the case of energy resource distribution. Women in the fieldwork area have no access to information about energy services. Though the Energy Ministry and companies share information in websites, these

women are uneducated and do not have access to information technology as they do not have mobiles, laptops and internet connections. Sometimes, television shares different information about energy but most of the women do not have the opportunity to watch TV. Moreover, they have never seen any officials from energy ministries or companies in the fieldwork area and they have never been asked about their energy needs. On the other hand, men have some idea about energy services from television as most of them observe TV. They also get information about the use of modern energy services and technology in agriculture delivered by agriculture extension workers. Secondly, meaningful participation can improve public confidence in the government (Leach et al., 2005; Renn et al., 1995). It is important to accommodate the needs of different groups in a policy. Women have no opportunities to participate in the formulation of energy policy and planning. Policymakers did not even consult with urban women at the time of policy formulation. As a result, this policy overlooked rural women's needs for modern energy services and technology; this observation is similar to the findings of Clancy et al. (2000). Thirdly, access to legal procedures is not available to the rural women for two reasons. They do not have knowledge about their rights as they are uneducated and have no access to information from where they can learn about their rights. Moreover, they have no idea about the legal system and do not feel the court has any importance related to their energy access.

C. Research Question (3): What factors affect women's contribution to the household's ability to afford energy?

Women's financial contribution to energy costs helps to improve their participation in household energy decisions but no literature tries to explore this area. The contribution of

women relies on their financial ability which depends on two factors: women's access to resources and earning opportunities. Here, this research focused on the access to inherited resources as access to inherited resources is one way of improving a woman's financial resources. Women in the fieldwork area under study mostly do not have access to inherited resources due to prevailing laws, religion and patriarchy. Inheritance laws of the different developing countries do not protect equal rights of women because those laws are derived from religion where men get the major share in comparison to women (Agarwal, 1994). In Bangladesh, women get smaller shares than men as the inheritance laws are formed on the basis of religion, but this is not consistent with the Constitution of Bangladesh, 1972 where the guideline is no citizen should be discriminated against based on age, sex, race or religion. Moreover, women here are not getting their share allocated by inheritance laws. Patriarchy prevails in the society where the brother's mindset and social stance opposes women receiving their rightful property and jeopardises women obtaining their smaller allocated share. In addition, patriarchy shapes women's behaviour in favour of men in a way that compels them to be passive, due to women's vulnerable position in the husband's house and society. Here, women cannot live alone whether they have the financial capability to do so or not. Moreover, these women are also economically vulnerable. They want to keep good relations with their family to seek shelter with their brothers in times of trouble. Furthermore, relatives and neighbours do not want to settle inheritance disputes about property. The author observed that many family disputes like divorce, quarrels, physical assault or sexual harassment are settled outside the courts through informal arbitration by the relatives, or neighbours, but nobody is interested in solving disputes relating to property inheritance. It could be that people

think if they argue in favour of women in disputes of this nature, they will feel obliged to give rightful shares of property to women relatives. Formal arbitration is possible through the village court of the Union Parishad (the smallest part of local administration) but this action has not become effective. This is for two reasons: one is that brothers are able to ignore any recommendations arising from the arbitration as there are no consequences for non-compliance. Another factor is that the chairman is also a male and he may have less interest in taking the initiative; if he makes a decision in favour of women he may lose the support of men at election time. There may be a counterargument that he may get more votes from women if he supports women's rights; however, this is unlikely because women in the rural area under study are not well informed about their surroundings and they have no organisation. But, men meet regularly with other men and argue in favour of different issues. This bargaining power pushes the leaders to support them. Lastly, the courts have not become popular and effective in solving the problem due to its lengthy procedure. It needs a long time, sometimes a decade, for a decision to be reached and the brother gets the use of the property during this time. Moreover, there is no provision for imprisonment in the law so that the brother has no fear of custody. In addition, women in the fieldwork area have no knowledge about the court procedures as they are mostly uneducated; they find it difficult to enter into the court process. Above all, pursuing a remedy through the courts requires the expenditure of a considerable sum of money but these women are mostly poor. The government and NGOs could help in this process. If women could get a free advocacy programme related to their property rights and information on how they can establish their rights, women might step forward to claim

their rights. Free legal aid is important as it can boost women's morale to claim for justice.

Women have limited economic activity inside and outside their homes. This is mainly for two reasons: (a) patriarchy and (b) lack of working opportunities due to energy poverty, insecurity and non-reliability of energy supply. 'Patriarchy' has created a 'division of labour' in the society of Bangladesh; women are involved in non-income generating activity as they do household work. Besides the influence of patriarchy, women's income opportunities at the household level are hindered due to lack of time because they have to work hard till the afternoon on household work, especially cooking with indigenous fuel. If they had modern fuel and labour-saving household appliances, they could save time and could engage in earning activity in this saved time. Most of the women have free time in the evening but they cannot utilise this free time due to load shedding; as a result this limited access to energy reduces their working opportunities. Moreover, women are not able to set up poultry farming, or animal husbandry as the supply of electricity is not continuous due to frequent load shedding.

This research found that microfinance is available to start up a business in the fieldwork area; most of the women are taking loans from NGOs but only a few women are involved in economic activity. Women mostly use the loans to benefit their husband's business like farming or shops; though it generates income for the households, it cannot improve women's earning capability. The loans are also used in non-income generating activity; the women may purchase a TV, or some other household item, or they may finance the marriage of their daughters. It was felt that NGOs should pay more attention to monitor

loans to improve women's economic activity by limiting the use of loans to the purpose for which the loan was issued.

'Patriarchy' controls women's mobility and work outside the home as it opposes women working with men. It is not the only reason for female unemployment as some educated women are working in the school and the community clinic. Uneducated women in rural areas cannot work outside their homes as they have no opportunities to work. Mills and industries have not been established in the rural areas due to lack of infrastructure (energy and power supply). There is no energy supply security in this area of Bangladesh which is the predominant factor necessary to establish mills and industries, because infrastructure like communication lines, water and cheap labour are available here. A gas supply line is not available here, plus there is no diesel supply station in this area. Moreover, frequent load shedding is also another adverse factor that restrains entrepreneurs from coming to this area. In urban areas, uneducated and poor women are working in the mills or industries. If women get the opportunity to work as in urban areas, families may not oppose this, since the researcher found that nearly 25 women are working in a manually operated women only carpet factory close to but not in the fieldwork area.

There are interconnections between the findings in relation to the different research questions. Insufficient or poor quality of lighting reduces women's opportunity to work at night which reduces women's income opportunities. Load shedding also hinders women from setting up poultry farms and other related business as a continuous power supply is essential for businesses of this nature. As a result it affects the capacity of women to earn a living, which might help to change their energy situation. It has also a negative impact on women's participation in energy decisions. If women could earn and contribute to the

cost of household energy services, they could participate in energy decisions. It could improve women's position at community level as women with an earned income are valued in the society. Moreover, a continuous power supply may attract entrepreneurs to set up mills and industries that would improve women's income opportunities as in towns. In addition, the lack of women's access to IT services means that they are less able to be informed and participate in decision-making.

From this research it is found that the findings of the three research questions are not mutually exclusive. It is found that different energy services like lighting, cooling, heating, information and communication and energy for earning a living are dependent on the accessibility of electricity, and availability of clean fuel and modern energy efficient stoves are also important for cooking. Besides ensuring accessibility of modern energy, it is obvious that it is necessary to ensure energy justice in order that women receive modern, affordable and safe energy services and technology. But, energy accessibility and energy justice are not enough to eradicate energy poverty; households must have the ability to purchase equipment like fridges, TVs, mobiles or air conditioning and to pay energy bills as well to receive those energy services. Therefore, three things need to be assured to overcome energy poverty for the household and for women: energy accessibility, energy justice and financial capability to afford energy services.

In the literature energy poverty is conceptualised and measured at household level (see chapter 2). But, the qualitative research in this thesis showed that there are advantages to measuring it at individual level to take account of gender, as it was found that the access to energy services for men and women are not the same, and furthermore that the effects

of energy poverty are more severe for women in comparison to men. The research also investigated the experience of women's energy poverty and explored the underlying causes of the higher energy poverty of women. Whilst previous literature explains energy poverty as lack of access to energy services or the inability of the household to afford energy (see Chapter 2), this research found that the experience of women's energy poverty is not only dependent on access and affordability but also on the distribution of labour in the household, lifestyle, and husbands' mindset. Cooking with indigenous fuel is one of the main reasons for the energy poverty of women that causes drudgery and ill health. Women suffer more from this due to the gendered division of labour that exists in rural Bangladeshi society that assigns cooking to women. Sometimes different lifestyles of men and women worsen women's energy poverty experience. Inadequate lighting due to frequent load shedding in the evening especially in summer might be expected to affect men and women equally, however women are restricted to stay at home and face the consequences of load shedding while their husbands stay outside in the shops and in the markets where power supply by generator is available. In the case of information and communication, sometimes inaccessibility of energy services is not the only reason for women's deprivation; their husband's mindset and decisions are also responsible for it. Almost every house has a mobile but women have no or limited access to it; if husbands allow it, women can use it when the husband is at home. Women cannot watch TV as households do not have the ability to purchase TV but men watch TV in the market. Cooling is not available and women have to suffer a lot in hot and humid summer especially at noon, but men stay outside the houses at the road side, river side and under the trees and are thus able to make themselves less uncomfortable than women are. As

households do not have space heating arrangements, men and women have the same experience at night.

TEA proposes a generic model of the minimum standards of energy access for developing countries. This research argued that the TEA model would be better framed in regional context; specifically, minimum cooling and space heating temperatures may vary in different geographical conditions. In the case of cooling, the minimum temperature is suggested by the TEA model as 30 degrees which is observed as not comfortable in the field work area where humidity is high, and would need to be reviewed. As well, space heating temperature in day time is suggested as 12 degrees Celsius in winter which is not comfortable in the field work area as people experience on an average above 20 degrees Celsius for nine months a year (see chapter 4). Moreover, no night time temperature is suggested in the model, and that should be added as nights can be much colder than days (see chapter 4).

This research showed that women's energy poverty is related to energy injustice. In the literature, energy poverty and energy justice are considered as two different concepts and tend to be discussed separately. But, this research showed how energy poverty may be derived from a lack of energy justice. Women in rural Bangladesh do not receive energy justice at any level from household to national level. 'Fair' distribution of energy resources are not attained at household level as women do not have access to modern cooking fuel and burners to aid in their work, whereas men carry out their work with the aid of energy services in farming. The scenario is not similar for rural and urban women in the case of cooking fuel, nor in lighting because of the higher load shedding in rural areas. Rural women's energy needs are generally not recognised in the household and are

not recognised by energy policy, acts and rules or by the energy companies. Rural women are not able to participate in energy decisions at household to national level; they have no opportunity to participate in the formulation of energy policy, acts and rules and hence they lack procedural energy justice.

As mentioned earlier, previous literature explained that one of the two general reasons for energy poverty is a household's inability to purchase energy (see chapter 2). Generally, the aggregate income of men and women in the household is considered as household's financial capacity. But, in the field work area a household's financial capacity mainly depends on the husband's income. This research showed that women's energy poverty can be reduced if women have the financial capability to purchase energy or contribute to household energy purchase (see Chapter 5). Women's financial capability can be improved if they have access to inherited resources and/or earning opportunity. This research explored the reasons that prohibit or limit women's access to inherited resources or earning opportunities and found that firstly, women do not have equal inheritance rights to men secured by law as the laws on this is are derived from religious guidelines. Moreover, the patriarchal social system discourages or restrains women's access to even the inheritance that they do have rights to. Lengthy legal processes and the cost involved prohibit the improvement of women's access to their inherited resources. Secondly, women's economic activity is curbed due to patriarchy and energy poverty. Patriarchy creates a strict division of labour where women are involved in non-income generating activities and it prevents most of women's work outside the house. As well, energy supply shortage reduces women's opportunity to work inside or outside the home.

Women could save time in cooking if they had modern cooking fuel and burners and they

could use this free time in income generating activity. Furthermore, load shedding in the evening hampers earning a living as women cannot work without adequate light. Women in the fieldwork area suggested they could set up poultry farms if there were uninterrupted power supply; or with a better energy supply, entrepreneurs may set up industries like garment factories where less educated women could work and earn, as in towns (see chapter 6).

This research showed that women's energy poverty is not only an economic phenomenon. To understand the energy poverty of women, patriarchy, social stance, religion and policy decisions need to be considered along with economics (see chapter 4 and 6). Another important finding of this research is that the concepts of Gender and Development (GAD: see chapter 2) need to be applied in order to alleviate women's energy poverty. Gender relations need to be understood and addressed. In addition the varied circumstances of women need to be taken into account and energy needs of women of different socio economic strata may not be the same. The energy needs of each group need to be recognised and their voice has to be heard in energy decision making process related to energy policy, acts and rules (see chapter 5).

7.3 Policy implications

This research explored multiple dimensions of women's energy poverty. It analysed the root causes of energy poverty. In the energy poverty literature there is hegemony of economics; researchers mostly concentrate on the capability of the household to afford energy in order to explain energy poverty. This research showed that social and cultural influences along with the unfair distribution of energy resources are also responsible for

women's energy poverty. It is found from the research that energy poverty, for women in particular, exists though some households have the ability to afford to purchase energy services; the energy poverty of the household arises from the husbands' mindset and unwillingness to use modern energy services. Many husbands think it is not a problem to work with indigenous fuel as their predecessors did not feel this to be a problem and some husbands' think that it is a waste of money as modern cooking fuel is more expensive. Many husbands think their wife should not have mobiles as it incurs additional costs. Therefore along with economics, social and cultural factors have to be taken care of in the policy to alleviate women's energy poverty. GAD focuses on gender relations and suggests to be aware of how gender intersects with class and caste; it is important to consider the GAD approach to alleviate energy poverty of women (see section 2.9.1 h).

This research explained the limitations of current energy policy and planning in developing countries. Like energy poverty literature, the energy policy of the developing countries does not consider women's energy needs separately. This research gives an insight into women's energy poverty and its impact on women resulting in their drudgery, ill health, lack of income opportunities and socially subordinate position in comparison to men. This research may draw the attention of policy makers to focus on women's energy needs and address these in policy and planning. Moreover, energy policy focuses on cooking fuel and lighting only. But by applying the TEA model to women this research has identified the importance of other energy services like information and communication technology, space heating, cooling and the provision of energy to earn a living, that also need to be addressed in policy.

This research showed the importance of incorporating the concept of ‘energy justice’ in energy policy. It was found that ‘ENEP 2005’ fair distribution of energy resources has not been ascertained for women in the fieldwork area, as in the policy. It is to be noted here that the policy has to be followed for fair distribution of energy resources to alleviate women’s energy poverty. Recognition of a group is important at the time of framing policy but the existing policy has not recognised women and their energy needs. The concept of procedural justice was not followed; women in the study had no access to information, or meaningful participation. For meaningful participation to take place women should have the opportunity to consult and share their opinions in the decision-making process, which was absent. In this way policymakers could hear the voice of women which was unheard in the policy. The main reason for this lack of consultation was that a ‘top-down approach’ was followed by Energy Ministry officials in the formulation of the policy. Though they shared their draft policy with experts, the stakeholders were not consulted. As a result, women’s voice was unheard in the policy. If the voice of women was heard and addressed it could also improve women’s empowerment as well as fulfil their energy needs. This research argues for an ‘opened up approach’ at the time of framing policy where every stakeholder has the opportunity to participate in the policy formulation. This process would help to integrate the ideas and claims of different stakeholders. Normally every group wishes to maximise their opportunities; as the resource is limited, policymakers will need to ensure fair distribution of energy resources through policy, acts and rules. NGOs and women advocacy groups may play important roles. They may provide information to the women affected by energy poverty about energy services and government’s action that will help to improve

women's knowledge about modern energy services and technologies. They may also negotiate with the government to establish women's energy rights. But, this is not enough to establish procedural justice for women because this is an indirect access to information and indirect participation in decisions for energy poverty affected women. It is important to ensure women's direct access to information and participation in energy decisions. A 'bottom-up approach' model has been proposed in chapter 6 (in section 6.4, Figure 6.1) about women sharing information and participation. This model ensures two-way communications: women will get information from the Energy Ministry and they will also be able to share their opinions. After, they will get feedback on their opinion and how it has been responded to. They also are able to participate directly when any acts, rules or policy are formulated. This model will ensure women are represented in the policy and the 'voice' of the women incorporated in the decisions. It also helps to overcome the power relations existing in the rural society.

This research highlighted that those women who contributed to the purchase of energy took part in the household's energy decisions. To allow women to develop their potential and capability to contribute to households (financially but also to decision-making) policy support is essential to ensure an uninterrupted power supply to the locality so that poultry farming, animal husbandry or other projects can be set up in the household. Moreover, it is essential to attain security and reliability of energy supply so that mills and industries can be established in rural areas. Thus, women can generate income inside and outside the households. Presently, the energy sector is concentrated on gas but alternative sources of energy and power supply need to be attained. Government policy stresses the need for renewable energy but the progress to use of the solar cooker or

improved burner is very slow. Moreover, power generation is limited to gas and furnace oil.

Patriarchy creates gender discrimination among society in the developing countries that also has adverse effects on women's energy experience and income opportunities, but the effect of patriarchy is not in the same amplitude in rural areas and towns. In town, women can work outside the home and earn money; they have a voice in families and society as well, but rural women are passive and have a relatively bad situation in contrast to urban women. This is due to the lack of education, consciousness, association, income opportunities and earning potential of women. Rural women's earning opportunities need to be enhanced in order to improve women empowerment and the voice of the women so that they can take part in energy decisions. Moreover, it can also reduce gender disparity. This research showed that there is scope to work for gender equity as no significant steps have been taken by the women's Welfare Ministry to improve the economic position of rural women. In addition, the Energy Ministry did not give any policy support to women to help them improve their potential for 'earning a living' inside or outside the home. In energy policy and planning by the Energy Ministry and women's development agenda by Women's Welfare Ministry a GAD style approach should be used that recognises gender relations need to be understood in context and that they are dynamic – not necessarily the same in rural and urban areas for example. Work to alleviate women's energy poverty and improve their development should therefore work on the gender dynamic, not just on women.

7.4 Future research

- Women's energy poverty is a relatively new area of research. The major findings of this qualitative research are that the effects of energy poverty are not equivalent for women and men in rural Bangladesh; women experience higher energy poverty than men, and women and men's energy needs are not identical (see Chapter 4). Another important finding of this research is that energy poverty is related to energy (in)justice (see Chapter 5). This research also showed that women's financial capability if improved could alleviate their energy poverty but social, political and religious factors limit or hinder women's financial capability (see Chapter 6). The findings of research on this topic may be similar or divergent in South Asian countries like India, Pakistan, Nepal etc, and also in the sub-Saharan countries. This research study may be replicated in those countries to capture the overall scenario of women's energy poverty. Given that the specific situation is likely to vary, there should be a generic approach: the gender dynamics of each context need to be understood and although there may be commonalities and generic lessons to be learned there will probably also be local specifics to be addressed.
- The findings of this research showed that energy poverty needs to be understood through multi-disciplinary lenses; economic, social, political and religious factors are responsible for women's energy poverty (chapter 4). Moreover, women's financial capability is also curbed due to social, political and religious factors (chapter 6) along with lack of 'fair' access to energy resources (chapter 5). Research on the causes and ramifications of energy poverty should not be limited

to the field of economics. It needs to be carried out through social, political, geographical, and environmental perspectives. As well, this research showed that energy justice is not attained in Bangladeshi rural society where 'fair' distribution of energy resources does not exist. Women's energy need is not recognised and addressed in energy policy and planning, acts and rules (see chapter 6). There is scope to work on energy law in order to establish the right of citizens, especially for women, to fair access to energy resources, services and technology.

- Research may be carried out in those areas where renewable energy services are available to women and investigate whether there is any improvement in their quality of life. Unfortunately, no area of Bangladesh has yet been fully covered by renewable energy; in the meantime this research may be carried out in those locations of the developing countries and sub-Saharan countries with access.
- It is important to assess a minimum standard of energy service needs for men and women separately. Men and women in the same household may not be achieving the standards to the same extent. From this research it is found that energy needs for women and men are not identical, and the 'energy profile' of women and men are also different as their work and daily life are different. For example women are facing the major consequences of cooking with indigenous fuel, while men do not suffer from this so much as they are not responsible for cooking and do not stay in the house at the time of cooking. Load shedding in the evening affects women more as they are confined to the house while men can go to the market where power supply by generator is possible (see Chapter 4). Future research should look beyond the household level and explore the energy needs of different

household members, and whether they are being met, as well as consider the different impacts of energy poverty on different household members.

- The TEA model may be applied in different regions of the world and different minimum standards of energy services may be proposed based on the region. From this research it is felt that research should be carried out to propose regional minimum space heating and cooling temperatures instead of a single minimum space heating and cooling temperature for all countries. This model may also be tested in rural areas of India, Pakistan, Nepal, and Sri Lanka in order to find out whether the minimum standards of the six indicators of this model are sufficient to meet the minimum energy needs of women of the south Asian region and put forward suggestions if any require revision.
- Research may be carried out to design energy efficient houses suitable for use in developing countries in order to reduce energy costs. This research showed that the houses in the rural areas of the field work area are mostly made of corrugated sheets, bamboo and leaves or semi paka.⁶ These houses do not have heat or cool retention abilities. In summer, they become hot quickly and people feel uncomfortable especially at noon and at night. Alternatively, in winter houses become cold quickly after sunset. Moreover, it is observed that the indoor temperature is approximately same as the outside temperature in summer and winter. Therefore, there is a need for affordable housing in rural areas of

⁶ The sides of the houses are made of bricks and roof is made of corrugated sheets.

Bangladesh and other countries that is built in a way that retains heat or cool and requires less energy for heating and cooling.

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