

Studying household decision-making context and cooking fuel transition in rural India

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ABSTRACT

This short communication piece questions whether unaffordability really matters for families to reject improved fuels. It presents the case of an Indian village where nearly every house has successfully introduced a TV, but only one house adopted LPG for cooking. Considering that the former is more expensive than the latter and whilst both are relatively new and energy-related technologies, the paper asks how and why people decided to adopt one extensively but not the other. Methodologically, the study employs a mixed method approach, collecting both quantitative and qualitative data. The findings suggest that the lack of sufficient income has little influence on people to adopt or reject improved fuels. The paper argues that it may not give us a clear picture if we research why people choose or reject one fuel over another. This paper demonstrates that to understand a household's fuel choice decision, it is essential to understand the broader decision-making context within which families operate and make all decisions.

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Introduction

The prevalence of energy poverty is extensive in India with more than 800 million people relying predominantly on traditional solid fuels for cooking (IEA, 2016). The adoption and sustained use of modern fuels has been identified as a measure to alleviate the detrimental effects caused by cooking with such fuels on the environment (Brockhaus et al., 2012), social (Practical Action, 2014) and human health (Dutta & Banerjee, 2014). The Government of India (GoI) has initiated various schemes to persuade families to substitute solid fuels with liquid petroleum gas (LPG), such as 'Pradhan Mantri Ujjwala Yojana'¹. Under this scheme, families 'Below Poverty Line' (BPL)² are eligible to receive subsidy on new LPG connections.

Research suggests that households' energy choices correlate to their income (e.g. Hosier & Dowd, 1987; Howells, Alfstad, Victor, Goldstein, & Remme, 2005; Miah, Foysal, Koike, & Kobayashi, 2011). The 'energy ladder' model puts forward a linear process of transition to cleaner and efficient fuels as families' income level rises (Hosier & Dowd, 1987). The model places electricity at the top and solid fuels, such as wood, dung and crop wastes, at the bottom of the ladder. It explains that a household moves up the ladder as its economic status improves. Although several empirical studies, for example, Cheng and Urpelainen

(2014), Masera, Saatkamp, and Kammen (2000), Wickramasinghe (2011), disagree with the linearity of the model, they tend to agree that affordability is crucial in the adoption process of modern fuels. A study by Jain et al. (2015) on access to clean cooking energy and electricity carried out in six energy deprived states in India concludes that the high upfront cost and recurring expenses of LPG are major barriers to completely give up traditional solid fuels. Can this be then assumed to argue that families decide to upgrade their cooking fuels when they become affordable?

According to India's 2011 Census, households with TV are more in number than those with LPG. As Fig. 1 shows, nationally, around 47% of families own TV, whereas only 28.5% have LPG in their house (Census of India, 2011). Similarly, in both rural and urban areas, there are more TV owners than LPG users. Considering that a TV set (including cable subscription and renewal) is costlier than an LPG stove (including LPG bottle, stove, lighter and pipe), it may be implied that a family which is able to afford a TV can also adopt and use LPG. Why has then LPG uptake among families remained significantly lower than TVs?

This study brings the case of a village in the state of Andhra Pradesh in India, where nearly every house has a TV, but only one house owns LPG stove. It investigates the context within which a household makes decisions to understand relatively slower adoption of LPG as opposed to TV. Drawing on van der Kroon, Brouwer, and van Beukering (2013), this paper demonstrates that decisions regarding fuel choices happen in a household decision-making environment that is complex and multidimensional. The central argument of this short communication piece is that families may decide against switching to improved cooking

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¹ For more information, visit <http://www.pmuujwalayojana.com/>

² Below Poverty Line (BPL) indicates economically disadvantaged families that are in need of the government's assistance.

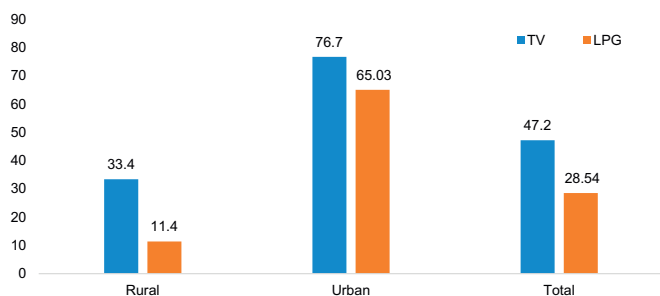


Fig. 1. TV owners and LPG users in 2011 in India (Data source: Census of India, 2011).

fuels even if they are considerably more affordable. It presents evidence that households prioritise and decide to fulfil their needs sequentially as their income increases, and fuel switching may not necessarily fall into their priority list or it may be one of the least urgent ones.

The remainder of this paper is organised in five sections. Section two summarises key takeaways from relevant literature. Section three discusses methods employed to collect data. Section four presents the case study, including results from the research. In Section five the paper discusses significant findings. Finally, it concludes with some lessons in Section six.

Literature review

Literature on why households reject to adopt modern fuels exists in large numbers. Many of them identify unaffordability as a crucial barrier to the successful uptake of these fuels and argue that increase in income assists switching to efficient fuels (Balachandra, 2011; Heltberg, 2005). That is, the share of solid fuels in the total energy consumption declines as incomes rise (Barnes, Khandker, & Samad, 2011). Switching to improved fuels requires high upfront cost, and often poor families are unable to manage it (Jain et al., 2015; Nayak, Werthmann, & Aggarwal, 2015). Smith (2017) underscores that the cost and accessibility of modern fuels have been identified as two major barriers limiting their desirable expansion. He further emphasises that the need to find an effective way to promote the adoption and sustained use of efficient fuels rather than increasing their availability and having them sitting in shops.

In addition to the unaffordability issue, scholars, such as Bhattacharyya (2006), Sehjpal, Ramji, Soni, and Kumar (2014), and Masera et al. (2000) ascertain that there is a need to look beyond income while examining the factors impeding energy transitions. Bhattacharyya (2006) suggests that reliance on traditional fuels has multiple dimensions, and its widespread use cannot only be explained by the unaffordability of modern alternatives. Masera et al. (2000) demonstrate that modern fuels are unreliable in supply, which restricts families from completely abandoning their traditional fuels. Likewise, Bhattacharyya (2006) and Joon, Chandra, and Bhattacharya (2009) argue that there are socio-cultural factors that sway people's fuel choices. Both Masera et al. (2000) and Joon et al. (2009) explain that people prefer to cook their food using traditional fuels because of their taste preferences. Hence, despite having access to fuels, people do not reject solid fuels altogether.

This paper explores whether households adopt modern cooking fuels if they are affordable. It rests on the concept that informed decisions regarding fuel choice do not occur in isolation and all household decisions are guided by a multi-dimensional household environment. While studying factors affecting fuel switching decisions, van der Kroon et al. (2013) argued that little attention has been paid to the broader decision-making context within which households make their decisions. Following Brüntrup and Heidhues (2002), they distinguish three categories that determine a household's decision environment: (i) the country's external environment, specific to each country (such as climate, history, culture, and geography); (ii) the decision context

that is external to households but internal to the country (such as markets, institutions and policies); and (iii) the household's internal opportunity set (HOS) that includes family-specific characteristics internal to the households, such as land, capital, know-how, preferences, and cultural habits. It is the HOS that acts as a foundation for household's decisions about livelihood strategies.

The fuel choice model developed by Treiber, Grimsby, and Aune (2015) has also conceptually influenced this paper. They argue, cooks select stoves and fuels out of all the available options, and they are not solely based on their efficiency and cost-effectiveness. Cooks, according to them, prioritise the available stoves and fuels using several criteria, for example, technical suitability, cultural and traditional preferences, and individual characteristics such as age and education. The criteria presented by Treiber et al. (2015) resemble the HOS described by van der Kroon et al. (2013). While integrating both the multi-dimensional household environment framework and the fuel choice model, it may be suggested that a household chooses a certain activity or technology out of the pool of available options. Households' decision-making environment, combining all three categories, plays an important role in prioritising options and making choices. Since household's decisions happen in a broader context, it is pivotal not to assess fuel switch decisions in isolation but collectively with other choices families make.

In their book, Poor Economics, Banerjee and Duflo (2011) argue that poor are often deprived of critical information that may actually trap them in the vicious cycle of poverty. Giving an example of immunisation, the authors explain that having no knowledge of the benefits of immunising their children, poor, in many cases, end up making wrong decisions not to immunise. They further illustrate that poor are missing critical information not because they do not want to know but perhaps because this information may not be appropriately designed for them. Similarly, a recent Noble Prize winner in Economic sciences, Richard H. Thaler in his book, Nudge: Improving Decisions about Health, Wealth, and Happiness, with Cass R. Sunstein has highlighted how people make irrational decisions due to their biases caused by several factors such as status, firmly rooted beliefs, and limited knowledge, among others (Thaler & Sunstein, 2008).

Relating these studies in the context of cooking fuel choices, past studies have demonstrated that how missing information regarding negative aspects of smoke from burning biomass on health have resulted in the sustained use of such polluting fuels for cooking. For example, Ahmed Mushfiq, Puneet, Robert, Lynn, and Grant (2012) found that women in Bangladesh preferred not to uptake efficient cookstoves because they believed that indoor air pollution was a low-priority health risk compared to other risks. Hence, their study recommends delivering tailor-made health education programs along with other technological and policy interventions.

Methods

This research was carried out in Chittoor district, Andhra Pradesh in January 2017. The study site was selected in consultation with a local non-government organisation, Foundation for Ecological Security (FES). The organisation has its presence in the district for quite a long time. FES also supported this research with an independent interpreter during data collection. The research followed a case study approach because the study village represents a unique case of special interest (Yin, 1994). This case is selected not necessarily to pursue the generalisation of the findings to other cases; rather it is selected to understand the functions, interactions and complexities that this case holds. This type of study, according to Stake (1995), is called an *intrinsic* case study.

A two-stage process was employed to select research participants. In the first stage, the researcher organised a general meeting, and the objectives of the study were informed as well as consents to take part in the study were obtained. In this stage, those households who were willing to participate in interviews, were identified. Data was collected in the second stage. Both quantitative and qualitative data was

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