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Gender in the modernisation of waste management: key lessons from fieldwork in Bhutan, Mongolia, and Nepal

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ABSTRACT

The waste sector is a significant and growing source of global greenhouse gas (GHG) emissions. Most developing countries are minor contributors to global GHG, and produce limited emissions from municipal solid waste. However, as poor countries become integrated into global circuits of production and consumption, their contributions to global GHG emissions are likely to increase concomitantly. National and local governments and international agencies have identified municipal waste sector reform and modernisation in emerging economies as a global priority for climate change mitigation. International attention and funding is increasingly targeted towards improved and sustainable waste management in developing countries, both as part of climate change mitigation strategies and as a response to the marine litter crises. However, when moving towards more sustainable practices of waste management, it is important to take into account socioeconomic factors and how modern approaches to sustainable waste management will impact the livelihoods of people who currently find their income – often informally – in current waste management activities. Here we look at how gender norms play an important role in current waste management practices and how gender equality is influenced if the modernisation of waste sector is not taking into account gender aspects.

Le secteur de la gestion des déchets est une source considérable et croissante d'émissions mondiales de gaz à effet de serre (GES). La plupart des pays en développement sont des contributeurs mineurs aux émissions mondiales de GES, et produisent des émissions limitées émanant de leurs déchets solides municipaux (DSM). Cependant, à mesure que les pays pauvres s'intègrent aux circuits mondiaux de production et de consommation, leurs contributions aux émissions mondiales de GES sont susceptibles d'augmenter simultanément. Les gouvernements nationaux et locaux et les agences internationales ont identifié la réforme et la modernisation du secteur des déchets municipaux dans les économies émergentes comme une priorité mondiale pour l'atténuation des effets du changement climatique (OCDE 2017 ; PNUE 2015 ; Banque mondiale 2018). L'attention et les financements internationaux ciblent de plus en plus la gestion améliorée et durable des déchets dans les pays en développement, tant dans le cadre de stratégies de changement climatique qu'en réponse aux crises des déchets marins (OCDE 2019 ; Banque mondiale 2019). Cependant, dans le cadre de l'évolution vers des pratiques plus durables de gestion des déchets, il est important de tenir compte des facteurs socio-économiques et de l'incidence qu'auront les approches

KEYWORDS

waste sector; feminism; climate change; municipal solid waste; gender; landfills; gender equality

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modernes de la gestion durable des déchets sur les moyens d'existence des personnes qui tirent actuellement leurs revenus — souvent de manière informelle — des activités de gestion des déchets. Dans cet article nous examinons le rôle important que jouent les normes de genre dans les pratiques actuelles de gestion des déchets et l'effet sur l'inégalité entre les sexes si la modernisation du secteur de la gestion des déchets ne tient pas compte des aspects liés au genre.

El sector de los desechos es una fuente importante y creciente de emisiones de gases de efecto invernadero (GHG) a nivel mundial. La mayoría de los países en desarrollo contribuye en menor medida a estas emisiones y produce emisiones limitadas de residuos sólidos municipales (MSW). Sin embargo, es probable que a medida que los países económicamente desfavorecidos se vayan integrando a los circuitos mundiales de producción y consumo sus contribuciones a las emisiones mundiales de GHG aumenten simultáneamente. Gobiernos nacionales y locales, así como organismos internacionales, determinaron que, en las economías emergentes, la reforma y la modernización del sector de desechos municipales es una prioridad mundial para la mitigación del cambio climático (OECD 2017; UNEP 2015; World Bank 2018). La atención y la financiación internacionales se orientan cada vez más hacia una gestión mejorada y sostenible de los desechos en los países en desarrollo, haciéndolo como parte de las estrategias de mitigación del cambio climático y en respuesta a las crisis causadas por los desechos marinos (OECD 2019; World Bank 2019). Sin embargo, al avanzar hacia prácticas más sostenibles de gestión de desechos, es importante tener en cuenta los factores socioeconómicos y la forma en que los enfoques modernos de gestión sostenible de desechos repercutirán en los medios de vida de personas que actualmente encuentran —a menudo de manera informal— sus ingresos en las actividades actuales de gestión de desechos. Este artículo se propuso examinar la forma en que las normas de género desempeñan un papel importante en las prácticas actuales de gestión de desechos y de qué manera se afecta la igualdad de género si la modernización del sector de los desechos no toma en cuenta los aspectos vinculados a este.

Introduction

This article explores the role of gender norms in the modernisation of municipal waste management by drawing on knowledge acquired from the authors' fieldwork in the capital cities of Bhutan, Mongolia, and Nepal. National governments and international agencies are increasing attention and funding towards the modernisation of municipal waste management in developing economies as part of global climate change mitigation strategies. Mongolia, Nepal, and Bhutan were identified by the United Nations Environment Programme's (UNEP) International Environmental Technology Centre (IETC) as target countries for the Waste and Climate Change project funded by the International Climate Initiative (IKI). One of the project priorities was to examine gender dimensions of municipal waste.

The work, conducted in 2018–2019, consisted of mapping the gendered nature of household solid waste management (UNEP-IETC and GRID-Arendal 2019). In addition to revealing the gendered patterns of the waste sector, the mandate was to develop

gender-informed policy recommendations for improving and modernising the sector while avoiding adverse social and environmental impacts.

The article finds that the modernisation of the waste sector will harden gender inequalities unless reform is carried out through a gender lens. However, if done with gender awareness, modernisation of the municipal waste sector could not only mitigate its climate change impacts, but also enhance gender equality in the sector with ripple effects in broader social domains.

Waste context

Globally, about 37 per cent of solid waste goes into some form of organised landfill, while 33 per cent ends up in open dumps, 19 per cent is recovered through recycling (including composting), but the rest is incinerated (Kaza *et al.* 2018). In developing economies, open dumping is the most common waste management practice (Kaza *et al.* 2018). Urban settings in these geographies provide limited options for waste disposal, and open landfills and informal dumps are the norm. The World Bank estimates that more than half of municipal solid waste in developing economies ends up in open dumps, and 90 per cent either in open dumps or burned (Kaza *et al.* 2018). In addition, waste generation in these georgraphies is predicted to grow by 40 per cent or more by 2050 (Kaza *et al.* 2018).

Most of the policy and research literature about waste in low-income and emerging economies is framed through a development lens, particularly examining the health and socioeconomic consequences of poor waste management. The health risks and pollution exposures associated with municipal waste management have been well explored (Mondal 2016; Njoku *et al.* 2019; UNEP 2019; Vrijheid 2000). Current research and activism has expanded its attention to include the economic aspects of landfill picking, with a particular focus on precarity, as it is an important source of income for many people in poor countries, especially women (Gani *et al.* 2012; Hartmann 2018; Madsen 2005).

Waste generation and its management is increasingly drawing the attention of global environment and development agendas through a climate change lens. The decomposition of organic matter in landfills produces CO_2 and methane, the most potent greenhouse gases (GHG) (UNEP 2015). Unsealed landfills and open-air dumps release methane gas directly into the atmosphere, uncontrolled and uncaptured. Globally, landfills are the third-largest anthropogenic source of methane, accounting for approximately 11 per cent of total methane emissions (Global Methane Initiative 2011). The waste sector also produces emissions from other phases of practices, including the fuel used in collection and transportation, burning of waste (which is still often a common practice in many developing countries), and recycling (EEA 2011; UNEP 2015). Recently, waste management is also gaining attention within the context of controlling marine litter.

The focus on modernisation of waste management in developing economies comes despite the minor contribution that municipal solid waste disposal in these countries has on global GHG emissions. Mongolia is a minor contributor to global climate change, with its total GHG emissions representing around 0.02 per cent of global emissions, while

the waste sector accounts for less than 1 per cent of national emissions. Nepal as a whole only accounted for 0.08 per cent of global GHG emissions in the year 2000, while Nepalese emissions from the waste sector accounted for 2.7 per cent of all national GHG emissions. At present, Bhutan is carbon negative in terms of emissions and it aims to remain carbon neutral by ensuring that its GHG emissions do not exceed the sink capacity of its forests (UNEP-IETC and GRID-Arendal 2019).

The effort of international entities to foreground modernisation of waste management in developing economies aligns with the financial interests in the growing industry of waste management for international investment. Public–private partnerships are increasingly being promoted by international lenders (such as the World Bank and the Asian Development Bank) to make municipal services 'more efficient' (World Bank 2019). Thus, focusing on developing economies' waste serves both global climate change agendas as well as neoliberal global market-growth and financialisation agendas (Emerging Markets 2013; International Finance Corporation 2016; OECD 2017). It is crucial to note these vested interests to avoid exploitation, and to plan for waste management programmes which can primarily benefit the local population.

Modernisation of urban waste management in countries with developing economies and economies in transition requires the application of gradual steps in the so-called 'Waste Management Hierarchy', firstly by prioritising waste prevention and minimisation, secondly by following waste reduction practices such as recycling, and utlimately reaching the final treatment including waste disposal or incineration (UNEP 2020). The waste hierarchy should be based on Environmentally Sound Management (ESM), a broad policy concept applicable to all phases of this structure. According to these frameworks, governments should take necessary measures to ensure that all waste is managed in ways that protect human health and the environment (UNEP 2013). Practical applications of these frameworks could include citizen engagement in waste reduction and recycling programmes, ESM recycling facilities, and converting open dump sites into sanitary landfills (Aidis and Khaled 2019; UNEP 2015; World Bank 2018).

Gender context

Academics and practitioners are paying increasing attention to the structural relationships of gender to waste management, highlighting the many ways in which waste generation and management are not gender neutral, neither in concept nor in practice (Buckingham *et al*. 2005; Dias and Fernandez 2012; GA Circular 2019; IETC 2015; Seager *et al*. 2019; Thomas-Hope 2015; UNEP 2015, 2016). The position of waste in social and economic systems is defined by existing gender inequalities, responsibilities, norms, stereotypes, and roles. It would be unreasonable to imagine otherwise – the waste sector is not separate from gender attitudes and perspectives that shape all other socially constructed activities and economic sectors (UNEP 2015; UNEP-IETC and GRID-Arendal 2019).

Every stage of waste management, from its prevention and minimisation through to final disposal, is gendered. This means that the global push to modernise the waste sector

in developing economies will concomitantly be gendered. To reduce GHG emissions, priority should be given to reduction, reuse, and recycling of waste. However, without a gendered map to guide the process, waste-sector modernisation is likely to be less effective, and gender inequalities may be widened – a common risk when economies and occupations shift from informal to formal. In 2018–2019, the authors conducted fieldwork in the capital cities of Bhutan, Mongolia, and Nepal to map the gendered nature of household and municipal waste (UNEP-IETC and GRID-Arendal 2019) in order to develop gender-informed policy recommendations in relation to the modernisation effort under way.

All three countries have formal commitments to gender equality, both in their constitutions and in suites of national laws. However, as everywhere in the world, gender inequality frames social and economic life. Across all three countries, women's rate of formal employment is lower than men's, women are paid less than their male counterparts, gender-based violence is pervasive, and household/domestic and family care work are considered to be almost exclusively women's responsibility. Mongolia has a longer track record of commitments to gender equality, reflecting in part a legacy of equality policies implemented under the communist regime (Even 2015; Tucker 2020). Many gender equality metrics point towards greater equality in Mongolia than in Nepal or Bhutan: women's rate of education is higher than men's (although this advantage does not convert into labour force or pay advantage), government provided childcare services are available in most municipalities, and labour protection laws are in place (Begzsuren and Aldar 2014; UNEP-IETC and Grid-Arendal 2019).

In overarching view, all three countries have significant gender equality gaps (see Table 1). The increasing gender gap in Bhutan and Mongolia from 2018 to 2020 is mainly driven by dropping rates of women's political and economic participation (WEF 2020).

Against this backdrop, the waste sector manifests particular configurations of gender-differentiated participation, reward, and access.

Mapping the terrain of gender and waste: Kathmandu, Thimpu, Ulaanbaatar

Domestic and household care

Households are at the foundation of waste generation and reduction. Women are, *de facto*, the waste managers.

In most countries, from developed to developing economies, household waste is the largest component of municipal solid waste. Everywhere in the world, women have

Table 1. Global gender gap rank for Mongolia, Nepal, and Bhutan in 2020, and rank change from 2018 (WEF 2020).

Country	2020 global gender gap rank (153 countries; 1 is the least gender gap)	Rank change from 2018
Mongolia	79	−21
Nepal	101	+4
Bhutan	131	−9

primary responsibility for household care and maintenance activities, including managing household waste (Fredericks 2008; Gani *et al.* 2012; Poswa 2004; UNEP 2015).

Despite their increasing participation in the formal workforce, women are still expected to perform their household and caregiving duties. In Mongolia, women, including those who are engaged in paid work in the labour market, spend roughly twice the amount of time as men on household and care duties (JICA 2013). In Bhutan, women spend an average of 3.6 hours a day on unpaid household labour, compared with 1.4 hours for men (UN Statistics 2015). The acceptance of traditional gender roles in the household exacerbates time poverty for women, while men remain alienated from household tasks. In addition, children grow up observing this example from their parents, which may make it difficult to change such attitudes and behaviour patterns later in life.

In all of the three countries under investigation, women are the primary managers of household waste, which further reinforces gender stereotypes. Women largely decide how different waste streams are handled (burned, sent to landfills, composted, or recycled), and manage the systems for waste allocation, while men are typically more involved in the subsequent phases of waste disposal, including collection, transport, scrap dealership, and landfill operations (see Figures 1–3).

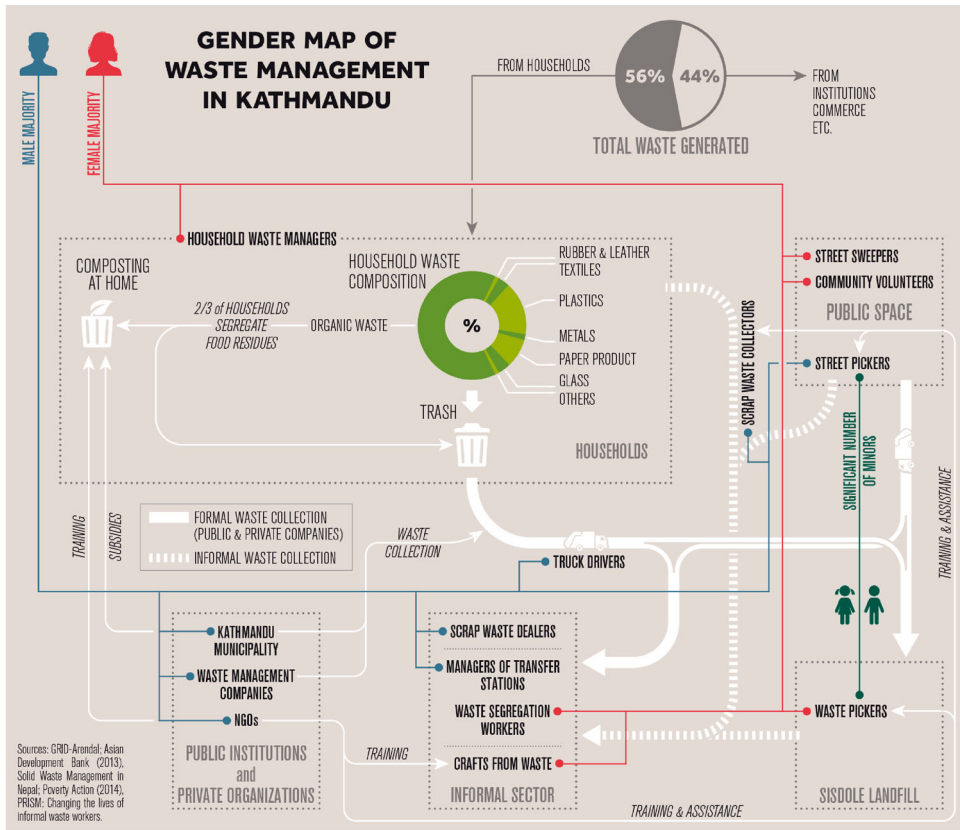

Figure 1. Gender map of waste management in Kathmandu (Nepal).

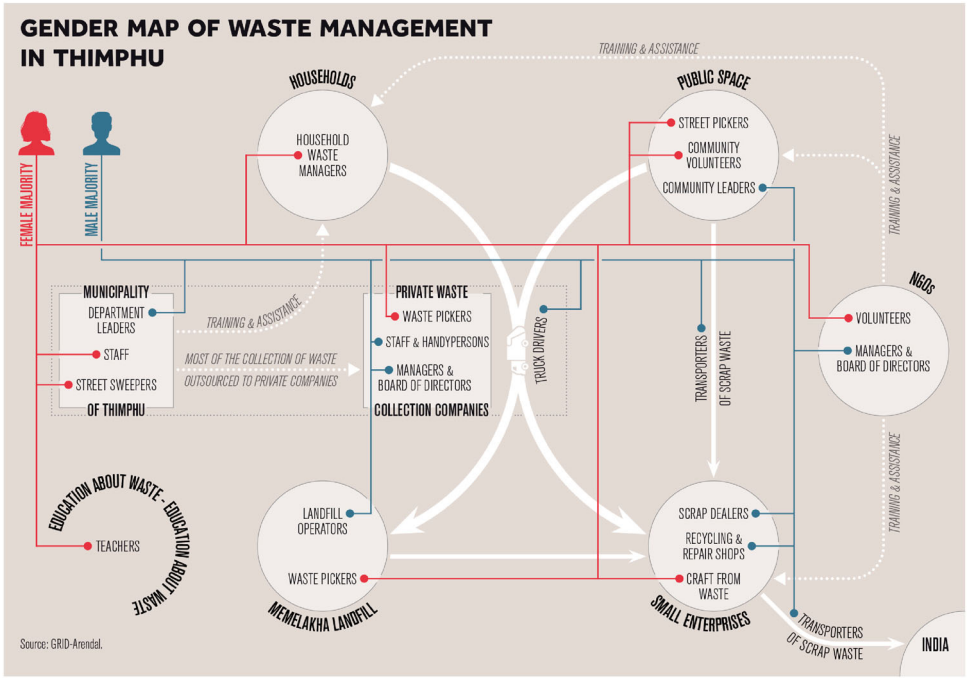

Figure 2. Gender map of waste management in Thimphu (Bhutan).

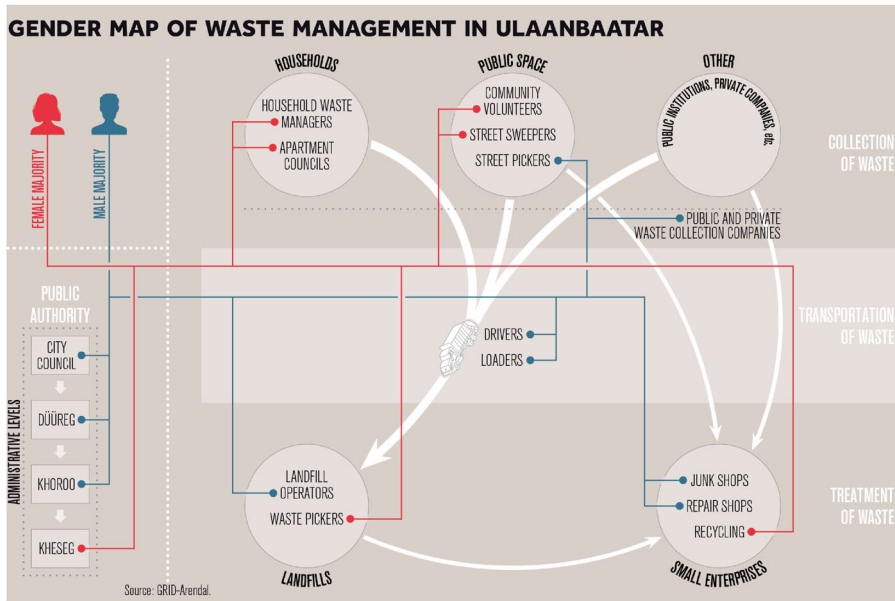

Figure 3. Gender map of waste management in Ulaanbaatar (Mongolia).

The waste disposal activities of segregation at the source, composting, and recycling, are deemed to be the most efficient ways for reducing unwanted negative effects of waste (EEA 2011). Diverting materials from the general waste stream at the household

level, through steps such as source segregation or composting, contributes to reducing pressures on the environment. As managers of waste disposal in the household, women's labour provides environmental sustainability benefits, although usually overlooked in these terms.

Household composting is an essential waste management strategy, but one largely uncounted in official systems. Organic waste comprises 79 per cent of all household waste in Kathmandu (Nepal) and 58 per cent in Thimpu (Bhutan). Composting, when it occurs, is usually informal and considered part of women's household duties. In Kathmandu, the municipality provided 8,000 subsidised local compost bins to households and offered trainings to users. Although gender-disaggregated data on this programme were not collected, field evidence shows that women were the principal target group and participants of the project (interview, Thimpu, June 2018). Women from the upper middle class were primarily involved, while women living in poverty usually had arduous work conditions and were not involved in these initiatives. Wealthier households had servants perform housework.

The normative and traditional allocation of domestic labour to women is, in some cases, used to reinforce the argument that women should not participate in the formal waste sector. For example, when interviewed during the fieldwork, the director of a waste collection company in Ulaanbaatar said 'Women can't be truck drivers because it is dirty work. How would she cook for her family in the evening with dirty hands?'

In contrast to the exclusion of women's participation from formal waste-sector jobs, the private responsibility of household cleanliness as a women's care duty is usually extended to public spaces, putting women at the centre of community cleanliness (Fredericks 2008; Gonzenbach and Coad 2007; Huong 2003; Macawile and Su 2009). For example, our research revealed that the 'clean-up'/litter-reduction community events organised in neighbourhoods in Kathmandu,[1] Thimpu, or Ulaanbaatar (Mongolia) were almost always powered, and attended, by women.

There are almost no economic or social models that assess the value of sustainability services provided on an unpaid basis by women managing waste in households and communities. The true nature of the waste sector's value chain is, therefore, underestimated and distorted.

Informal waste sector

The fieldwork in Nepal, Bhutan, and Mongolia highlighted the many ways in which informal labourers are crucial in running waste management operations. The services provided by informal workers, such as waste picking and waste segregation, complement those of the formal waste sector and, at times, play a major role in handling waste and diverting it from landfills. These services include waste picking – door-to-door and in landfills – or sorting and recovery of recyclables which are then sold to intermediaries for further recycling (e.g. informal waste dealers).

Workers usually work independently but might also organise in structures. These include informal waste dealerships and transfer stations which employ many waste

pickers. In these informal organisations, waste workers are heavily supervised and work under pressure to perform. Many people earn a living through informal work in the waste sector. Nonetheless, informal workers are often underpaid and lack social protection, while performing their duties with limited resources and technology, in conditions with low standards for health and safety.

At the landfills in Kathmandu, Thimpu, and Ulaanbaatar most waste pickers are women. While there is very little information about the overall economic value and sustainability benefits of informal waste picking, and while the working conditions are deplorable, this activity gives many women an income and independence. Modernisation practices that move the waste sector away from dump sites to sanitary landfills – with limited access due to security reasons – or any other efforts that try to curb the need for independent waste pickers, will need to consider the negative effect on the livelihoods of informal workers.

At the second largest Ulaanbaatar landfill (Tsagaandavaa), women currently represent about 60 per cent of the 200 waste pickers. Here we interviewed two landfill pickers, a woman and a man. Interviewees reported that, until recently, a significant majority of landfill pickers were women but that the proportion of men was increasing (interview, Ulaanbaatar, June 2018). They also reported that the advantage of working at the dump site is flexibility: waste picking can be carried out as a seasonal job which is good for pickers with multiple jobs (e.g. school cleaners) or for pickers with care duties, such as taking care of parents or children.

In Tsagaandavaa, women reported during our interviews that they can earn about 10,000 MNT/day (US$3.50), while men can earn about 30,000 MNT/day (US$10.50), when they sell their goods to an informal recycler or waste agent. The logistics of waste dumping and picking might explain the difference in earnings. When a truck comes in, the landfill co-ordinator tells the driver where to dump the waste while pickers surround the truck and grab as much of the recyclables as possible, mostly plastic and glass. There is a competitive 'scrum' amongst waste pickers to get first grab at the truck's dump load; it may be that women are less aggressive or less competitive in the physical scramble, and this might explain the difference in daily earnings. The female interviewee said she can pick about one to two bags of recyclables a day (each of 1 cubic metre); the male said two to three bags.

When analysing the gender composition of the informal sector, the authors of this paper noticed that most of the informal waste dealers are men. In Kathmandu, most of this segment informally employs Indian immigrant men who profit from a lucrative transboundary waste movement as most of the valuable waste – metals, paper, and plastic – is recycled in India. Scrapyards and junk shops are typically run by men, although both men and women work there (often in family businesses) to sort through the waste.

Informality plays an important role in upcycling. Upcycling is the process of turning waste into new products, or recycling to find new uses for the material. It can contribute to a cleaner environment and provide financial independence for communities. In the three countries, there is a clear trend showing that a growing number of social entrepreneurs are looking at waste as a resource (UNEP-IETC and Grid-Arendal 2019). Women play more roles in upcycling (e.g. weaving baskets, making decorations, or composting)

than in the direct waste handling and recycling businesses. A small arts and crafts sector converting waste materials into commodities can be found in all the three cities of Kathmandu, Thimpu, and Ulaanbaatar, and consists mostly of women artisans.

Formal waste sector

Waste management is an essential utility service co-ordinated by the public sector, though the actual operations may rely heavily on the private sector or public–private partnerships. As a result, double layers of administration are often found both in public and private structures.

As a labour-intensive sector, waste management creates many job and business opportunities for professionals, including engineers, repair and maintenance technicians and traders, as well as for those performing practical low-skilled work, such as waste pickers, waste collectors, drivers, recyclers, and sweepers (see Figures 1–3). Factors such as caste, poverty, education, and gender, among others, often prevent individuals from participating in a wide range of jobs, with labour being heavily divided and polarised according to gender and nationality.

The worker's categories are shown below.

Street sweepers

Until the early 2000s, most of the street sweepers in Ulaanbaatar were women. However, at that time, the municipality took steps to professionalise street sweeping, including giving the workers uniforms, protective equipment, and increasing pay. Since this professionalisation, women working as street sweepers have been losing their jobs. For example, in 2017, one private waste collection company in Ulaanbaatar employed 44 women and ten men as street sweepers. Their contract for street cleaning was sharply reduced in 2018: to accommodate the cut 41 women were dismissed, but no men. When asked why women were disproportionately dismissed, the director said that men did the best work, particularly in cold weather and harsh conditions, despite previously having said that women cared more about cleanliness and were more conscientious workers (interview, Ulaanbaatar, June 2018). In 2018, Thimpu's municipality employed about 75 street sweepers, 71 of whom were women, all working without an official contract.

Waste truck drivers

In the three countries considered in this article, employees hired as waste collection truck drivers and loaders are almost exclusively men. Gender stereotypes and norms – both about men and women – drive the exclusion of women from these jobs. A range of attitudes emerged during our field interviews about why women could not or should not be waste truck drivers. For example, in Ulaanbaatar both men and women informants said things such as:

- women are not supposed to drive (any vehicle);
- women are worse drivers than men;

- women are unable or do not know how to drive large or heavy vehicles;
- women should not drive large and heavy vehicles;
- drivers sometimes have to assist with lifting the waste into the trucks, which is heavy work that women cannot or should not do;
- truck driving is a man's world and women should not be working that closely with men;
- waste collection is dirty work; it would be both unhygienic and inappropriate for women to go home after doing such work to prepare meals for the family.

In Kathmandu and Thimphu, women were excluded from the relatively higher-paying driver jobs by the same gender stereotypes as women in Ulaanbaatar, and also because they were less likely to be able to get driving licences than men. In many countries, gender norms either prohibit or restrain women's access to driving licences (and/or to the education that is a prerequisite for licences), and lack of driving licences restricts women's economic opportunities (Baruah 2017).

Landfill operators are exclusively male, while waste pickers (both informal and formal) are mainly female. With professionalisation, women get persistently excluded at different levels of integration.

Administration/management

In Ulaanbaatar, men occupy most of the managerial positions of the private waste collection businesses that have contracts with the city. In public waste collection companies, several women, although still a minority, are directors. Recent studies have found that, in Mongolia, the employment sectors with an higher percentage of women are often those with the lowest salaries, typically paid through state budgets (Begzsuren and Aldar 2014). This is also seen in the waste sector, as reflected in the staffing of a relatively small private waste collection company contracted by the city and a large, public 'Tohijilt Uilchilgeenii Kompani' (TUK)[2] (see Tables 2 and 3).

In Ulaanbaatar and Thimphu, the public sector – the municipal administration – tends to offer more opportunites for gender equality in employment than the private sector, although remaining a male-dominated sector. Numbers show how the waste division of Kathmandu Metrapolian City is also male-dominated: at the time of our visit, men accounted for 29 office staff positions while women only for seven (see Figure 4).

Table 2. Staffing of a small private waste collection company, Ulaanbaatar.

Classification	Men	Women	Total
Administrative	8	8	16
Drivers and loaders	18	0	18
Sweepers and greeners	10	3	13
Clean-up assistants	5	4	9
Total	41	15	56

Table 3. Staffing of a large public TUK, Ulaanbaatar.

Classification	Men	Women	Total
Management	4	0	4
Administration (budget, human resources, logistics, secretaries)	8	30	38
Drivers, loaders, and truck repair	119	1	120
Sweepers and greeners	189	184	373
Landfill managers, drivers, and support administration	51	21	72
Total	371	236	607

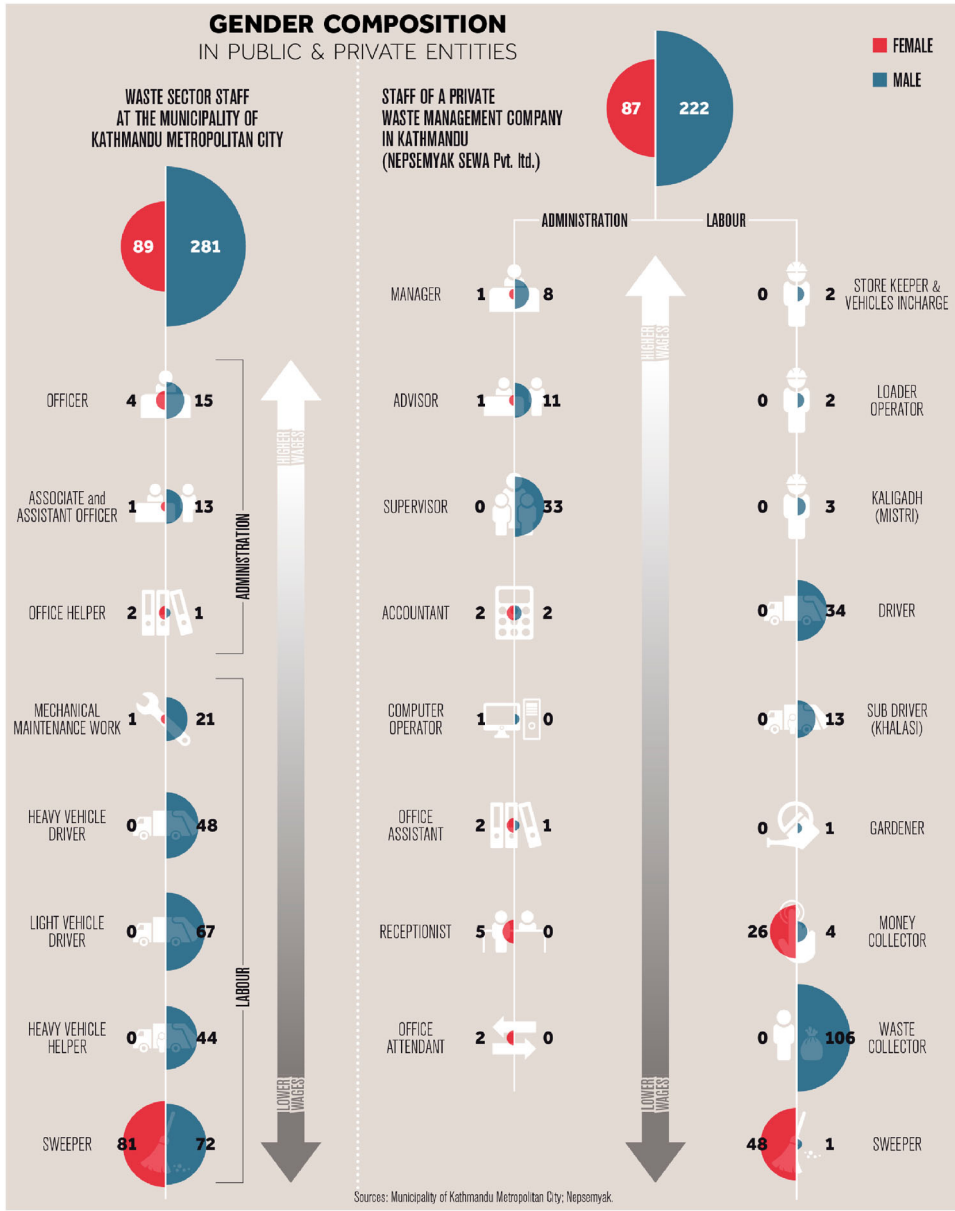

Figure 4. Gender composition in public and private entities.

Entrepreneurs

Formal entrepreneurs are a small fraction of total entities dealing with waste. In Nepal, in 2018, the Office of the Company Registrar had 152 scrap dealers on file while an independent project of a non-government organisation estimated between 700 and 800 unregistered waste dealers (UNEP-IETC and GRID-Arendal 2019).

In Bhutan, national policymakers do not yet fully recognise waste as a resource, nor do they see it as a potential revenue stream, mainly because the volumes are considered too small. At the municipal level, leaders recognise that waste has a value as a resource but mainly because it provides income to people working in the informal sector. An increasing number of entrepreneurs and scrap dealers (sometimes referred to as 'social entrepreneurs') are gaining from informal trade. However, their earnings and volumes remain unknown and undocumented, and accounts are not published. Social entrepreneurs also enjoy tax benefits which are often personally retained and justified with the claim that they are doing good for society.

Although the waste sector provides opportunities for women and men to start small-scale businesses, entrepreneurship in this branch is most likely to be taken up by men. An important driver of male dominance in entrepreneuship in the waste sector is access to start-up financial instruments. In Bhutan, entrepreneurs in the waste sector are almost all male. However, the hospitality sector in Bhutan is more balanced, with female entrepreneurs representing 46 per cent of the service sector in hotels and restaurants (Dorji and Wangmo 2018), which demonstrates a particular tendency for gender inequality in the Bhutanese waste sector. Loans and other informal credit appear to be the biggest obstacles for women to own enterprises in the waste sector (Dorji and Wangmo 2018).

Promoting women's entrepreneurship could increase female participation in the formal economy and help reduce the gender gap in labour force participation rates. Findings from our round of interviews show how training courses which target only women could increase their participation by acting on two levels: firstly, by bringing courses closer to female participants – as women usually have less free time to attend courses due to household tasks and being often located in rural areas – and, secondly, by creating a more inclusive environment where women can feel free to speak up, which is usually more limiting in the presence of men. However, no entrepreneurship training course in Thimpu targets women only, and although the Bhutan Association of Women Entrepreneurs (BAOWE) helps women set up small businesses, this is mainly to help them sell their farmed goods.

Gender, wealth, and waste

Making waste

Waste generation increases with income (Kaza *et al.* 2018; UNEP 2015). On scales from national to individual, greater income levels are correlated with greater consumption, production, and waste (Kaza *et al.* 2018; UNEP 2015, 55). UNEP projects that, unless specific waste prevention measures are taken, 'per capita waste generation levels in the

current low- and middle-income countries will increase as their economies continue to develop and gross national income (GNI) levels rise' (2015, 58–9). Between 2020 and 2050, global waste is expected to grow at a rate of more than double that of population. By 2050, daily per capita waste generation is projected to increase by 19 per cent in developed economies and by 40 per cent in economies in transition and developing economies (Kaza *et al.* 2018). This growth should also be seen in the context of the existing challengies of waste collection – at the moment, only about 48 per cent of waste in cities is collected (Kaza *et al.* 2018).

Waste generation is also increasing in Nepal, Mongolia, and Bhutan. Between 2013 and 2018, the amount of solid waste generated in Kathmandu increased from 170,141 to 221,555 tons per year (ADB 2013; MoFAGA 2020). Between 2000 and 2015, Ulaanbaatar saw a sharp increase in waste generation from around 200,000 to about 1 million tons a year (UNEP-IETC and GRID-Arendal 2019). The increase in waste generation is correlated with the economic growth experienced by the two capitals. In Mongolia, the GDP per capita increased by 19 per cent between 2013 and 2019, while in Nepal the increase was 28 per cent in the same time period (Trading Economics 2019). There are no quantitative data of municipal solid waste over time available from Thimphu, but rapid urbanisation alone has contributed to a considerable increase in generated waste (WWF Bhutan 2018).

Waste generation trends are driven by urban growth and by the effects of global circuits of capital on local economies which are leading to an ideological shift towards increased accumulation and consumption (Kaza *et al.* 2018; UNEP 2015). Several people interviewed for this study in Ulaanbaatar reported that an increase in waste was seen as a 'positive' sign of affluence. Several interviewees said that they (or others) believed that consuming more is better and that littering, for example, is a right and an expression of freedom.

The gendered dynamics of increasing wealth, waste, and consumption need further exploration. Some evidence sets the stage for understanding these linkages. Women are not represented in circles of globalised capital, and all evidence suggests that women do not share equally the financial rewards of market financialisation in any sector (Oxfam 2016, 2018). Globally, wealth is both concentrated and masculinised (Gonzales *et al.* 2015; Oxfam 2018). Everywhere, on local to global scales, men represent the largest share of the wealthy. In 2017, the top 42 richest people in the world, 95 per cent of them men, held as much wealth as half the world's population, 3.7 billion people. Of the 2,043 billionaires in the world in 2018, 89 per cent were men (Oxfam 2018).

While the gendered nature of 'local' consumption dynamics is under-studied, at a macro scale there is considerable evidence that the elite capture of resources is disproportionately male. Globally, the emerging urban discretionary-income, high-consumption class is not equally populated by women and men, although much of the gender-specific effect is masked by the standard practice of collecting information on consumption and spending by 'household' units. Men dominate the ranks of the rich, high-consuming urban class, especially at the top of the wealth pyramid (Ukhova 2015). A recent International Monetary Fund (IMF) study examining the linkages of gender and income

inequality revealed that at the top of the income ladder, higher gender inequality is strongly associated with higher income shares (Gonzales *et al.* 2015; UNEP 2016).

Household-based, environmentally relevant decisions on matters such as water use, consumption of both essential and discretionary items, energy-source choices, or financial allocations for agricultural adaptation are usually negotiated, often unequally, between women and men inside the household. Intra-household dynamics are important in terms of resources and their use, conservation, consumption, and the ways women and men (may) act as agents of change. Many environmentally consequential decisions made within households are filtered through gender norms and roles (UNEP 2016). But evidence-based analysis of the specific ways in which gender norms drive consumption is scarce.

A further dimension of the waste–gender–consumption convergence is gender-stereotyped marketing that is aimed at reinforcing and selling to gender stereotypes, thereby driving increases in new consumption (Seager *et al.* 2019). Marketing to reflect and reinforce gender norms is one of the features and accelerators of unsustainable consumption and production. The 'gratuitous gendering' of consumer products, from pens to candy, is an especially prominent feature of consumption in developed economies that aims to create duplicative production and consumption. Another related driver of consumption is the manufacturing and selling of goods that have the primary purpose of reinforcing and fuelling gender aspirations, e.g. cosmetics for women, power tools for men (Seager *et al.* 2019).

Globalisation, professionalisation, and financialisation in the waste sector

Waste management is increasingly becoming financialised and marketised, carrying large-scale investments and profit-generating mechanisms such as shares and bonds, often operating at global scales. In Nepal, Mongolia, and Bhutan, women are not represented in the higher levels of the increasingly globalised waste management sector, nor in domestic business operations. Women are not involved in the international waste consortia that are seeking entry points into the waste management of developing economies. At the global level, women's representation in the waste management sector is even more limited than it is 'locally', and men's hegemony is even more entrenched.

As the waste sector becomes increasingly reliant on innovation and technology, workers will need higher levels of education and training, especially in the Science, Technology, Engineering, and Mathematics (STEM) disciplines. However, the participation in STEM disciplines is not gender neutral. At present, women are significantly under-represented in STEM disciplines and technology-related studies. In Bhutan, the sharpest gender gap in education is found in science and engineering, where only 510 women are enrolled compared with 1,250 men (JICA and IC Net Limited 2017). In Nepal, only 31 per cent of science and technology students, and 21 per cent of engineering students, are women. Similarly, in Mongolia only 23 per cent of students enrolled in engineering are women (UNESCO 2015). If education opportunities are not made gender equal, women will be excluded from critical entry points into the sector as it modernises.

Waste modernisation and women's equality

Women are mostly excluded from the more lucrative levels of waste management. The higher levels of administration and the better-paid jobs are deeply masculinised. Women do not benefit or participate in the wealth generated by globalising the waste sector. Unless national policies are promulgated to prevent women's exclusion, the gender gap will be accentuated by the professionalisation, globalisation, and technological innovation of the waste sector. Formal gender equality policies need to be developed and implemented at all levels in waste disposal management in order to close the gender gap.

Placing an emphasis on waste diversion at source, modern waste management is likely to become dependent on women's unpaid domestic labour. Requiring households to separate waste, or imposing fees and penalties for not doing so, puts even greater pressure on women who, *de facto*, become unpaid waste managers. Women's work adds considerable value to the sustainability services of waste management. These services should be measured as part of a reforming drive. Waste modernisation could play a leading role in advancing gender budgeting equality, developing models to make visible and establish the added value of women's unpaid work in domestic waste diversion.

The central feature of waste modernisation is moving away from dump sites. The health and environmental benefits of the elimination of dump sites are immediately apparent, but the gendered and socioeconomic rebound effects are not well studied nor incorporated into waste management modernisation efforts. With modernisation, waste pickers will be immediately disenfranchised. Unless waste management systems plan for waste pickers' economic well-being, the economic impact will be felt most adversely among workers of the waste sector with lower incomes, particularly women. Similarly, if planning for management systems which capture recycling activities, policymakers need to take into account the entire sector of formal and informal small enterprises which will be undercut.

As for gender dynamics in the waste sector, information is scattered and based on limited-scope field and case studies, such as the one presented in this article. Gender-disaggregated data across all aspects of the waste cycle are essential to develop robust policies. Traditional attitudes, stereotypes, and perceptions about appropriate gender roles drive the gender and waste nexus. To reform the waste sector in a gender-sensitive way, changing attitudes about gender and norms of appropriate femininity and masculinity are as important as technological or structural changes. The waste sector cannot remain isolated from larger societal efforts to achieve gender equality. In fact, modernisation offers an opportunity to reframe the gender relations of an entire economic sector in more gender-equitable ways, and at the same time curb GHG emissions.

Notes

1. Kathmandu refers to Kathmandu Metropolitan City.
2. Waste service providers known as TUKs in Mongolian (Tohijilt Uilchilgeenii Kompani) are allocated to provide services in specified zones in the city.

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