Cows, Cookstoves, and Climate Change

A Non-Anthropocentric View of Household Energy Use in the Rural Indian Himalayas

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How are cows, cookstoves, and climate change connected? How do human/non-human relations affect energy use in rural homes in the Indian Himalayas? How are these themes related to air pollution, health, and climate change? Household air pollution in the form of smoke from cookstoves in low-income homes in the Global South adversely affects the health of people exposed to the smoke, particularly women and children, and contributes to global climate change (Smith 2010; Balakrishnan et al. 2011; Lim et al. 2012). Many development actors and government organizations have attempted to transition poor families away from "traditional" cookstoves to "modern" cookstoves, many with noble energy justice intentions in mind, but have met limited success [1]. Many families continue to use their "traditional" cookstoves, which typically use a combination of solid biomass fuels such as firewood, animal dung, and crop residue. Energy studies researchers have attempted to understand the development failures in household energy, and have proposed factors such as expenses, inability of the cooktove to meet local cooking needs, and gender dynamics (Mobarak et al. 2012). Based on research in the rural Indian Himalayas,

[1] I bracket "traditional", "modern", and "improved" (used later in this article) in quotes to draw attention to the fact that these are contested terms with unstable meanings. What is "traditional", "modern" and "improved" depends on the context and the perspective of the observer. However unstable these categories are, they are useful analytics to retain for the rest of the paper, so I will continue to use them within quotes. These terms are used frequently in household energy literature, and so I find it productive to remain in conversation with these terms, while still drawing attention to the problematic assumptions built into them.

this paper will demonstrate how efforts to promote improved cookstoves bring different visions of stoves together in rural kitchens – as a technology meant to generate heat for cooking food, and as a device at the heart(h) of energy and mass flows between people, their livestock, and their fields. Drawing on eighteen months of fieldwork conducted between 2013-17 in rural Himachal Pradesh in India, this paper will examine the effect that human-animal relationships have on household energy decisions, ultimately affecting individual health and the environment. This approach expands existing scholarship in energy studies, which has historically been anthropocentric.

Multi-species entanglements are constitutive of life on earth, and anthropological scholarship has increasingly recognized that the study of the human cannot exclude "our entanglement with other kinds of living selves", what Eduardo Kohn has called the "anthropology of life" (Kohn 2007). Environmental anthropologists have long studied the relationship between people, animals, and plants, but new scholarship in multi-species ethnography aims to push beyond the exploration of relations; it "aims to decenter the human in ethics and theory" (Ogden et al. 2013). Scholars are ethnographically illustrating the connections between humans, animals, and plants, seeing non-humans as agentive beings, and human/non-human relationships in non-hierarchical ways (Haraway 2008; Kirksey and Helmreich 2010). This relatively recent scholarship builds on a much deeper scholarly engagement on the way human society is connected to its environment. In this paper, I add further empirical evidence to this conversation by showing that limiting our analysis to the human misses important cross-species connections that influence household energy use in the rural Indian Himalayas. Energy use by low-income families across developing countries has drawn a lot of attention from development and environmental organizations, as I will discuss in some detail below. Questions about why people use energy in certain ways cannot be fully answered if we restrict our lens to human family members. By expanding our boundary of the household to include human and non-human family members, we gain a more nuanced understanding of the various aspects that rural families need to consider while making energy decisions. Based on ethnographic research carried out in the Western Indian Himalayas, this paper discusses how cows, cookstoves, and climate change are inextricably linked.

But why is household energy use important to study? Approximately 40% of the world's population meets their daily energy needs by using stove technologies made locally and burning solid biomass fuels like wood, dung, and crop residue (Masera et al. 2015). These are subsistence energy needs, mainly for cooking, which is vital to the survival of low-income

families all over the world. The smoke from cooking fires causes death and disease when inhaled; researchers estimate that in 2010, 3.5 million premature deaths annually could be attributed to solid biomass fuel use, called "household air pollution" (Lim et al. 2012) [2]. In some regions of the world, like South Asia, household air pollution is the leading risk factor for disease (Lim et al. 2012). In India alone, a million people die prematurely every year due to household air pollution, and it is the leading cause of death and disease for Indian women and children (Smith and Sagar 2014). In addition to the adverse health effects discussed above, household air pollution also exacerbates global climate change when emitted into the atmosphere (Sagar and Kartha 2007), in addition to causing hotspots of forest degradation in some areas (Bailis et al. 2015). The climate impacts of woodfuel smoke comes from black carbon emissions, which are particles that increase radiative forcing by trapping more solar radiation in the atmosphere (for a detailed explanation of the global environmental impacts of household energy, see Bond et al. 2004). The adverse health and environmental effects of this "mundane bioenergy" (Chatti et al. 2017) have prompted numerous development organizations and government agencies to attempt to transition families to "modern" energy technologies such as "improved" biomass cookstoves, and liquefied petroleum gas (LPG) or electricity.

However, these programs have seen mixed success in terms of changing the way that low-income families cook [3].

In rural Himachal Pradesh in the Western Indian Himalayas, where I conduct my research, many families have multiple cookstoves using a variety of fuels. These include a mud stove called a *mitti ka chulha*, a dual purpose cooking-and-space-heating metallic stove called a *tandoor*, a stove that runs on LPG, and a stove that runs on electricity (called an "induction" stove). All of these are usually used in indoor settings. Additionally, it is common to have a three stone fire outdoors for heating bathing water, and cooking food for livestock. Most families in this region rely on agriculture (a combination of grains, fruits, and vegetables) and livestock (typically goats) for their livelihoods, and several households keep cows to provide dairy for family consumption. As eloquently described in Radhika Govindrajan's article *The goat that died for family*, interspecies kinship in the Indian Himalayas is produced through the "embodied experience of

[2] For comparison, ambient air pollution accounted for 3.1 million deaths in 2010 (Lim et al. 2012).

[3] For a history of failed cookstove programs in India, see Meena Khandelwal and colleagues' excellent paper in World Development (Khandelwal et al. 2017). For a description of the modest successes and unique regional challenges of improved cookstoves programs in India, see Barnes et al. 2012.

everyday entanglement in relations of care" (Govindrajan 2015). While Govindrajan's article focuses on a different topic – the affective relationship, much like that between a parent and child, between humans and goats who are ritually sacrificed, my research explores the relations of care and kinship that emerge between humans and cows through the everyday acts of providing food for one's family, human and non-human. Feeding one's cows requires collecting fresh grass and leaves for them twice a day in one's fields or common wooded areas, and carrying it back for them to eat. It requires cooking food for the cows once a day, and providing them with fresh water. Feeding one's human family requires collecting a fuel, and burning it to cook food. When I asked Jyoti [4], a farmer with two cows who cooked her daily meals on two kinds of stoves – a mud stove using solid biomass fuels, and a metallic stove using LPG gas – if she could ever imagine a time in the future when she wouldn't use her "traditional" mud stove, she replied: "As long as I have cows, I will use my mud stove. I need to feed them everyday, don't I! I will always need to bring them leaves to eat. I burn the leftover branches in my stove when I cook my food. What will I do with all these branches if I don't have a mud stove?". This puzzled me, as in the literature on cookstoves I had only ever encountered "cow" as a part of the word "cow-dung", in the context of combustible biomass. But here Jyoti was saying something else – that her responsibility to provide food for her non-human family, her cows, linked her to her responsibility to cook for herself and her human family. Once her cows nibbled the green leaves off the branches she had brought for them, Jyoti dried them, and used them as fuel in her "traditional" mud stove. As long as Jyoti kept cows, she planned to keep her "traditional" stove. In Jyoti's mind, her kitchen, fields, and livestock were interconnected places to be managed together.

Efforts to get households to adopt "improved" cookstoves have always been intertwined with attempting to get households to dis-adopt their "traditional" stoves, as it is the use of the latter that is seen as the root of environmental and social issues. Some newer stoves, especially ones that use LPG as a fuel, are aspirational technologies that many families desire to acquire and use. However, the adoption of new stoves does not automatically lead to the dis-adoption of older stoves, and this vexes and puzzles household energy researchers. In project meetings and conferences of cookstove researchers, a big theme of discussion is how to get families to move away from their traditional stoves. Whether their motivations are health, climate, or gendered time use, the traditional *chulha* (cookstove)

[4] Following ethnographic conventions, all names of people in this article are pseudonyms.

is seen as the problem. However, as discussed in a recent paper based on fieldwork in the same region, there are a complex web of factors that need to be understood to properly understand energy choices (Jagadish and Dwivedi 2018), and in this paper I argue that understanding human-animal relations is integral to this.

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