



Are renewable energy subsidies in Nepal reaching the poor?

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ABSTRACT

The Government of Nepal has been providing subsidies to promote biogas technology since the 1970s and Solar Home Systems (SHS) since the 1990s. This study uses nationally representative survey data to examine the extent to which these subsidies benefitted the rural poor. We find that only 5% of households who are eligible for a biogas subsidy have adopted biogas; and only 2% of biogas adopters are below the poverty line, as compared to a poverty rate of 19% in the country. For SHS, 27% of the households eligible for subsidy have adopted the technology, and 25% of the adopters are below the poverty line. The SHS subsidy program is much more accessible to the poor as compared to the biogas subsidy program for two main reasons. First, Solar Home Systems are much cheaper than biogas plants, and so are more accessible to the poor after the subsidy, and second, the SHS subsidy is geographically targeted toward poor areas, while the biogas subsidy is not.

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Introduction

Globally, 1.3 billion people have no access to electricity and 2.8 billion still rely on solid cooking fuel (IEA, 2012). Most of these people live in rural areas (SE4ALL, 2013). Studies suggest that access to modern energy services is a primary prerequisite for poverty reduction and sustainable human development (Practical Action, 2010). In this context, the Sustainable Development Goal number 7 is to ensure universal access to affordable, reliable and modern energy services by 2030.

In Nepal, 66% of households (33% of the urban households and 72% of the rural households) were using firewood as their main source of cooking fuel in 2001. After a decade, in 2011, 64% of households (26% of the urban households and 73% of rural households) were still using firewood for cooking (CBS, 2002, 2012).

With regard to lighting, the proportion of households using electricity as their major source of lighting had increased from 40 to 67% between 2001 and 2012. When disaggregated by area, the increase in usage was from 83 to 94% in urban areas and from 32 to 60% in rural areas.

The Government of Nepal has been promoting renewable energy technologies (RETs) for a long time. However, an aggressive promotion of RETs started when the Government started providing a subsidy for biogas in 1992 and for Solar Home Systems (SHS) in off-grid areas in 2000 with the aim of providing access to clean energy to the rural poor (Government of Nepal, 2000). The subsidy policy was revised in

2009 and 2013 with a similar focus of helping the rural poor to adopt RETs (Government of Nepal, 2009, 2013).

Using nationally representative data, we examine the effectiveness of the renewable energy subsidy policy in helping poor households in rural areas to adopt renewable energy technologies. Our results indicate that only 5% of the eligible households for the biogas subsidy had adopted the technology as of 2011. Among the biogas adopters, only 2% were below the poverty line. The subsidy for Solar Home Systems seems to be relatively effective in reaching the poor, where 27% of subsidy-eligible households had adopted the system by 2011, with about 25% of the adopters below the poverty line.

Brief background of subsidy policy for RETs in Nepal

Since the early seventies, RET projects have been promoted in Nepal to reduce rural poor people's dependency on firewood for cooking and fossil fuels for lighting (Gurung, Ghimeray, & Hassan, 2011; Pokharel, 2003). More recent developments include establishment of the Alternative Energy Promotion Center (AEPCC) in 1996 as a lead body to promote RETs in Nepal; and the introduction of subsidies for RETs in the Rural Energy Policy in 2006. The goal of the Rural Energy Policy was to reduce rural poverty through the provision of clean and reliable energy technologies in off-grid areas. In order to target the subsidy, villages were classified according to poverty, remoteness, and caste/ethnicity.

This is not the first time that attempts have been made to provide RETs to rural poor. Biogas was promoted in Nepal since the 1970s; and solar-PV-based rural electrification was first started in the late 1980s. But, in both instances, adoption of these technologies was

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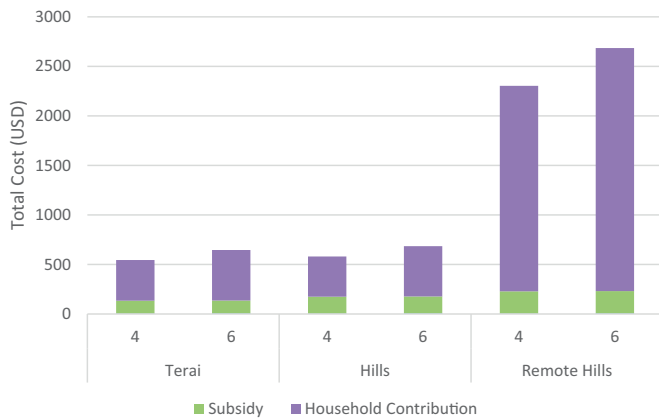


Fig. 1. Total Cost, Household Contribution and Subsidy for biogas plants in year 2010.

minimal until subsidies were provided through the Biogas Support Program and AEPC (Piya & Rai, 2003; Pokharel, 2003).

Subsidies for biogas dissemination started with the provision of an interest-free loan in 1975. From the inception of the programs, only households with at least one cow or buffalo have been eligible for the subsidy, since without animal dung biogas plants cannot produce gas.¹ This requirement excludes the rural poor and urban households who do not or cannot own cattle. The subsidy policy was revised in 1996, 1999, and 2006, where larger subsidies were proposed to smaller biogas plants and remote hilly areas. In addition additional subsidy provision was in place for socially disadvantaged ethnic community.

The government of Nepal started subsidizing Solar Home Systems since the 1990s. Only those households that are not connected to the national or local grid are eligible for SHS subsidies. The current policy targets geographically remote Village Development Committees (VDCs) or households located in these VDCs (Government of Nepal, 2013). Thus, households living in VDCs listed as “very remote” receive a greater subsidy than households living in “remote” VDCs. The households living in “not remote” VDCs receive the least subsidy for SHS.² Within targeted VDCs, the subsidy provided depends on the size of the SHS, with 10–18 watt-peak systems receiving a smaller subsidy than those with a peak output that is higher than 18 W.

The total cost of a typical household biogas plant varied from 500 to 700 USD in the Terai and the hills, whereas in the high (remote) hills, it cost around 2700 USD due to high transportation costs for the construction materials (AEPC, 2010). The program emphasized plants of 4 or 6 cubic meters, useable by households with just one cow or buffalo. Taking the price from the year 2010 and considering only 4 and 6 cubic meter biogas plants, it is found that after the subsidy a household paid around 400 to 500 USD³ in the Terai and the hills, respectively, whereas households residing in the remote hills paid 2000–2400 USD for the same size of biogas plant due to the additional cost of transporting the construction materials (Fig. 1). The actual subsidy is around 20–30% of the total cost of biogas plant in Terai and hills, whereas in the high hills it is around 10% only.

In 2010 the costs of 20-watt and 40-watt SHS were USD 300 and USD 500, respectively (AEPC/ESAP, 2011). Households living in the very remote area pay less than households living in accessible VDCs. For a 20-watt system, a household paid around 160–210 USD depending on the location. The share of the subsidy in the total cost of a Solar Home System would be 28–45% for a 20-watt system and 17–27%

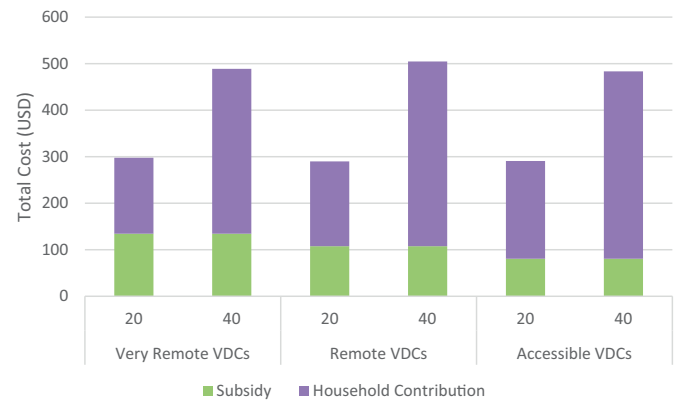


Fig. 2. Total Cost, Household Contribution and Subsidy for Solar Home System in year 2010.

for a 40-watt system (Fig. 2). These subsidies are given to the companies who first install the system and later claim the subsidy amount after verification. Households pay the remaining costs net of subsidy.

Comparing the costs of the two technologies, we see that households tended to pay considerably less for SHS than for biogas plants. Adding to this up-front cost differential is the fact that biogas plants also require considerably more labor to operate than SHS. The daily operation of biogas requires the collection of dung,⁴ mixing it with water, and management of the slurry. In contrast to this, the SHS is easy to operate. Once installed, the household can simply switch it on to get lighting.

Data and variables

This study is based on secondary data obtained from the Nepal Living Standard Survey III 2010/11 (CBS, 2011a), which adopted the methodology of the World Bank's Living Standard Measurement Survey (LSMS). This survey collected information on various indicators of households' living standards from a nationally representative sample of 5988 households drawn from 499 primary sampling units (PSUs). For this purpose, Nepal was divided into 14 different strata based on geographical and ecological regions. The PSUs were selected from the 14 strata using Probability Proportional to Size (PPS), where size was based on the number of households. From each PSU, 12 households were randomly selected (CBS, 2011a).

In the sample, about 62% of all households owned at least one cow or buffalo, thus making them eligible for the biogas subsidy. Likewise, 19% of households were not connected to grid electricity because they resided in an off-grid rural area, thus making them eligible for the SHS subsidy.

The analysis of biogas and SHS technology was carried out using the full sample (5988 households) and sub-samples of subsidy-eligible households (3279 for biogas and 1008 for SHS). We use the full sample to examine the extent to which the eligibility criteria help to target poor households. Then we use the sub-samples of households that are eligible for the subsidies to assess how adoption varies by income and other characteristics within the eligible groups.

Biogas is used for cooking meals and requires animal dung to produce flammable gas whereas SHS is used for lighting and requires

¹ Thirteen households in the sample do not own cattle but still own biogas. They may get dung from relatives, neighbors, or a landlord, and share the biogas with them.

² The categorization of the VDCs is done by the Ministry of Federal Affairs and Local Development.

³ 1 USD = NPR 74.36 (Annual Average of the year 2010 from www.onda.com).

⁴ Open grazing is less practiced in Nepal these days as most of the forests are managed by communities who restrict open grazing. There is tendency of keeping cross-breed cattle which require stall-feeding. Therefore, households collect fodder from forest and their own lands and stall-feed cattle. Further, fields have standing crops for most of the year. These practices limit the movement of cattle and so households do not need to collect dung from a large grazing area for much of the year. It can, therefore, be worthwhile for even poor households with a single cow to adopt biogas plants.

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