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Original research article

A (new) cultural turn toward solar cooking—Evidence from six case studies across India and Burkina Faso

Pia Piroschka Otte*

Department of Sociology and Political Science, Norwegian University of Science and Technology (NTNU), Edvard Bulls veg 1, Dragvoll, 7491 Trondheim, Norway

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ABSTRACT

Solar cooking can generally be described as a way to use the sun's energy for cooking. Despite its multiple benefits as a clean, modular, simple source of energy, the implementation of solar cookers is not as widespread as one would hope. In the literature it is argued that solar cookers are not adopted because they are often considered to be culturally disruptive. This paper shines a new light on the cultural dynamics of cooking by showcasing the social acceptance of solar cookers. Six cases are presented from two different countries, Burkina Faso and India where a particular type of solar cooker (Scheffler reflectors) was installed among bakeries, shea nut butter producers, and steam kitchens. These cases demonstrate how cultural factors can be adoption-enhancing or limiting in different contexts. In essence, the paper finds that solar cookers are successfully implemented where they conform to underlying cultural factors. The study concludes that by implementing solar cookers as part of an existing socio-cultural framework, solar cookers move away from an image of a mere foreign technology to an integrated part of the target society.

1. Introduction

> . . . We don't want to pollute the nature and this goes along with solar energy. Clean the mind and clean the earth. The world suffers from polluting thoughts. . .
>
> (Brahma Kumaris devotee at Shantivan complex, 17.12.11).

Solar cooking can generally be described as a way to use the sun's energy for cooking. The principle of solar cooking is simple: sunlight is converted to heat energy that is retained for cooking. This is not a novel concept. The first solar cooker designs can be traced back to the 18th century when Nicholas de Saussure (1740–1799) built a black insulated solar cooker [1].

Solar cooking is regarded as a fruitful alternative for people in developing countries where primary energy needs are often met by using biomass on a three stone fire (see [2]). It is a clean cooking technology because it does not produce smoke, as opposed to the conventional use of firewood for cooking. In the case of solar cooking, the sun provides the "fuel" for cooking. Furthermore, solar cookers have also become a relevant technology in the context of climate change as a Clean Development Mechanism (CDM) [3]. Several NGOs, such as the Kyoto Twist Solar Cooking Society, support existing solar cooking projects with the aim of reducing GHG (Greenhouse Gas) emissions, and the western nations' environmental footprint, while simultaneously addressing poverty with this intervention [4].

There are currently many different organizations working with solar cooking technologies worldwide, resulting in the development of a wide range of solar cookers. One of the largest non-profit organizations is Solar Cookers International (SCI), founded in 1987. Through its information exchange network, SCI contributes to a widespread awareness of solar cooking around the world [5]. Solar cooking gained popularity, especially in the 1990s, and the number of solar cooking projects increased drastically [2]. Solar cookers are being developed and distributed in several countries and engineers in different parts of the world are working on technical design improvements.

An interesting aspect is that solar cooking proponents often address the household level in their campaigns (see [6–8]). However, solar cookers can be also applied at a level beyond households, among institutions. In this paper, solar cookers are examined among three types of institutions: bakeries, shea nut butter producers, and kitchens. At an institutional level solar cookers become even more relevant to lessening vulnerability to supply shortages

* Tel.: +47 73590503.
E-mail addresses: pia.otte@svt.ntnu.no, pia1905@gmail.com

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and offsetting rising energy-related expenses. Solar energy is a free energy source. As the cost of electricity, gas, kerosene or charcoal continues to rise, the use of solar cookers can create substantial energy savings [9].

Despite these multiple benefits, the implementation of solar cookers is not as widespread as one would hope [10]. Several technologies have been developed for solar cooking at a household and institutional level such as boarding schools, religious centers and hospitals that can improve the situation. However, we lack information on the continuous use of these technologies particularly at an institutional level. Tucker [3] argues that solar cookers are not adopted because they are often considered to be culturally disruptive, since they introduce a new way to prepare food. In addition, Toonen [11] states that solar cookers need to be coherent to the cultural context.

This paper shines a new light on cultural factors—and partially invalidates the findings from Tucker and Toonen—by focusing on adoption at an institutional level. The study argues that cultural factors can be constraints but also enablers for the social acceptance of solar cookers and encourages NGOs (Non-Governmental Organization) to utilize these factors in their implementation strategies.

More specifically, the paper investigates the cultural dynamics of solar cooking in a comparative case study. Six cases are presented from two different countries, Burkina Faso and India where a particular type of solar cooker (Scheffler reflectors) was installed at an institutional level. These cases will show how cultural factors can be adoption-enhancing and limiting. The article captures two cases from Burkina Faso where a solar cooking system was installed in the form of a solar bakery and shea nut butter production and four cases from India where the same solar technology was installed in the form of a steam kitchen at the Brahma Kumaris,[1] a religious group in India. The inclusion of several cases from two different countries is considered to increase the explanatory power of the data.

The paper is structured as follows: First, it starts with a short review of different case studies that address the relationship between culture and technology, which presents the point of departure for this study on solar cooking. From this general literature review on technology and culture, the second part of the paper presents a short review on how different cultural factors are assumed to play a role for the limited success of solar cookers. Third, the paper introduces the six cases and offers a short overview of the technical functioning of the solar cooking technology installed at these institutions. Fourth, based on the case descriptions, it analyzes how underlying cultural practices in the different contexts influence the adoption or rejection of solar cookers. Finally, the paper concludes that cultural factors should find more attention in solar cooking programs, not only as barriers but also as enablers for successful adoption.

Before proceeding with the main content of this paper, it needs to be acknowledged that the objective of this article is not to develop a full or consistent theory on the adoption of solar cookers. Rather, it seeks to provide examples that might better clarify the impact of cultural practices on solar cooking. Furthermore, the paper does not presume that cultural practices are the only factor that influences the adoption of solar cookers. The situation is much more complex and a comprehensive list of those factors is available elsewhere [see 12]. However, this paper focuses primarily on the cultural turn.

[1] When it is referred to Brahma Kumaris in this paper, I refer to the Brahma Kumaris as a religious group.

2. Culture and technology—a literature review

Several scholars have addressed the question whether the characteristics of cultures have an impact on technology adoption. Before reviewing different case studies that address the relationship between culture and technology, we need to define the term culture. Steers et al. [13] collect different concepts of culture and conclude with one overall definition, which is also applied in this paper. They define culture as follows:

> Culture is characterized by shared values and norms and mutually reinforcing patterns of behavior. Culture is learned and evolves over time, albeit slowly. Culture is also often invisible. Indeed, so inextricably it is interwoven into the fabric of society that both its characteristics and the manifestations of these characteristics are often recognized least by the very people affected most. [13:256]

The emphasis here lies on the invisible aspect of culture [14]. In the context of solar cooking it is argued that promoters often disregard the underlying cultural aspects of their target societies, which leads to an abandonment of solar cookers. Wentzel and Pouris [15] argue that the process of implementing solar cookers has focused on a "technologically driven approach", which means that a certain technology is favored by NGOs without addressing the actual consumer needs of their target group. In order to make solar cookers more acceptable, it is argued that their implementation should begin with an assessment of the underlying cultural aspects including the user needs of the target group:

> The dissemination of solar cookers must begin with an analysis of the local situation, i.e. of traditional cooking habits and local needs – not with the selection of a certain type of solar cooker. [15,16]

If we move beyond the solar cooking literature, we can see that several scholars have discussed the role of culture for technology adoption in different case studies. Nardon and Aten [17] analyze the adoption of an ethanol-fueled transportation system in Brazil. They conclude that by developing the *flex fuel* car that can run with ethanol and petrol, or a mix of the two, the Brazilian government chose a so-called logic of flexible adaptation that is culturally derived and led to a successful innovation. Flexible adaptation is considered to be a characteristic of the Brazilian culture anchored in the concept of *jeitinho*. Nardon and Aten [17:270] describe jeitinho as the logic of action of flexible adaptation, which is commonly applied by Brazilians to deal with various problems.

Another study by Lee and Ungson [18] investigates the role of cultural factors in explaining Korea's rapid adoption of the internet economy. They mainly identify five cultural values of Korean society influencing the rapid take up: (1) Collectivism, (2) Rule orientation, (3) Harmony and affection, (4) Power orientation, and (5) Monochromic time. Palis [19] analyses the influence of culture for the adoption of agricultural technologies. She shows in her study how culture plays a role in the context of integrated pest management (IPM) as an agricultural activity in central Luzon, Philippines. IPM is considered to be better adopted when it is implemented in the form of farmer field schools (FFS). FFS are considered to include the user's agency and people's own culture. Furthermore, this kind of training requires collective working, which means that the participants are "socialized in a cultural system" [19:492]. Palis [19] describes the different fears of uncertainty farmers had to face during the FFS and argues that the Filipino culture and particularly the group-oriented norms *pakikisama* (which means getting along with the others for the good of the group) and *hiya* (which stands for shame and embarrassment) helped to overcome those fears.