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Clean cooking for every ‘body’: Including people with disabilities in modern energy cooking services in the global south

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ABSTRACT

Clean cooking solutions, with greater access to cleaner and safer cooking fuels than traditional energy sources, are key to ensuring access to affordable, reliable, sustainable and modern energy services for all. However, the needs of the 1 billion people living with disabilities globally who face disproportionate levels of poverty, poor access to nutrition, and challenges with buying and preparing food, have been neglected from discussions around the expansion of access to clean cooking across low- and middle-income countries. Drawing on academic and grey literature and informal discussions with disability and energy sector experts, this paper calls for the inclusion of people with disabilities in the transition to clean cooking, highlighting the potential benefits that this can bring. Including people with disabilities in clean cooking can improve the nutritional and economic status of their households, facilitate their independence, provide routes for inclusive technological innovation, and improve the health of people with disabilities. People with disabilities need to be included in the expansion of access to clean cooking. Engaging people with disabilities as champions of clean cooking, involving organisations of disabled persons, engaging disabled men and boys as well as disabled women, and linking to global resources such as social media are pivotal to widening access to clean cooking. Involving people with disabilities in clean cooking can ensure that every ‘body’ is part of efforts to achieve Sustainable Development Goal 7.

1. Introduction

Global challenges relating to the impacts of climate change, health and nutrition, gender relations, economic livelihoods and the environment are intertwined with the reliance of nearly three billion people on highly polluting biomass sources including such sources as firewood and charcoal (also known as traditional fuels) for cooking and heating in low-and-middle-income countries. Advances in modern clean energy, payment technology, and business models have enabled national governments and the global community to make significant progress towards meeting the targets of Sustainable Development Goal 7, ensuring access to affordable, reliable, sustainable and modern energy for all by 2030, specifically 7.1.2: ensure universal access to affordable, clean cooking solutions by 2030 [1]. Some countries have driven a partial transition to clean cooking, or ‘access to safer and more sustainable cooking and heating fuels and stoves than traditional biomass stoves’ [2] through the promotion of LPG (e.g., India, Indonesia, Morocco), but there continues to be a high prevalence of biomass based cooking, even

in households which have access to electricity, due to load shedding, weak grids, perceptions on the affordability of electricity, the accessibility and subsidisation of LPG, cooking traditions that favour traditional fuel sources, and nascent markets for non-biomass based cooking appliances [3]. Traditional biomass-derived cooking smoke is also commonly used to drive flies and disease-bearing vectors out of the home [4], to give food certain flavours, and because electric burners are often seen as more difficult to control than flames. The Modern Energy Cooking Services (MECS) programme has called for 40 % of all households connected to grid or off-grid electricity to be using electricity for cooking by 2030, and 60 % of households to be using modern energy for cooking generated from low-carbon sources by 2030 [5].

The clean cooking sector, a diverse sector aiming to provide a broad range of cooking solutions to consumer groups [6] seeks to address these challenges by developing and expanding access to clean, efficient cooking technologies and energy storage options. ‘Clean cooking’ involves people using energy efficient stoves and cleaner fuels to cook [7], for example using e-cooking technologies, or put simply, electric stoves,

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which do not require biomass sources to work. Success stories around the adoption of e-cooking technologies include reporting the benefits of being able to cook meals in less time for older people in Kenya [8], and in creating employment opportunities for 3000 women in Bangladesh working along the supply chain to manufacture the cook stoves [9]. Yet, the clean cooking sector has also faced challenges in implementation. For example, barriers of cost have been reported in countries such as Burkina Faso [10]. Folk beliefs have raised concerns among rural women in India around issues such as cooking speed and how electrification might affect family health and whether clean cooking technologies and appliances might fail to live up to expectations once they are purchased [11]. The electrification sector, which faces challenges with insufficient investment in low-carbon finance and unequal access to technology in low- and middle-income countries [12], seeks to increase access to electricity for all uses. But for years the clean cooking sector and the electrification sectors have been separated. There is now a recognition that clean cooking (especially with electricity) should be planned for as part of electrification projects, with an estimated projection of USD 8 billion needed to achieve universal access to clean cooking by 2030 [13].

The energy transition sector has also come under scrutiny for failing to be fully inclusive of different groups, for example, by not considering the relevance of indigenous knowledge to ensure that solutions are ‘just’ [14]. To meet the aspirations of SDG7 we need to make sure that no-one is left behind during this transition, meaning we need to pay attention to every ‘body’, including the estimated one billion people, or 16 % of the global population, living with disabilities, 80 % of whom live in the global South [15], where access to clean cooking is especially challenging. However, to date, the needs of people with disabilities, and particularly women and girls with disabilities, who are still largely responsible for the unpaid burden of cooking and the physical challenges of managing fuels are rarely considered in discussions on expanding access to clean cooking programmes. There are some exceptions. For example, there has been some discussion of how some clean cooking solutions can reduce the burden of collecting firewood, as is the case for women of all abilities in many low- and middle-income countries such as Kenya [16], Burkina Faso [17], India [18], and Nepal [19] but such issues are rarely discussed specifically as a disability issue. We know that people with disabilities are more likely to be confined to the home, not only due to their health needs, but also due to the inaccessibility of the wider community and stigmatisation and discrimination which keeps them at home ‘out-of-sight’ [20]. They are thus more exposed to harmful indoor air pollution through smoke from burning biomass cooking fuels.

However, existing discussions around enabling people with disabilities to cook, where it is discussed at all, predominantly focus on the improvement of their nutritional status and enabling their autonomy and self-sufficiency. Yet, broader socio-cultural expectations should also be considered. People with disabilities are not only the beneficiaries of the actions of other people. Many disabled people, particularly women with disabilities, remain responsible for the cooking and feeding of their nuclear or extended families. Mothers with disabilities are still generally expected to feed their children. Cooking for the family is a daily task expected of wives, including those who have a disability and a woman’s standing in her household and community is still often judged according to the number of chores, such as food shopping and cooking, she is able to do for her family.

Additionally worldwide, households with disabled members are disproportionately poor [21]. One result of this poverty is that people with disabilities globally are less likely to have access to modern energy services and more likely to experience energy poverty than households without people with disabilities, as had been documented in countries like Lesotho, Tanzania, Eswatini, and Bangladesh [22]. This is due to lower household incomes, limited employment opportunities and inadequate or non-existent social security support systems for persons with disabilities in many countries. The need to direct a significant

proportion of household income to disability related needs such as medical care, adaptation in daily living related to a disability and transportation further compounds this poverty. For example, someone with limited mobility living in a cold climate may need to have a constant source of heating. If using an electric, gas or coal fired heater, that fuel needs to be purchased. If they rely on a fire using biomass, that fuel needs to be either collected or purchased and tended throughout the day. This energy deficit remains absent from country-level reports on the Convention on the Rights of Persons with Disabilities [23] so in effect it remains an invisible problem managed almost entirely at the individual household level.

Recent data on access to clean energy sources among people with disabilities is scant, with the latest data dating back to 2010, when an estimated 52 % of households with people with disabilities across 14 countries in the global South used traditional cooking fuels as their main source of cooking fuel compared with 46 % of those without [24]. Action is needed to further explore the current extent of access to clean energy among people with disabilities, and address this invisible issue. Even sources of energy that are ‘free’ for non-disabled households (e.g., locally collected firewood) may need to be purchased by a person with a disability if they are unable to collect the fuel themselves. Government-level measures to address energy poverty for people with disabilities in low- and middle-income countries are made even more challenging by the fact that different aspects of disability policy are often divided between different departments. Whilst the provision of assistive technologies for disabled people may come under the mandate of the ministry of health, there is rarely coordination with the ministry of energy to directly address the energy deficit faced by the same individuals or members of their household. Lessons should be taken to address this from South Africa, where efforts were made to mainstream people with disabilities as well as young people into programmes run by the Department on Energy [25].

Drawing on the existing academic and grey literature and discussions with experts in both the disability and energy sectors and in line with the principles of ‘nothing about us without us’, the global disability rights call to actions that emphasises that people with disabilities must be full and active participants in all decisions that affect them [26,27] that informs all global and local disability-inclusive activities, we believe there is need for the active inclusion of all people with disabilities in the transition to modern energy, or clean cooking¹ [28].

2. Cooking and nutrition for people with disabilities in low and middle-income contexts

The World Health Organization includes people with physical, intellectual, sensory (i.e. deafness, blindness) or mental health impairments – or a combination of such impairments, as a ‘disability’¹. An individual’s disability will also vary based on the severity of their impairment. Barriers in access to clean cooking will vary by an individual’s disability as well as their socioeconomic status, whether they

¹ The World Health Organization (2022) defines ‘disability’ as ‘resulting from the interaction between health conditions and/or impairments that a person experiences, such as dementia, blindness or spinal cord injury, and a range of contextual factors related to different environmental and personal factors including societal attitudes, access to infrastructure, discriminatory policies, age and gender. While the term ‘disability’ is used to refer to an entire group of people, in fact, it is important to note that the type of disability one has as well as the severity of the disability, will make a difference in terms of ability to perform household tasks such as cooking, and participation in clean cooking initiatives. People with disabilities may have: 1) an impairment in their body structure or function or mental functioning, or impairments such as the loss of vision, memory loss or a limb 2) limits on their activities, such as difficulties seeing, hearing, walking or problem solving, or 3) limits to participating in normal daily activities such as working, engaging in social activities and accessing key services such as health care.

live alone or in a household with others, whether they live in urban or rural settings, cultural contexts and so forth. Having a disability impacts millions of people's ability to feed themselves and their families, to provide and access energy services, and in some cases, to use certain clean cooking technologies. Despite this, disability status is rarely considered when clean cooking issues are discussed. Cooking and food preparation reflect intersecting and diverse concerns for people with different types of disabilities. Such issues revolve around the relationships between nutrition, poverty, safety, autonomy, and fulfilling expected roles (with a particular emphasis upon the roles of women with disabilities).

The range of activities involved in the acquisition, preparation and consumption of food is challenging for many people with disabilities. Part of these challenges are related to food insecurity, which remains a major challenge for many people with disabilities [29], particularly given the absence of effective tools and techniques for supporting accessible cooking in many countries. Disabled people face a multitude of financial barriers in acquiring and preparing enough food or enough nutritious food due to the higher levels of unemployment and poverty which they experience [30]. Compounding this is the inability of some persons with disabilities to shop for, transport, and prepare nutritious food [31]. People with disabilities, thus, globally face barriers to meeting their cooking and nutritional needs, including: poorer physical access to food [32]; a greater dependency on processed food; higher rates of malnutrition [33]. Many people with disabilities are reliant on family members to buy and prepare food for them, but many more are responsible for cooking for themselves and their families [34].

A significant component of such cooking practices is access to cooking fuels and here, the energy sector has overlooked the challenges that people with disabilities face in meeting their nutritional needs through cooking. It is a subject which has not been examined in the energy literature. For example, in urban areas, prices of charcoal increase as distances over which it is transported increases [35]. Safety is also a concern. There are the issues of safely lighting and managing stoves and fires. For example, in Cambodia [36], research conducted by the MECS programme identified a regular risk among people with physical disability and epilepsy of falling onto open fires. The risks of burns also exist for people with lower body impairments, who have difficulties standing for long periods of time. People with leprosy have also been found to experience high rates of burns when cooking due to the absence of sensation in their hands [37]. Uneven floor surfaces can prevent people with mobility impairments from quickly moving away from an unsafe situation. The issue of safely using cooking implements like larger pots, or heavy pans is a further challenge for many with physical impairments [38].

Adapted cooking utensils and appliances are now available. For example, access to specially adapted induction hobs with features for deaf and blind users, cooker safety devices, and talking appliances can be accessed through mobility retailers. But these innovations are rarely available in the global South. Indeed, such specifically adapted equipment is often unaffordable for people with disabilities in the global North. Table 1 summarises the different challenges faced by people with disabilities in relation to food, cooking and nutrition.

Table 1
Challenges faced by people with disabilities in relation to food, cooking and nutrition.

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- Poorer physical access to food and poorer nutrition
 - Inability to afford food
 - Dependency on other people to cook for them
 - Greater level of exposure to indoor smoke pollution from fire stoves,
 - Greater risk of injury due to heating sources: such as risks of falling into the fire
 - Physically inaccessible utensils that are difficult to use, and an inability to afford adapted utensils
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3. The opportunity

As discussed above, there are currently important new 'clean cooking' initiatives occurring in many countries, such as Cambodia, Nepal, Myanmar, Bangladesh, Zambia, Rwanda, and Tanzania [39]. Yet persons with disabilities and organisations that represent them are rarely included in such efforts. We believe this is a real missed opportunity. The expansion of access to electricity and the growing use of more automated cooking appliances (plug in and leave) provides an unprecedented opportunity for inclusive technological innovation in cooking by people with many types of disabilities. Instead of being last, people with disabilities could be among the first adopters.

Ensuring that people with disabilities are included in local and national clean cooking projects offers a number of additional benefits to the expanded uptake of modern energy cooking. The nutritional and economic status of households could be raised if household members with disabilities of all ages were able to cook or reheat food for themselves and for other household members. The ability to cook for oneself and one's family frees other members of the household from caregiving responsibilities, allowing them more time to pursue other community based, educational, social, recreational, or income-generating activities. Gender imbalances can be redressed by encouraging both men and women with disabilities to engage more in cooking activities. Transition to clean cooking could improve safety and health, most notably through reduced exposure to indoor smoke and live fires. Indeed, clean cooking can offer not only self-sufficiency and safe use of the kitchen, but for many people with disabilities, the ability to prepare food at home may offer new ways for them to generate income by preparing and selling food from their own homes.

Automated cooking appliances are also relevant to persons with disabilities. These appliances are designed for universal use. They are intended to be affordable, locally available easily maintained and repaired, making them accessible to all members of the community. For example, electric pressure cookers have been found to provide significant savings in energy use and fuel costs, and reduce the time needed for cooking staple foods. Field studies have shown considerable success in such innovative approaches to cooking in countries such as Kenya, Tanzania, Zambia, and Myanmar [40–43]. Induction stoves facilitate safe cooking because there is no open flame. Heat is transferred directly to the pan, rather than the hob or stove top, and if the pan is removed, the heat is no longer transferred. Electric pressure cookers, rice cookers, multicookers, and slow cookers work on timers, so the appliance cannot continue cooking indefinitely (i.e., if forgotten) and overheat. This means a less arduous cooking process for those with limited dexterity, mobility, strength (e.g., to move pans of food around), and physical energy. Many appliances also have both audible and visual reminders, alerting the user that the cooking cycle has ended, through both beeping and a flashing light. Granted, in some appliances, the lights are very small and so may not be immediately obvious to people with visual impairments, but this can be overcome with a minor modification. Contrasting colours can help people with vision impairments identify different parts of the appliance, whilst retaining visual appeal as a consumer good. Accessible apps for tablets and mobile phones, which are easily downloadable and could integrate features such as spoken recipes and e-cookbooks could support cooking activities for people with different types of disabilities.

The issue is not about designing cooking innovations specifically for people with disabilities, it is about adopting universal design principles which make appliances easier and more intuitive for everyone to use. More expensive, disability-specific adaptations could be avoided by affordable universal design features. For example, a common addition in high-income settings is the inclusion of 'talking features' (e.g., the appliance says 'bake, fry, roast' as the user scrolls through options).

Disability specific adaptations such as braille on key buttons, larger buttons, and larger display screens are available in some countries such as Germany [44] whilst cooker safety devices that turn cookers off if users are not present and the temperature increases significantly can be accessed in the USA [45]. The inclusion of people with disabilities in innovation processes overall can lead to better design of clean cooking technologies, drawing on feedback gathered through sessions in which diverse audiences, including people with disabilities, test them.

4. Call for action: including people with disabilities in modern energy cooking services

Expanding access to modern energy cooking technologies in low- and middle-income countries requires attention to both people with disabilities in general and the diverse needs of people with different types and levels of severity of disability to cook for themselves and their families. Inclusion of people with disabilities should be part of these efforts from the outset. There needs to be direct engagement of people with disabilities and organisations that represent persons with disabilities in the development of clean cooking strategies as they are developed and not years down the road as an afterthought. Such inclusion from the outset will be far more cost-effective than redesigning services to be inclusive later on. The fact that people with disabilities constitute a significant part of any consumer population must be kept in mind [46]. Moreover, if people with disabilities are not included then any clean cooking campaign that intends to reach the entire community will simply not be effective.

4.1. Engage with users with disabilities early as champions of eCooking

Local vendors of eCooking technologies, which enable people to cook with electricity [47], can be made aware that people with disabilities are reliable and valued potential customers. It is recognised that the affordability of these new appliances is critical to adoption. There is a good deal of research going into the different options, from carbon credits to pay-as-you-go, and various forms of loans (from on-bill financing to buy-now-pay-later options). Yet households with people with disabilities are too often viewed less favourably by traditional loan making organisations (e.g., Micro Finance Institutions) [48]. However, there is a growing body of research showing that in fact, households of persons with disabilities participate as successfully in micro-credit efforts as all others [49]. In addition, there is a growing body of evidence that shows that switching to efficient electric cooking lowers household costs and saves money – money which could be used to pay back a loan to cover the up-front purchase. This could facilitate the scale up of access to eCooking appliances for low-income households with people with disabilities. Such accessible appliances could even enable some people with disabilities to create income-generating opportunities through being able to sell food and enable them to be active participants in the local and national economy.

Bringing together local vendors of appliances and organisations of disabled people in low- and middle-income countries could provide a productive and currently little used route to raising awareness on the benefits of switching to an eCooking appliance. Programmes in the energy field have consistently shown that in-person demonstrations and product trials are effective methods in encouraging people to adopt a new behaviours and technologies. National governments, through existing social protection measures, including energy rebates for households with people with disabilities could support the early transition to clean cooking for people with disabilities, and enable them to champion the use of innovative technologies in their communities. A byproduct of this is that it may also help to reduce some of the entrenched social stigmas surrounding disability. Utilities could ensure that social tariffs are easy to understand and access.

4.2. Involve organisations of disabled persons (ODPs) we

ODPs range from national umbrella organisations to small, locally based support groups for people with specific disabilities, or organisations providing information and services to subgroups, such as disabled women. ODPs have the networks that could allow those undertaking clean cooking initiatives to more effectively identify and reach persons with disabilities in their local communities. Many of these organisations also have the capacity to provide information and training to many persons with disabilities and their families around clean cooking initiatives. The potential of ODPs to promote clean cooking could be an important, local outreach link for the transition to modern energy cooking. For example, in-person classes and ‘e-cooking schools’ run through ODPs as access to clean cooking expands could provide people with disabilities with a skill set to be able to cook for themselves and others. Clean cooking technology that could allow persons with disabilities greater self-sufficiency to cook for themselves could also, allow some to generate additional household income, enabling them to make and sell food items to others.

ODPs are well placed to train people with disabilities on how to use clean cooking appliances and to support them to apply for loans that would allow them to buy new cooking appliances. An additional benefit from eCooking technology is the potential for some people with disabilities to find employment in food businesses, appliance repair businesses, or even to sell eCooking technologies to others.

Widening access to clean cooking services should also seek to include and encourage men and boys with disabilities to become involved in cooking to contribute towards efforts to achieve gender equality and to allow them to make substantive contributions to their households.

4.3. Linking with global resources

Finally, there is an opportunity to utilise media to contribute to the ever-growing community of cooking themed resources including recipes, cooking demonstrations, and how-to videos to engage people with disabilities in clean cooking initiatives and help them to understand the benefits it can bring. E-cooking campaigns do not need to create ‘specialist’ materials to be designed for people with disabilities. ODPs and people with disabilities can draw heavily on already existing resources and campaigns for the general public. Inclusion of people with disabilities in these broader efforts can and – and should – be routinely. Such inclusion can often be done at little or no cost. Simple adaptations, for example, an image of a woman in a wheelchair cooking using an off-the-shelf electric pressure cooker could be included in any outreach campaign. In the longer term, as access to clean cooking expands, social media channels and internet pages dedicated to increasingly awareness of and knowledge about accessible clean cooking technologies and nutritious recipes for people with disabilities can ensure inclusion for people with a range of disabilities across low- and middle-income countries.

5. Conclusion

To meet the aspirations of SDG7, it is vital that the estimated one billion people living with disabilities who constitute 16 % of the global population, participate in the global transition to clean cooking. The expansion of access to cleaner fuels, particularly electricity and the growth in more automated cooking appliances provides an unprecedented opportunity for inclusive technological innovation. The spread and adoption of inclusive modern energy cooking technologies has scope to address the multiple challenges faced by people with disabilities: malnutrition, poverty, the right to independence and access to reliable and clean energy while reducing the risks to their health posed by exposure to indoor smoke and the dangers of working around open

fires. There are opportunities to make people with disabilities champions of clean cooking, challenging existing stereotypes. and ensure that it is a valuable opportunity for every 'body'.

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Amita Bhakta: Conceptualization, Writing – original draft. **Ed Brown:** Funding acquisition, Writing – review & editing. **Nora Ellen Groce:** Conceptualization, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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