



The revolution from the kitchen: Social processes of the removal of traditional cookstoves in Himachal Pradesh, India



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ABSTRACT

Despite decades of effort, widespread adoption and long-term use of improved cookstoves in developing countries remain hard to achieve. Conventional energy transition models emphasize households' socio-economic improvement as the most important driver of energy transition. However, previous work has shown households' continued use of old cookstoves or fuels even when adopting new technologies. Through a case study in India, this paper highlights the socio-political processes of the permanent removal of the traditional chulha cookstove. Newly available liquefied petroleum gas stoves and improved biomass stoves, thought to be substitutes for chulha, lead to different adoption pathways for lower and higher caste households. Lower caste households seem to remove chulha more readily because of sensitivity to chulha's heavy smoke that pollutes their utensils, kitchen, and clothes. We posit that by adopting cleaner stoves and removing traditional ones, the marginalized can disassociate themselves from practices that perpetuate their social stigma.

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Introduction

Since the 1970s, development and conservation groups have disseminated millions of improved cooking devices and fuel to address a variety of environmental, health, and livelihood issues in the developing world with varying degrees of success. Many of the early interventions were triggered by the perceived fuelwood crisis and deforestation in the 1970s (Eckholm, 1975; FAO, 1985). As later studies show that agricultural expansion and commercial timber harvesting contribute more to deforestation (Agrawal, 1986; Leach and Mearns, 1988), the focus of later interventions has shifted to development and health improvement as a result of growing evidence of impact of energy poverty and indoor air pollution. Many scholars have continued to argue that access to more commercialized, cleaner fuels and devices, such as charcoal, kerosene, or liquefied petroleum gas (LPG) stove, critically contributes to human and economic development (Bates, 2002; Pachauri et al., 2011; Smith, 1994). Globally, 4.3 million premature deaths each year are attributable to household air pollution from inefficient burning of solid biomass (WHO, 2014), which is the third most important mortality risk factor for Indians and fourth biggest globally (IHME, 2013a, 2013b). The concern of climate change associated with black carbon, commonly found in the soot resulting from incomplete combustion of biomass, has

ignited the newest round of enthusiasm in household energy (Bond and Sun, 2005; Grieshop et al., 2011).

The literature on why cooks adopt or reject improved cookstoves abounds (e.g. Bailis et al., 2009; Barnes et al., 1994; Lewis and Pattanayak, 2012; Mobarak et al., 2012; Ramirez et al., 2014); but falls short on what factors incentivize households to discard traditional stoves. The general assumption is households will automatically abandon their rudimentary stoves and fuels when they switch to high quality modern ones, as their income goes up—constituting the so-called “energy ladder” model (Hiemstra-van der Horst and Hovorka, 2008; Hosier and Kipondya, 1993). Despite decades of efforts, many empirical studies have found that widespread adoption and sustained use of improved biomass cookstoves or modern fuels are hard to achieve (e.g. Agrawal, 1986; Gill, 1987; Hanna et al., 2012; Mobarak et al., 2012; Puzzolo et al., 2013; Ruiz-Mercado et al., 2011). Masera et al. (2000) find that households often revert to their traditional stoves or use them together with improved biomass, electrical, or LPG cookstoves in order to meet users' diverse food and fuel preparation practices—a phenomenon referred to as “fuel stacking.” They and other studies suggest a non-linear multiple-stove model that accounts for cultural, economic, and health factors that shape people's decisions (e.g. Heltberg, 2005; Ruiz-Mercado et al., 2013). While LPG or hyper-efficient forced draft stove powered by an engine is recommended as key to meet health standards, the continuous use of smoky stoves can seriously undermine the intended health improvement of large-scale improved cookstove distribution programs (Hanna et al., 2012; Johnson and Chiang, in review). Johnson and Chiang (in review) report that even one hour of

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cooking on three-stone open fire in a week exceeds the World Health Organization's (WHO) annual guideline or the less stringent interim 1 target for PM exposure. How to deal with stove stacking is of heated debate among cookstove practitioners and scholars, especially given the current emphasis on the health objective of many ICS policies and programs (Gordon and Hyman, 2012; Washplus, 2013). This paper attempts to offer greater understanding of how removal might happen.

Based on household surveys and semi-structured interviews carried out in the mountain communities living in the Kullu district in the state of Himachal Pradesh, India, we trace the social processes of the permanent removal of the traditional cookstove made of mud called *chulha*. We begin by introducing our case study field site and methodology. We then outline the debate in fuel transition theories and discuss our contribution to it by drawing from anthropological and historical studies of development and innovation diffusion, with a focus on the role of underlying cultural and political dynamics that propels change (e.g. Pigg, 1992; Rogers, 1995). Specifically in the case of Hindu societies in India, we extend the theoretical framing to explore how two interrelated social forces—the caste system and the drive for modernity—shape the kitchen and the culture of food and cooking. In discussing our results, we center the analysis on the kitchen space and underline its key connections with the ecology and agents of the modern world: the local stove artisans and markets, the development and conservation organizations, the quasi-public gas distribution agency, etc. To trace the fate of the traditional stove, we first document the process of the dissemination and adoption of the clean-burning LPG cookstoves promoted by a local non-government organization (NGO), and then the penetration of another type of fully commercialized improved biomass cookstove called a “tandoor.”

As an attempt to understand the removal of traditional stoves, the paper highlights that access to alternative fuels and/or stoves and social delineation are important factors, among other things. Lower caste households seem to be abandoning the traditional stoves more readily than higher caste households and we identify a set of triggers and drivers for such changes. We posit that the lower castes, tired of the heavy smoke that blackens their kitchen and perpetuates the religious stigma of them being impure, attempt to disassociate themselves from practices that are both literally and symbolically dirty, in favor of practices that are both clean and modern. The case study suggests that the adoption of a new technology somewhat follows the conventional scheme where economic and social elites lead diffusion. However, it proposes that the traditionally marginalized might lead the disadoption of the old, fueled by their desire for cleanliness to remove social stigma. Finally, we discuss the ways in which insights into cultural and political context provided by rigorous qualitative case study can inform our thinking about interventions to accelerate the transition to clean energy services and what constitutes aspirational demand.

Research site and method

The state of Himachal Pradesh belongs to the Western zone of the Himalayas, the world's youngest mountain chain (Alam, 2008). The rugged landscape is replete with ridges, valleys, and folds, which historically has given rise to isolated pockets of societies (Berreman, 1963). Ninety percent of Himachal's 6.8 million residents are rural (Census of India, 2011). Its per capita income is 82611 rupees (1300 USD), above the national average of 60972 rupees (950 USD) (Government of India, 2013). The study took place in the Kullu district, where scheduled castes (SCs) and tribes (STs) account for 32% of the population—formerly untouchables in India (Census of India, 2011). The rest are officially categorized as other backward class (OBC) and forward class (FC) and are referred to as other castes (OCs) in this paper. The Rajput caste makes up the majority of the non-SC population (Berkes et al., 1998). Sarkar (2013) shows that LPG users increased from 10% of those surveyed in 2002 to 50% (n = 220) in Kullu district

in 2012. The state has achieved 99% electrification at the village level in 1989 given its abundant hydropower resources, but the supply in most places is rather unreliable (Rahi et al., 2008).

From June to August 2013, the lead author conducted fieldwork in collaboration with a local, community-based organization called Jagriti (“awakening” in Hindi) based in Kullu town, the capital of the district. Jagriti's main mission is to empower poor rural hill women, living in Lag and Gadsa Valley northwest and southeast of Kullu town (Jagriti, 2014a). Its activities include the promotion of drudgery-reducing and energy efficient devices and small-scale production and marketing of non-timber forest products within the women's saving and credit groups (WSCGs), created and supported by Jagriti. The lead author participated in field visits and meetings with stove manufacturers organized by Jagriti's staff and interviewed managers in gas agencies and stove manufacturers/vendors in the area. She accompanied a Jagriti enumerator for 43 household surveys, conducted another 21 semi-structured interviews,¹ three focus group discussions with 19 people in total, and participant observation in 11 villages in Lag and Gadsa Valley.² Two male interpreters assisted in the fieldwork, translating a combination of the local language Kullui and Hindi into English. The household surveys were part of a larger study to measure gender and livelihood impacts of LPG use by Jagriti's WSCG members, in partnership with the Global Alliance for Clean Cookstoves and Practical Action. This study surveyed 148 LPG users and 52 non-LPG users and is herein referred as Jagriti (2014b). The survey questions included basic information such as demographics, sources of livelihoods, the suite of cookstoves owned, year and price of purchase, firewood use, cook's experience with the LPG, etc. The survey consisted of 56% SCs and 46% OCs. The survey data illuminate trends of *chulha* retention/removal. We contextualize these data using our rich qualitative evidence and engage in social theories to seek deeper explanations of underlying drivers.

Theoretical framing

From the linear “energy ladder” to the multiple stove model

Our objective is to examine the social processes underlying the removal of the *chulha*. What were the pivotal moments for such decisions to be made? Why were SC households more likely to reject the older technology than the higher castes? Is there a set of situational factors that trigger removal, or are there certain household characteristics that we can identify? Through both statistical and qualitative evidence, we hope to bring out the complexities, nuances, and occasionally conflicting narratives that more closely reflect lived realities of these rural communities.

The decades of history of ICS dissemination as a response to changing global concerns of natural resources, public health, and most recently climate, speak to the complexity of both defining the problem and designing solutions to it. In this paper, we focus the discussion in the context of energy transition in developing countries. The puzzle, after decades of attempts, is that households' acceptance of the new does not mean the rejection of the old.

The debate over what determines household fuel choices and the transition over time has seen two main phases of development. Early theories of household cooking patterns in developing economies focus on the “energy ladder” model (Leach, 1992). The model is derived from empirical data suggesting the correlation between the increase in urban households' income and the uptake of modern cooking fuels and devices (Maser et al., 2000). Sathaye and Tyler (1991) show that

¹ Many of these semi-structured interviews were conducted in households with more than 1 family member present, often with husband and wife.

² Names of informants are made anonymous unless they requested otherwise, adhering to the study's institutional review board agreement.

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