



Women's empowerment and electricity access: How do grid and off-grid systems enhance or restrict gender equality?

## EXECUTIVE SUMMARY

7 January 2019

This publication has been realized within the scope of ENERGIA's Gender and Energy Research Programme, funded by the UK Department for International Development (DFID). ENERGIA, the International Network on Gender and Sustainable Energy is hosted by Hivos, an international organisation that seeks new solutions to persistent issues.

The views and opinions expressed in the publication are those of the authors. They do not necessarily reflect ENERGIA's, Hivos' or UK government's views and/or official policies.

**Cover photo:** Rose and her family at home, using solar light. Kenya, Homa Bay County, Gwassi Division, Magunga. April 2018. Photographer: Sven Torfinn/ENERGIA

# Women's empowerment and electricity access: How do grid and off-grid systems enhance or restrict gender equality?

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## International research consortium

This independent research project was conducted by an international team of researchers and practitioners, which constituted Research Area 1 ‘Electrification through the grid and decentralised systems’ in the Gender and Energy Research Programme coordinated by ENERGIA, funded by the Department for International Development, UK (DFID). The project was entitled “Exploring factors that Enhance and restrict Women’s Empowerment through Electrification” (EFEWEE). For further information, see <http://www.efewee.org/>

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# EXECUTIVE SUMMARY

## 1. Introduction

This report presents the results from a four-year independent research project exploring women's empowerment through electricity access, with particular attention to comparing the effects of electricity provided by the grid and off-grid systems. The work was commissioned by ENERGIA's Gender and Energy Research Programme and funded by the UK's Department for International Development (DFID). The research was carried out in three countries where a relatively large share of the rural populations lack access to electricity: Nepal, Kenya and India.

In the current discourse on energy and gender, three paths to women's empowerment are often highlighted: First, it is assumed that electricity interventions would enhance women's empowerment if women were included in the systems of supply. Second, the Sustainable Development Goal number 5 identifies improved infrastructure as one of its targets for ending discrimination against women. Third, it is anticipated that women's access to using electricity and time-saving appliances would help them reduce the time and hardship they spend doing drudgery tasks (e.g. fetching firewood). Implicit in this thesis are the expectations that women would use their resulting freed-up time to pursue income-generating activities and thereby become economically empowered. Also implicit is that, with access to electricity as a given, women have the power and means to decide on and use the appliances they desire.

This study sets out to empirically examine these and other potential paths to women's empowerment through electricity in a limited number of geographical contexts. Building on this material, we aim to identify conditional factors for electricity's gendered impact. By employing a novel framework for analysis, the study aims to demonstrate how success criteria and hindrances for women's empowerment through electricity may be studied. The results will inform the project's overall goal which is to propose recommendations for policy and practice on how electricity access in the rural South most effectively can enhance women's and girls' empowerment.

This report considers women's empowerment as a process towards gender equality, hence a concept that requires analytic attention to women, men, girls and boys. The project asks four main research questions:

- RQ 1: With respect to electricity access and use, what factors affect women's and girl's empowerment? Sub-questions:
- i. To what extent and how is electricity used for public services in ways that enhance women's empowerment?
  - ii. To what extent and how do women and men have access to electricity at home, decide on and use electrical appliances?
  - iii. To what extent and how do productive uses of electricity enhance women's empowerment?
- RQ 2: What are the potentials and limitations of grid and off-grid (decentralised) systems in terms of enhancing women's empowerment?

- RQ 3: To what extent and how does women's involvement in electricity supply empower them as individuals and what is the impact of women's inclusion in supply on the empowerment of women and girls in the wider community?
- RQ 4: How may empowerment in the realm of electricity be conceptualised and measured?

### *Methodology*

The team started by reviewing the empirical literature on women's empowerment through electrification and electricity access and examining to what extent gender issues and women's needs were addressed in national electricity policies in the three selected countries and also international initiatives. The reviewed literature shows that whilst electrification has often positively affected women's (and men's) wellbeing, very few studies have looked at the gender relational aspects (e.g. effects on women versus effects on men), and what evidence does exist is fragmented (Winther et al. 2017). In the recent past, electricity policies in the three countries mainly focused on providing electricity access, making services affordable to the poor and enhancing the availability and reliability of supply (University of Oslo et al. 2016). More recently, steps have been made to make electricity policies also become gender aware. However, as indicated through the studied cases in this report, these efforts appear to have had a limited bearing so far on the development of the electricity sector at the meso and micro levels.

In preparation of the empirical study, and addressing the conceptual research question "How may empowerment in the realm of electricity be conceptualised and measured?" (RQ4), the team developed a framework for analysing women's empowerment through electricity (Winther et al. 2017). The first part of the framework is based on a causal chain put forward by ENERGIA/DFID, and adapted to include a focus on four conditioning factors that are important in terms of electricity's gendered effects: i) the socio-cultural and material context; ii) the socio-technical design of the electricity system; iii) the process of implementation and management, staffing and ownership; and iv) policy, regulations, financing schemes and the role of international actors. The second part of the framework builds on Nabila Kabeer's (1999, 2001) work on empowerment and general social theory to identify three generic empowerment dimensions: i) rights, norms and social position; ii) access to resources; and iii) influence over decisions (agency). Taken at large, the framework, which informs the analysis presented in this report, brings analytical attention to the underlying mechanisms for electricity's gendered effects.

### *Empirical Research Methods*

The analysis is based on empirical material collected in selected geographical contexts in rural Nepal, Kenya and India. In each country, we selected two rural sites in which different systems of supply were available: central grid as well as various types of off-grid supply (six case study areas including a total of 14 systems of supply). Through qualitative methods and with the purpose of understanding the electricity-gender nexus, we examined the socio-technical systems of supply as well as the situation of various types of end-users (households, public institutions, and commercial enterprises). The research adopts a comparative case study methodology which allows for the comparison of the gender implications of various types of electricity provision systems

and processes of implementation. We also looked into the situation of people and institutions that lacked access to electricity. Furthermore, with the purpose of understanding how the issue of gender and various types of electricity access is regarded from the perspective of policymakers and national stakeholders, we interviewed 25 individuals holding this kind of positions in a variety of organisations, including national ministries; electricity utilities; off-grid electricity companies and NGOs. Three of the interviewees in Kenya were visited twice (Annex 7).

Subsequently, we returned to one rural site in each country to conduct a household survey, selected to reflect and compare households with various types of electricity access. The total material includes 245 qualitative interviews, 28 focus group discussions and 642 household survey interviews.

The survey data provide a novel type of findings regarding the gendered organisation, control and use of electricity and appliances. Statistical tests were run to check whether results comparing women and men's situation are statistically significant. We found that there is a significant difference between men and women in most key variables. The results also form an important basis for comparing the gendered contexts in which electricity was introduced. The survey results are representative of the respective case study areas (with two restrictions related to sampling, see below), but not of the whole country or state in which they were retrieved. The results do not prove causality statistically (i.e. the impact of electricity access) within or across the three countries.

Compared with realities in the study contexts, the survey sample is skewed in two ways. The share of households with access to electricity (whether grid, mini-grid, solar home systems) in the survey study sites differed considerably, spanning from 96% in Mahadevsthan (Nepal) to 87% in Chhattisgarh (India) and 41% in Homa Bay (Kenya). To enhance the possibility to compare households with and without access, we decided to include a fair share of each type in the survey samples. This means that the samples are skewed compared to the national statistics on electricity access rates in each country: a higher share of households without access in Mahadevsthan; a lower share of households with access in Homa Bay in Kenya. In Chhattisgarh, the sample was similar to the Chhattisgarh (state) average. Furthermore, to understand women's experiences thoroughly, the survey was purposively designed to include more women than men. As a result, 72% of the survey interviewees were women and 28% were men and the total sample is skewed towards women's responses. However, irrespective of the gender of the respondent, many survey questions related to information about women, men and other members in the households (e.g. 'Is the woman in this household member of a woman's self-help group?'). Therefore, a substantial part of the material concerns both women's and men's situations as reported largely by women. However, in the Kenyan site (Homa Bay) the women skewed recruitment strategy may have slightly affected the type of households that were recruited. Among the women who participated, a relatively high share (35%) were widows. However, we have reason to believe that the share of widows in Homa Bay is generally high and linked to the high prevalence of HIV in the area, which is at 26%, almost 4.5 times higher than the national average (National AIDS Control Council 2018). The relatively high share of widows in the Kenyan sample may thus be slightly higher than in reality, but it provides the study with a unique possibility to compare the situation of these women who tend to live without a male partner with the situation of other types of households.



We provide further elaboration on the survey's limitations in Section 1.2.3, Chapter 11 and Annex 11 to this report. This includes how the high diffusion of solar home systems – and householders keeping several types of access – contributed to making it problematic to quantify electricity's gendered impact in a statistically robust way. However, the data are statistically strong in terms of documenting women and men's different situations. In other publications (Winther and colleagues, in progress; TERI et al., in press), we describe the overall sequence of data collection activities and the survey sampling design, respectively.

## **2. Gendered Contexts and Gendered Systems of Supply**

A central feature of this research is to explore how different characteristics of the socio-cultural and material contexts conditioned electricity's gendered outcomes in the studied sites. Annex 9 provides an elaboration of the studied gendered contexts. In line with the study's overall objective, the purpose of examining contextual aspects is to identify criteria for success and suggest measures that can help policymakers and practitioners overcome some of the barriers to women's empowerment through electricity.

Across the three country case sites, there are several obstacles to women's empowerment that are rooted in patriarchal structures. First, women have limited power to make major decisions and there is an unequal distribution of long-term assets (land and houses primarily owned by men) as well as income levels: women in the Kenyan and Indian samples earn on average only 40% of men's income. People's existing livelihoods condition the extent to which electricity is used for productive purposes. Farming is the most common source of livelihood in the studied rural locations in Nepal, Kenya and India, though in Homa Bay (Kenya), fishing and business activities imply more diversified livelihoods. In the study sites, 70% of the Nepali women are engaged in small-scale production; 41% of the Kenyan women-run businesses; while Indian women have few other options for livelihood than agriculture and casual labour (69%). Second, in all three country sites, women have had limited education opportunities among the adult segment. Third, across the sample, women are severely hindered in making changes in their lives due to the heavy burden of drudgery and dependence on men for decision making. Fourth, women in the study area in Kenya face serious hazards such as their high likelihood of experiencing violence when outside the home, or hunger during food shortages. 43% of the Kenyan respondents confirmed that women members of their households have been victim to violence when going to fetch firewood. Among 70 Kenyan households who reported to have experienced food shortage, 70% said that in such cases, the woman is the person who is the least likely to get something to eat.

In general, poor groups of women and men, who are the majority of people in both study areas, live a much harder life than the wealthiest minority, not only in terms of lack of money and material resources but also in terms of a heavy workload. A key question in this research is how and to what extent private homes and public institutions have benefitted from electricity and to what extent such access has helped reduce women's workload in particular.

### *The studied grid and off-grid systems*

In the three study countries, initiatives have been made at the national level to make electricity policies become gender aware (elaborated in 1.1.2 and Annex 10). Another key question in this research is whether there are signs of gender awareness on the ground level, i.e. in the implemented electricity systems in the study villages. Moreover, the literature indicates that off-grid systems are more likely to adopt gender inclusive approaches than do grid systems and extensions. We now examine these issues for the studied systems of supply.

In most of the study sites, particularly in India and Kenya, conventional grid electrification programmes had been implemented through a top-down process with little participation of users or communities, whether women or men. Despite broader gender mainstreaming efforts at the national level in the three countries, the studied interventions were mainly gender blind. The 14 systems of supply that were studied (Table A below), ranged from grids to various types of off-grid systems including mini-grids and other systems organised on the local level such as solar home systems (SHS) and an energy centre offering lantern renting and other services. The overall picture is that both in the cases of grid extensions and mini-grid initiatives (off-grid), efforts to include gender in energy on the macro/national level had not been effective on the meso/supplier and micro/village levels: these interventions resulted in that it was mostly men, and not women, become involved in supply at the local level. Moreover, only two out of four studied off-grid initiatives that *aimed* to include women in supply had the intended effect. The remaining two interventions adopting a gender approach did not succeed in recruiting women, which was partly due to the process and partly to existing gender norms that were not actively addressed. The picture is more mixed on solar home systems offered commercially by the private sector (Kenya only), where both women and men are involved as sales agents.

In the Nepal study sites, men had sometimes played an active role in bringing the grid or a decentralised system to their area of residence. Women did not take a strong part of these initiatives, with their roles limited to the erection of poles. However, the AEPC micro-hydro project in Mahadevsthan (System 2, Table A), specifically aimed to include women in construction, installation and supply. There was distinct technical training organised for women for the supply side, but despite this, no women ended up being involved in supply: beyond short-term technical training, no other resources or support were provided to effect the changes in existing attitudes, structures or practices.

Sl no	Country	State/ District/ County	Village/ VDC	Type of system	TIER	Implementation approach	Gendered involvement in practice
1	Nepal	Dhading	Mahadevsthan	Grid (7 years)	4-5	Gender-blind	Only men involved
2	Nepal	Dhading	Mahadevsthan	Micro-hydro/ mini-grid, SHS	2-3	Gender balanced committees	Only men involved (2 men from the 24 member committee)
3	Nepal	Dhading	Mahadevsthan	SHS	1	Gender-blind, top- down	Only men involved
4	Nepal	Tanahun	Ghiring	Grid (14 years, Govt./ Pvt.)	1-4	Gender-blind, top- down	Only men involved (as technicians, for meter reading and billing)
5	Nepal	Tanahun	Ghiring, Chapakot	SHS (15 years)	1-3	Gender – blind	Only men involved (as technicians, local salesman)
6	Kenya	Homa Bay	God Bura	Grid	3-4	Gender-blind, top- down	Only men involved as field technicians
7	Kenya	Homa Bay	Kiwa Island	Micro-grid (Pvt.)	3-4	Gender – blind, top-down	Mainly men involved
8	Kenya	Homa Bay	God Liech	SHS	1-2	Women targeted, local participation	Mainly women involved
9	Kenya	Kitui	Endau	Grid	0-4	Gender – blind top-down	Only men involved as field technicians
10	Kenya	Kitui	Ikisaya	Energy Centre	0-1	Gender balanced local participation	Both women and men involved, gradually only women recruited
11	India	Chhattisgarh	Kacchardih	Grid	3-4	Gender-blind, top- down	Men involved in technical work, women: Admin staff in central areas
12	India	Chhattisgarh	Mohda, Rawan	Solar, mini-grid (CREDA)	1-2	Gender-blind, top- down	Men: technical work, women: Admin staff
13	India	Bihar	Mogalia Purandaha	Grid (8-9 years)	2-4	Gender-blind, top- down	Men: technicians, women: Admin and tech staff in central areas
14	India	Bihar	Purani Garail, Rustumpur	SHS (JEEVIKA)	1	Women's groups targeted, local participation	Systems registered in women's names, but not involved as staff

**Table A The 14 studied systems for electricity supply (EFEEWEE Project)**

Also in the studied grid villages in Kenya, men dominated the installation, operation and maintenance, with women's involvement predominantly in central office based jobs. In contrast, some women residing in the villages became deeply involved in management and supply in two decentralised initiatives (Systems 8 and 10). These were both small

community initiatives which were also attuned towards meeting the needs of women end-users. International actors played a key role in the two projects which took place in villages where there was no pre-existing electricity system available.

Again, in India, the process of providing grid electricity to the study village involved only men on both the provision and user sides. Whilst there were women engineers and technicians, family life and women's preferences were reported to make women avoid taking up field based responsibilities. These were exacerbated by difficulties in travelling to remote locations or unfavourable working conditions through the lack of facilities (such as health clinics) in those rural areas. It was a similar case in a mini-grid site in Chhattisgarh: no women were involved in supply in the villages, though some women did have desk-based administrative work in the central CREDA office.

### **3. Wider Implications of Women's Recruitment in Local Supply**

Based on the study of the gendered set-up and organisation of various types of electricity access, we then examine the implications for women's empowerment. As noted, of the 14 systems that were studied, 12 brought employment to men in the villages rather than to women. This provides an illustration from the ground as to how and why electricity supply tends to be a realm dominated by men. In 2011, female employment in the electricity, gas and steam, and water sectors was half the level of male employment (WDR 2012). Regarding the two exceptional Kenyan projects that successfully included women in supply, an interesting question is whether these initiatives had a positive effect on women's empowerment in the wider community. To examine this question we draw on the adopted framework and look at gender norms and women's social position to assess if there are signs of changes deriving from women's involvement in electricity interventions.

The findings show that the two Kenyan projects adopting a gender approach positively affected men's beliefs in what a woman can do. It can, therefore, be argued that women's involvement in supply had the effect of challenging existing gender norms, which implies some degree of empowerment to all women and girls living within those communities. Furthermore, because the women staff at the energy centre (System 10) were said to be patient and willing to treat customers in a flexible way (e.g. when not being able to pay for the service due to seasonal variation in income), poor customers, of whom many were women, had continuous access to the service despite their shifting level of affordability. Women's inclusion in supply thus increased the chances that women (and men) struggling with finances would have enduring access. There was a perceived effect about improvement in the quality of services provided and therefore an increase in system viability. This added value of including women in supply tends to be omitted in implementation processes that follow a gender-blind approach.

The survey included questions on whether people had observed women being involved in supply at the local level and the effects of such observations with respect to how the respondents think about women and what women can do. The results from Nepal and Kenya were highly positive. A significant share of the respondents (both women and men) answered in the affirmative and provided elaborated answers to an open-ended question on this point. This positive effect might reflect that gender norms have been

modified, though the context of the interview might also have influenced people's answers.

The failed attempts to include women in supply also provide important lessons for learning. In the Nepalese and Indian cases that attempted to include women, the initiatives failed because the attempts were too weakly designed, implemented and followed up to make a lasting effect on the existing practices that ascribe 'appropriate' roles to women and men. When we probed into the reasons for women's non-participation, barriers that appeared were women's need to move to her husband's place when getting married (Nepal) and that women's mobility is (socially) hindered as are their (social) possibilities to do technical tasks (India). In relation to the mentioned success cases in Kenya, there are two key points of difference. First, in Kenya, the gender approach was 'strong' in small de-centralised systems as it was instructed from the external implementers who also undertook steps to ensure in-depth training and follow-up over time in the years after implementation. Secondly, though some staff involved noted challenges with women's participation, the existing business practices in rural Kenya where women have participated for a long time, implied that the barrier for women to enter the realm of electricity was much lower than in Nepal and India. Nonetheless, Standal's (2008) thesis from Afghanistan (Solar Mama project), where gender norms are no less restricting than in the Nepalese and Indian cases, proves that women in such constraining contexts can be trained, recruited and take part in supply in successful ways.

Our results indicate that women who become successfully involved in supply gained increased self-esteem. As shown in previous studies, when women get involved in technical/managerial positions in the electricity projects or in the electricity supply system they are more often likely to be listened to in their community, which may help overcome traditional social barriers (Khan 2001). When women take up leadership positions, this may positively affect women's position, status and role in the society (Bryce and Soo 2004, Khuller 2001). Our findings confirm that such engagement may transform the view of women in the local community when the process of including them is based on insights into socio-cultural factors and include measures to overcome their barriers. Policy makers and implementers in the public, voluntary and commercial sectors can directly promote a gender perspective in planning, management and organisation of supply.

#### **4. Electricity Failing to Improve the Quality of Public Services**

Improved infrastructure is considered as one of the important means for ending discrimination against women (SDG 5). Numerous studies on rural electrification (e.g. IEG 2008, Winther 2008, Matinga 2010) have documented a positive effect of electrified public services on women's and girls' empowerment in terms of increased human resources (health, drudgery, opportunities for learning). The study set out to examine to what extent public services in the study locations actually had access to functioning supply and for what purposes electricity was needed and used. We look at schools, water supply and health services, and mobile phone diffusion and internet connectivity.

##### *4.1 Schools*

Electrification of schools, whether through the grid or off-grid systems has only led to a better learning environment in some cases where certain conditions are met: First of all, reliable supply is needed, which was not the case in the Kenyan study areas and partly not in the Nepali contexts. An important consequence of unreliable grid supply is that the high cost of backup energy sources becomes the responsibility of the individual school or parents, and in some cases, the school goes without power. Secondly, equipment and appliances for better teaching and learning opportunities are required and it is contextually dependent what purposes are desired (apart from teachers needs to charge their mobile phones): In Chhattisgarh, India, where there is a hot season, fans were considered necessary. In Nepal and India, sound equipment and projectors were desired, while in Kenya, the teaching of IT as a subject and access to digital content was an expressed demand. As to the impact on children's enrolment and performance, the teachers we interviewed in Nepal and India perceived that household electricity access increased study time, but did not think there was a connection between enrolment rates and school electrification. In a Kenyan case, electricity impacted upon the ability of a secondary school to offer boarding facilities for students in the major exam-going years. There is a documented impact of these boarding facilities on children's and particularly girls' performance (marks), which resulted from increased study time, extra teaching, and less time use on household chores. We retrieved accounts of the importance of electricity for providing these boarding facilities, but with unreliable and/or costly supply, this kind of effort to improve children's performance was abandoned and ambitions were scaled down. The boarding facility had also helped mitigate a problem that is serious in rural Kenya: children's safety and the risk of violence (including by wildlife) if walking outdoors at night time. In our survey, 12% of the Kenyan respondents said that girls in the household had been a victim of violence when walking to/from school, while 9% reported that boys in their household have experienced the same. Based on our material from the Kenyan site, the provision of boarding schools, which are conditioned by well-functioning electricity supply, appears as an effective way to enhancing children's learning and reducing their risk of violence.

#### *4.2 Water and Health*

A striking finding across the three countries is that electricity has not brought significant improvements in peoples' access to water services. In most cases, the water supply was not targeted for electrification. When it was, the failure to improve services did not derive from limited capacity in the electrical systems, but from irregular and poor quality supply together with a lack of investment in water infrastructure. Water collections remain the main type of drudgery for women (and some men and children) in the study contexts. For example, in the Kenyan study sites, households spend up to two hours a day collecting water either from centralised water points (typically boreholes) or directly from open water sources such as shallow wells or Lake Victoria.

Health services varied both within the in-country sites and across the three countries. Electrification of health facilities has partly occurred in Mahadevsthan (Nepal) and Chhattisgarh (India), but in the other sites in the two countries is either non-functional (Ghiring, Nepal) or health facilities were absent (Bihar, India). In Kenya, there is also a stark picture of either unreliable supply with clinics having to improvise by using solar lanterns (Homa Bay); or there being no public dispensaries available (Ikisaya, Kalungu), with health workers having to improvise.

In sum, the material shows that electricity has not improved the studied rural population's access to and quality of water supply which could have reduced women's drudgery and improved people's health. Nor has electricity helped improve other public services to any significant extent. Health workers we interviewed were eager to explain the benefits of using electricity (e.g. examination light during labour, cold storage of medicine). However, they pointed to lack of reliable supply, including (in Kenya) in grid contexts. This observed failure to provide good quality services facilitated by electricity constitutes a missed opportunity for women's empowerment because it negatively affects their time use, health and safety. Such services do not only depend on electricity but when supporting infrastructures are also in place, reliable electricity access can make water supply systems and health clinics dramatically improve the quality (IEG 2008, Winther 2008, Matinga 2010).

#### *4.3 Mobile Phone Diffusion and Internet Connectivity*

Not surprisingly, access to electricity enhances the use of mobile phones. In the study sites, mobiles have almost become universal, widely used by both women and men. The phone is a significant communication resource for people living in rural areas, which enhances their access to social networks. Also, in the study site in Nepal, network connectivity and internet access were widely available, impacting upon peoples' use of social media in addition to telephone and video calling. In Kenya, the mobile phone was used extensively for mobile banking services, which have been very important in extending the reach of financial inclusion. In India, network availability varied amongst the study sites, impacting upon whether internet services were in use or not in addition to phone communications.

### **5. Gendered Access to Electricity's Services and Uses**

To unpack the assumption that women's access to electricity and time-saving appliances at home provides empowerment, Chapters 5–7 document how the 'gender' of electricity is shaped. From house ownership through to electricity subscriptions, the findings show that men's higher involvement in electricity both on the supply and customer side, as well as their higher level of income and status as family providers, have a bearing on decision making on appliances. Adding to this picture are gender norms guiding the long-term control of assets. In the Nepal study context, such norms imply that a woman has enduring rights to property (endowments), which in part explains the relatively high occurrence of rice cookers. In contrast, in Kenya and particularly in India, gender norms more strongly hinder women in accumulating wealth and thereby also investing in appliances of their choice. Further below we provide some suggestions as to how this male bias may be compensated in practice.

Despite electricity being primarily a male realm of responsibility and influence, some women have pursued convenience technologies related to cooking (e.g. rice cookers, kettles and blenders) – mostly in Nepal, and to a more limited extent amongst wealthier rural women in Kenya. In India, some women have enhanced their possibility to do tailoring (sewing machines). Irons and fridges have mixed gender connotations, depending on the context. For the remaining items observed, some are almost universal with individual ownership (mobile phones), while others are purchased and controlled

by men but widely shared, both in terms of ownership and use (colour television). Quite a few appliances (e.g. electric saw, water pumps, loudspeakers) are not found in large numbers but are interesting because the scope for electricity's uses is expanded. All these additional items were found to be controlled by men.

By and large, in all three countries, electricity has enabled longer working hours or more efficiency in production rather than allowing women and men to open up new businesses - which would require additional support mechanisms such as access to capital.

## **6. Impact of Electricity on Women's (and Girl's) Empowerment; Underlying Factors and Mechanisms for Electricity's Gendered Effects**

Based on the material deriving from this research, we conclude with respect to three main questions: to what extent did electricity access in the selected contexts bring empowerment to women and girls; what were the underlying mechanisms; and to what extent and how did grid and off-grid systems provide empowerment?

From an overall development perspective, the households which gained access to electricity experienced increased well-being, convenience, time savings and access to communication and information. This was also the case in particular to the majority of women who work in their homes and, as in Kenya, run shops, businesses and use mobile money services. From a gender equality perspective, in which women's position vis-à-vis men in terms of their rights, agency and access to resources are of key interest according to the adopted framework, electricity access has only had a modest impact, if at all (varies between the studied cases). For example, men's higher likelihood of obtaining paid work within emerging and expanding electricity systems on the local level works against a process towards more gender equality.

Nonetheless, the potential impacts in the long term of having access to light, communication and new media should not be underestimated, as such changes may impact gender norms in the long term (Winther et al. 2017). Moreover, particularly in the Nepalese case, women explained that they experienced reduced time on drudgery through the uptake and use of electric rice cookers. Across the cases, women report saving time when avoiding to walk by foot to procure kerosene or charge their mobiles. In Kenya, the reduced need to walk also outside enhances safety, as the risk of violence outdoors in the study areas was reported to be high. The survey data are not suited for documenting how much time women with various types of access save by using electric light and rice stoves (e.g. there were relatively few households in the Nepal sample without access to electricity and many households kept more than one system).

With respect to the differences between the grid and off-grid systems, we found that systems with fixed connections, together with socio-cultural norms and customs for distribution of wealth (men being house owners), resulted in the limited agency for women in terms of deciding on which appliances to obtain and use. In contrast, when the socio-technical design of the electricity provision allowed for flexible services, this appears to have enhanced women's agency in relation to electricity. For example, women who rent portable lanterns for a few shillings a day have more direct access and



autonomy to decide to get a lamp and where to use it, resembling their traditional power to decide on kerosene lamps. Because basic electricity services are needed and flexible systems enhance women's agency, it is, therefore, promising that both private agents and other lantern renting projects in Kenya, India and Nepal provide similar, flexible solutions both in terms of technologies and payment models.

At the same time, small systems limit the potential uses of electricity because they are unable to support high consuming appliances and equipment. However, the "problem" with capacity turned out not to be a most immediate hindrance for extended usage and potential prosperity. In grid areas in all three countries, grid electricity was rarely used for running larger machines (mills, welding and carpentry being exceptions in some areas and primarily controlled by men). From this, we conclude that additional, supportive mechanisms for stimulating women's (and men's) economic activity are required to tap into the potential for women's economic activities through electrification. The findings also show that appliances have context specific, gendered connotations. Therefore, insight into how traditional objects and new appliances become gendered – and the social practices of which they form part – is likely to enhance the understanding of what kind of appliances, measures and extended activities are desired by women and likely to be taken in use to enhance their empowerment.

Rather than finding that one type of system provides more empowerment than the other, our study has demonstrated that in areas with grid electricity access, the question of *reliability of electricity supply* for public and private consumption is a key conditional factor to purposeful use of electricity in general and women's empowerment in particular. Unreliable supply means that expensive alternatives (including backup solutions or going without electricity) are necessary. Also, there are costs to brownouts which have negative impacts on appliances and equipment. So not only is there a high cost, but there's also the prospect of electricity not delivering on "promises" of better healthcare services; security lighting; better lighting in households etc. Reliability forms part of the socio-technical design and is also linked to the political economy<sup>1</sup> and the management of electricity systems. Indeed, as in the case of the national grid in the study areas in Kenya and parts of the Nepalese cases, poor reliability is a fundamental barrier.

Furthermore, comparison of the Nepalese and Indian contexts on the one hand and the Kenyan on the other demonstrates the significance of affordability and, in Kenya, the gendered implications of high connection/subscription costs. In India, upfront connection subsidies make the quest for universal access within reach (being at 86% in our Indian study site in Chhattisgarh). In Nepal, subsidies for micro-hydro production have contributed to an electrification rate at 96% in the study context (Mahadevsthan). In contrast, in Kenya (with only 6% grid connection rate in the study area) not only are grid connections many times more expensive but even decentralised systems offering pay-as-you-go systems with instalments are beyond reach to a large part of the population. The many widows in Homa Bay are most likely not to have electricity access. To balance this tendency that the poorest households do not obtain access, one may

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<sup>1</sup> This study acknowledges, but does not adopt a political economy framework. For a study adopting this approach to energy and gender, see RA3.

look to India where subsidies ensure that the poorest segments (below the poverty line -BPL) are provided with free electricity.

Regulations for subscriptions also determine gendered outcomes. We found that two regulations had contrasting effects. First, restricting women's agency in electricity; Nepalese and Indian customer regulations require that the subscriber is the person registered as the owner of the premises (normally a man). This hinders married women from being the subscriber and it hinders people in rented houses from subscribing. Secondly, also in Nepal and India, but this time with a positive effect, installers of electricity in people's houses often followed a predefined procedure of including light in the kitchen. The Indian households in our sample often have light in the kitchens where women normally work in the evenings, and it, therefore, appears that women have benefitted from the installers' influence.

A repeated theme in the country-specific discussions above is the importance of the socio-cultural context, structures of which constitute the problem of gender inequality (before electricity's arrival). This study shows how gender ideologies, social norms and the gendered distribution of wealth are not much affected by – but rather condition – the gendered outcomes of electricity access. Again, this tells us that electricity alone is not a sufficiently strong mechanism for bringing social change and that other drivers are more important than electricity for more equality between the genders. Electricity is nevertheless important and plays a role for women's empowerment, and below we provide concrete suggestions on how empowerment could be further enhanced.

In terms of overall policies and international actors and whether these may positively affect the gendered outcomes of electricity, we first make an observation of the counterfactual. Our review of national policies in the three countries showed that general goals for gender mainstreaming and gender equality are in place. We also noted that the electricity sector at the national level (e.g. Kenya) increasingly put emphasis on gender issues. However, the impact of these policies on implementation and operation practices on the local level is yet to be seen. This report documents that this lack of attention to gender in practice has led to gender-blind interventions, in which only men became recruited as staff on the local level. On the other hand, other types of policies did result in a relatively low cost of connection/subscription in Nepal and India (here including free access for BPL), which have been effective in ensuring universal access. This is observably not the case in Kenya, where the government policy of reaching the last mile does not match realities and is obfuscated by differing ways of measuring and reporting "access". Across our Kenyan study areas, not even governmental rural schools and clinics have reliable electricity supply, and the government is also not supplying its population with easily accessible clean water. In forthcoming rural electricity interventions, targeting water supply and upgrading public services and making supply function over time, would be a very effective way to empower women and improve the quality of education for girls and boys.

## **7. Conclusions**

Our empirical research confirms that there may be several paths to women's empowerment through electricity, but, as also shown in our literature review (Winther et al. 2017), a considerable share of the potential is often left untapped. Based on the

studied cases, women's involvement in supply is the most directly observable pathway for transforming gender ideology and discriminating norms. Both the manner in which women's inclusion was planned and practised and the socio-cultural context played a large role in the extent to which such outcomes were realised.

The report has shown that the provision of affordable and reliable electricity access to householders and businesses contributed to women's empowerment through modified social practices that enhanced daily life for women in rural areas in crucial ways. Nonetheless, universal access has not yet been realised, hence access is not for all, and in Kenya, widows and single/divorced women householders were the least likely to have access. Also, across the country cases, because married women's access to using appliances tended to be controlled by her husband and sometimes her extended family (Nepal, India), this path appeared to be a slower and more unpredictable road (barrier) compared to the one mentioned above.

The Nepalese women's uses of rice cookers and the arrival of mills for grinding spices have implied important reductions in women's drudgery, which has contributed to increasing their human resources and their *potential* to pursue income-generating activities and have more leisure time (i.e. empowerment dimension 2). In Kenya, women operating businesses benefit from light, mobiles and mobile banking facilities, potentially increasing their economic empowerment. Nevertheless, in all three study contexts, and in India in particular, the immediate effect of using electricity primarily enhanced women's *performance of their traditional roles as caregivers*. Discriminating structures remained, as observed elsewhere (Standal and Winther 2016). Had electricity access significantly reduced women's immense burden of drudgery, the picture might have looked different. Rather, based on the research on electricity's *uses* in our study areas, we are not able to observe structural changes such as gender ideologies and norms (empowerment dimension 1) or increased ability to influence life decisions (empowerment dimension 3), which constitutes empowerment's strongest indicators according to our framework. In contrast, the two interventions that put women in leadership roles in supply directly affected gender norms, as noted above. With respect to women's drudgery tasks, the findings from this study suggest that the provision of functioning electricity supply in public services (and supply of equipment) would have been a more effective means, as are the more incremental but important reductions in drudgery deriving from women's access to using electricity, appliances and mobile phones.

Our study has contributed to understanding how the organisation of electricity supply may come into play in shaping the gendered outcomes of electricity access. The material from selected parts of rural Nepal, Kenya and India demonstrate that gender blind interventions, together with local norms and practices, hinder women's empowerment in that the provision of access is tacitly designed to become a realm largely dominated and controlled by men. This finding strengthens our previous recommendation (Winther et al. 2017) that women should be ensured of – and organise themselves to demand (c.f. RA3) – full participation in the planning, managing and operating of energy programmes and projects. This kind of strategy would comply with a central target in the SDG 5 on gender equality which highlights women's equal opportunity to be included in leadership on all levels. SDG 7 does not include this target.

The study sheds light on what impact effective electricity policy could have on the ground if it grants women opportunities to participate in supply. When women are given privileges, it often triggers initial reactions from men, but because the need for electricity, connectivity and charging capacity is high, and given time, it is likely, as in the studied cases where we observed ‘double transformations’ (i.e. a shift in technology and a shift in gender norms), that such barriers would be overcome.

In conclusion, this study shows that the issue of access and the realised benefits of access are not only, or even mainly, a question of technology, but policies, processes of implementation and organisation of supply, and end-users needs, social positions and aspirations.

## **8. Recommendations**

This study adds to the literature on how electricity access may empower women and contribute to gender equality by presenting findings on underlying factors and mechanisms that influence the gendered outcomes. Thus, when providing recommendations, we not only highlight the reasons for the effects of electricity access on women’s empowerment but also the reasons for “lack of” effects.

Our work has demonstrated that obtaining electricity access matters to women and men, but that the choices and opportunities for deciding and using electricity are gendered and contextually dependent. Gender-blind programmes and projects are likely to reinforce a particular set of ideas about end users: men doing productive work and women occupying households, apparently benefitting from electricity through a trickle-down process. Part of what is missed in this perception of the user side is insights into the needs, social positions and negotiating power of various groups of women and men. In particular, our study shows a need for supporting investments both for improving the quality of public services and enhancing women’s economic enterprises.

In the study areas in Nepal and India, subsidies have resulted in almost universal access. This is far from the situation in rural Kenya, where the grid is not only costly but often dysfunctional. In response, many Kenyans living in rural areas purchase solar systems through private actors. However, private actors do not address the situation of the poorest, those living at a distance from central places and the need to provide electricity access to enhance the quality of public and communal services. This is where the governments, together with private and public partners, should strengthen their current efforts to provide gender equitable grid extensions and decentralised systems of supply.

In our study, we compared various systems of supply spanning from grids to portable lanterns, and a key question was how various systems empower women. Rather than finding that one type of system provides more empowerment than the other, our material demonstrated that reliability and affordability (access and consumption) are much more important than the choice of system. Governments have committed themselves to ‘reaching the last mile’ and providing access to all by 2030, hence in only 12 years’ time from now (2018). As a result, there appears to be a strong emphasis on fast growth in the number of households with access, typically measured through (somewhat unclear) measures such as “connections”. However, there is a lack of focus on how the supply of electricity functions in practice after installation and upon

ensuring enduring, predictable services over time. Our research shows that both of these are significant constraints that diminish the potential of electricity to bring empowerment, social and economic effects.

In addition, we highlight that an effective mechanism for enhancing women's human resources and thereby empowerment (dimension 2) is potentially through ensuring the enduring provision of reliable and electricity to public services (water supply, health clinics, boarding schools), which reduces women's drudgery, increases safety and advance children's learning – given that other supportive infrastructures and equipment are in place. In the studied cases, this potential remains largely untapped. Illustrative of the significance of well-functioning public services to women's empowerment, this aspect constitutes a separate target in the SDG 5 on gender equality. In comparison, the SDG 7 is focused on providing universal access to clean energy (measured through 'share of the population' with access, i.e. households) and does not (yet) address electrification of public services as a target.

Capacity building is often interpreted in an instrumental way as technical training of women to participate in electricity supply (e.g. engineering and business activities), thereby opening up spaces for women to participate in the realm of electricity and beyond. The presented research, especially from Nepal, has shown that this instrumental path may not be adequate in itself. Electricity providers including policy-makers and rural electrification agencies should engage women and men in a consistent manner for an appreciable length of time (throughout project cycles and value chains), focusing on dialogue on gender norms and ideologies in order to co-identify how to address and overcome socio-cultural barriers (e.g. marriages, work uniforms that are inconsistent with traditional values etc.). There is a need for continuous development and updating of tools and practical guidance on how to recruit and retain women in energy supply. While guidelines about understanding gender inequities in the energy sector exist, there is a need to update them by paying particular attention to addressing women's social conditions beyond education and financing. These social conditions lead to women's exclusion in energy supply and use, hence emphasis should be put on how the heavily patriarchal electricity supply space could be modified to accommodate women's needs, rather than just focusing on trying to make women fit in patriarchal energy and social space. Because men dominated energy spaces constitute the main problem, this is what should be addressed.

Policy and practice need to provide for reliable access as well as equipment for public services to effectively use electricity to provide services. Similar types of public services may have different priorities/ needs depending on the local context. For example, in the studied Indian schools, fans were desired to making learning comfortable, while in Kenya, teachers put emphasis on lighting for studying and security, as well as power for laptops. Thus, related to electrification of public services, there is need to develop frameworks/tools that help policymakers and planners define what kind of access, electricity services, associated equipment, and maintenance packages are required in different settings. Such tools should not just allow for technical and generalised definitions of needs and priorities but should also value and allow for local viewpoints.

There is now increased funding for electrification, but inter-ministerial and interdepartmental planning of infrastructure and services need to be strengthened to

ensure that electricity services are planned into infrastructure development in a gender responsive manner. Such integrated planning should be linked to gender equality performance. In Kenya, there is a discrepancy between the need for Kenya Power (distribution utility) to answer to its shareholders (i.e. profit motive) versus non-profitable operations such as maintenance in rural areas. This discrepancy needs to be recognised by the government. Also, as private sector actors become more involved in electrification, such planning appears particularly important because such actors will only target women when it serves their commercial interests (Matly 2005) and they do not typically bear responsibility for gender equality issues, unless through their own voluntary corporate policies. The private sector, often in partnership with governments, is increasingly taking on the role of electricity providers (from national, government-owned utilities), especially in African settings. They, therefore, play a role in structuring gender benefits and their influence will likely increase over the next few years. Public financing, as well as regulations, could, therefore, be used to leverage and motivate a gender transformative approach to service provision.

The current slogan of “leaving no one behind” (2030 Agenda) will not be fully achieved without such measures to increase social justice in general. These measures would also make it possible for ordinary women and men (the majority of the rural population) to move beyond the basic levels of electricity use (tier 1-2). Financial support to households, either through cash transfers, general redistribution of wealth in society or subsidised prices for electricity provision (grid and off-grid) is necessary to achieve electricity access for all, including single women households.

As to the SDGs and SE4ALL, we recommend gender-specific strategies and targets for electrification of public services specifically health care, education and water facilities. The SDG 7 should look to several of the targets identified in the gender goal (SDG5), such as measuring the share of women involvement in energy leadership and management. The SDG5 also identifies improved infrastructures and enabling digital technologies as key strategies to end discrimination, and to these ends, electricity is a key enabling factor.

## **9. Suggestions for Policy and Practice**

Based on comprehensive research conducted in six case study areas in rural Nepal, Kenya and India, this report proposes to:

### **1. Consult and consider measures to make electricity subscriptions gender inclusive**

Addressing: energy ministries and regulators at the national levels and private/voluntary actors who plan and implement electricity systems (grid/off-grid)

#### **Possible options:**

#### **a. Allow other individuals than house owners to obtain subscription (grid and off-grid)**

- Problem: In many contexts, only the formally registered owner of a house can subscribe, and this person tends to be a man.
- Effect: women depend on husbands or other men for obtaining access to electricity. This hinders women’s agency and access to electricity

- What can be done? Modify regulations for a subscription so that a person registered at a certain address (citizenship card/ID) can obtain a subscription
- What will be the result: Women living in houses they do not formally own, will get the possibility to access electricity and get access to using electricity's services.

**b. *Ensure that instalment guidelines for house wiring give priority to the kitchen area***

- Problem: In Homa Bay, Kenya, 39% of the households with a subscription to electricity do not have electric lights in the kitchen. On an average, they keep 5 light points. In areas with systems offering portable systems in Kenya, women regularly use lanterns in the kitchen, indicating the need for light in kitchens.
- Effect: Every evening after darkness a female member of the household (female head, daughter, other women or a servant) cooks a meal. Performing this activity with only kerosene, the light of mobiles or the light from the fire is inconvenient and more time consuming than when cooking with electric lights.
- Promising models: In Chhattisgarh, India (where more people than in Kenya say that men decide on lights and appliances), the homes are 20 percentage points more likely than in Kenya to have lights in the kitchen, even when there is only one light point in the house. In Chhattisgarh (and Nepal), installers advice people to put up light in the kitchen, which has resulted in electrified kitchens.
- What can be done? Modify prescriptions/regulations in Kenya so that installers of electric equipment/light as default advice householders to put lights in the kitchen.
- What will be the result: Kenyan women will get an improved working environment and increased efficiency. Symbolic implication: It is possible that the electric light in the cooking place would contribute to increasing the value of women's work.

**c. *Make electricity subscriptions affordable***

- Problem: Homa Bay, Kenya: 74% of widows do not have access to either grid or off-grid electricity. For other types of households where also men reside, a lower share (ca 40 %) does not have access. The high connection/subscription fee to the grid and SHS makes electricity access out of reach to the widows due to a high level of poverty, partly resulting from HIV epidemic in the area. In comparison, the cost of grid connection is more than 3.7 times higher in Kenya than Nepal and 37 times higher than in India, where universal access to either grid or off-grid electricity is almost achieved in the study areas.
- Effect: The high cost of connection/subscription to grid/off-grid supply particularly hinders women's agency and their access to electricity and adhering services
- What can be done? Investigate what mix of solutions (grid/off-grid) would work under what conditions in rural Kenya and make electricity connections/subscriptions (grid and off-grid) affordable to all.



Consider lowering connections fees for marginalised groups and further improvement of the social tariffs ('the lifeline tariff') (e.g. make it into a Free Basic Energy Tariff with free access up to 50 units/month).

- What will be the result: The poorest segment of the population would get access to electricity and to using electricity's services. This would enhance their convenience, reduce drudgery and time use (making mobile charging possible at home and eliminating need to buy kerosene), improve the indoor environment, which would ease their lives and enhance communication. This would also imply less social exclusion and dependency on others.

**d. *Improve women's access to adopting appliances and machines powered by electricity***

- Problem: Across the three countries, most of the appliances observed in people's homes were either controlled and used jointly by household members or decided on/controlled/owned by a man. This results from women's income being ca 40% lower than men's and because men tend to own the house and are the electricity subscriber.
- Effect: Women have limited decision making power to obtain appliances and equipment that fulfil their needs, including time-saving appliances and machinery for productive activities (e.g. mills).
- What can be done? Adopt a systemic approach (e.g. appliance supply chains, financing, credit schemes) and work with local groups and communities to identify suited schemes (rental, instalments etc.) for making appliances and machines that women want available and affordable.
- What will be the result: Women would get a higher likelihood of adopting appliances that could help reduce the time spent on drudgery tasks and/or make productive activities become more convenient and effective.

**2. Consult and consider measures to make electricity systems gender responsive**

Addressing: energy ministries, regulators, rural electrification authorities, electricity suppliers and private/voluntary actors who plan, implement and operate electricity systems

**Possible options:**

**e. *Ensure a minimum degree of reliability***

- Problem: The grid in many rural areas counties is highly unreliable.
- Effect: This negatively affects private households, forcing people who wish to have access to electricity to also keep solar systems, not only as a back-up but in effect as their main type of supply (Nepal, Bihar, Kenya). Unreliability also negatively affects businesses and the quality of public services (see also below).
- What can be done? In the process of creating access for all, governments need to invest sufficiently in ensuring at least a minimum degree of reliability by emphasizing maintenance, monitoring and sustainability of existing grid systems and networks (lines etc.) as well as off-grid systems of supply.



- What will be the result? People and institutions who have already paid a high cost for obtaining access would get the service they have paid for. It would make the share of the population with access appear real and not only intended/potential, which is in line with the Global Tracking Framework that accounts for reliability and affordability.

**f. *Provide enabling conditions for the involvement of women and men in supply to ensure gender equitable outcomes***

- Problem: Conventional, gender-blind electricity interventions (whether grid or off grid), are male-biased in that mainly men are recruited and get paid jobs in the systems of supply on the local level. In centralized systems, some women are recruited for administrative jobs in central areas. In contrast, two cases of localized electricity systems (Kenya), both supported by external donors, represent best practice in that the adopted gender approach resulted in women becoming key players in the supply system. This had the additional effects that gender norms were modified and that customers were handled in a way that sustained their enduring access to services (e.g. in case of non-payment, the female staff suggested a schedule for repaying debts while maintaining access).
- Effect: The male-biased systems increase the gender income gap, serve to reinforce stereotyped gender roles, and lead to missed opportunities in terms of influencing gender norms that discriminate women.
- What can be done? Spot possibilities for ‘double transformation’ (electricity access and transformed gender relations) when setting up localised systems of electricity supply:
  - i. stating in the project strategy that women’s inclusion in supply is a goal (33%, or 50% of staff, and, in a series of interventions, ensure an equal number of women and men leaders); that they should have equal pay as men; and that the degree to which these goals are realised will be monitored and reported
  - ii. working in collaboration with women’s groups in the local community to find champions and leaders who can take part in the planning of the intervention and in the recruitment and training process (e.g. ensure that the training is substantial so as to reduce the need for technical pre-qualifications) and ensure that the project accommodates women staff’s particular needs and creates conducive working conditions including in the field (e.g. kindergarten, separate toilets, work hours, buildings and infrastructure, security)
  - iii. include a budget that accommodates for women’s inclusion
  - iv. expect resistance (silent or open) from men, and include men actively in the gender-sensitive planning to get them on board regarding the wider benefits of including women
- What will be the result: Women’s inclusion in supply would:

- i. empower the individual women involved who will get increased psychological power and economic autonomy and become role models for young girls
- ii. contribute to changing stereotyped gender roles and expanding the expectations for what women can do
- iii. enhance the local system's financial viability (based on two case studies and involved people's assessment)
- iv. reduce the barriers to field work and operations for women technical staff
- v. contribute to making poor segments maintain access to electricity (such groups are at times are unable to pay the fees, for example, due to seasonal variation in income, and in the case of Ikisaya, customers highlighted the female staff's flexibility, politeness and willingness to negotiate ways to pay back in the near future.

### **3. Consider measures to strengthen public services**

Addressing: energy-, health-, education and water ministries and planning agencies

#### **Possible options:**

#### ***g. Ensure that public services are provided with reliable electricity access and necessary equipment***

- Problem: The study observed that water provision systems had rarely been targeted for electricity, and this negatively affects women in particular (time use). Clinics were often targeted and connected, but supply tended to be non-functional which implies that electricity could not be used and the quality of services remains poor. Because electricity in the study areas does not improve the quality of such services, the high amount of women's drudgery work continues. There are also serious impacts on health (e.g. no capacity to store medicines needed quickly after a snake bite, lack of examination light when giving birth, poor quality of drinking water taken from lakes etc.). Another problem is the lack of equipment to facilitate the use of electricity (e.g. pumps, pipes, fridges, lamps). Schools more often have a subscription, but the reliability of electricity supply is relatively low, and equipment for labs, computers etc. are lacking. Boarding school facilities have a documented positive effect on girls' performance in particular, and such services depend on electricity for being able to operate. However, the situation with unreliable supply hinders the operation of boarding facilities. A milling facility (Nepalese site, owned by men) reduced women's drudgery but was only observed in one single site/village.
- Effects: Drudgery tasks remain, health problems remain, girls' education opportunities remain limited
- What can be done? Electricity, water and health sectors should work together (e.g. in inter-ministerial action groups addressing specific problems) to ensure that village infrastructure is improved in key public services that women in particular depend on. In particular, water supply should be targeted for electrification / included in

electrification plans for an area. In health clinics and schools, the reliability of supply should be ensured and monitored (e.g. yearly, which tier), as should the provision of equipment/appliances that are needed to provide needed services (e.g. milling).

- What will be the result: Women's drudgery tasks would be reduced, allowing them to spend more of their time on productive activities (if other conditions are in place) and for leisure (having today a working day from 12-16 hours). Improved health and improved quality of education.

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