Mental Health Risks Among Informal Waste Workers in Kathmandu Valley, Nepal

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Abstract
Informal waste workers are a vulnerable population group who are often socio-economically marginalized and disadvantaged, with more likelihood of experiencing ill health than the general population. To explore the determinants of mental ill health in this group, we conducted a cross-sectional survey of 1278 informal waste-workers in Nepal in 2017, using a demographic health assessment questionnaire and a modified Patient Health Questionnaire (PHQ-9). We looked at the potential associations between various exposure factors and mental health outcomes and found that 27.4% of waste-workers had depressive symptoms, more likely to be reported by female (OR 2.290), older person (OR 7.757), divorced/separated (5.859), and those with ill health (OR 2.030), or disability (OR 3.562). Waste-workers with access to social protection (OR 0.538) and financial savings (OR 0.280) were less likely to have depressive symptoms. There are key risk factors that may enable identification of particularly vulnerable persons within this group and also protective factors that may help improve their mental health resilience.

Keywords
depression, informal waste worker, mental health, social protection, substance abuse

What we already know
- In Nepal, the living and working conditions of IWWs is poor and they have no access to social or physical infrastructure like basic sanitation, water, and power supply.
- Due to the lack of formal recognition and adequate representation, IWWs are largely isolated from most social-security schemes and legal protection frameworks.

What this article adds
- Waste-workers with access to social protection and financial savings were less likely to have depressive symptoms.
- There are protective factors that may help improve the mental health resilience of IWWs, such as social and financial protections, and greater social capital in the form of membership of co-operatives.

Introduction
Waste is continuously generated by human activities. It is estimated that globally, approximately 2.01 billion tons of solid waste were produced in 2018 which is expected to grow to 3.40 billion tons by 2050. There are very few reliable estimates of the number of people engaged in collecting, sorting, and disposing of waste. Globally, it is estimated that around 56 million people (of whom 15 million are in developing countries) work in unhygienic and precarious conditions picking up, cleaning, sorting, and segregating recyclable waste. In India, there are approximately 4 million informal waste workers (IWW) who sell recyclable materials found on the streets to their local scrap dealers. In Nepal there is no definitive data on the number of IWWs, but a few studies indicated that there are around 50,000 informal waste workers.

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have estimated that the numbers of IWWs in the Kathmandu valley is between 7000 and 15 000. As IWWs are a mobile population not limited to one geographical area, ascertaining an accurate estimation of their numbers is challenging.

Waste workers are likely to experience a significant amount of adverse health effects. Several studies undertaken in many developing countries including the Philippines, Brazil, and India have highlighted a wide range of occupational risks faced by informal waste workers such as chemical hazards, musculoskeletal damage, infection, risk of injury, emotional vulnerabilities, and environmental contamination. Common health issues reported include respiratory diseases, eye infections, stomach problems, typhoid fever, and diarrhea. Falls, accidents, waterborne diseases, and dermatological disorders are also prevalent among these groups. Female workers may also experience a high incidence of infections of the reproductive and urinary systems due to the lack of safe hygienic practices.

The recycling activities carried out by IWWs makes a substantial contribution to society’s sanitary, environmental, and productivity conditions. Despite this, IWWs are often socially and economically marginalized around the world. Their work is frequently carried out in unhygienic and unsafe conditions, which are exacerbated by irresponsible waste disposal practices of both producers and consumers. Due to the lack of formal recognition and adequate representation, IWWs are largely isolated from most social-security schemes and legal protection frameworks. They often live apart from mainstream society and their precarious working conditions, low earnings and social stigma significantly contribute to an increased risk of psychological health issues. A study on the psychological well-being of IWWs in Mumbai for example found that shame, stigma, humiliation, and financial insecurity adversely affected their psychological health.

In Nepal, the living and working conditions of IWWs is similarly poor. They have no access to social or physical infrastructure like basic sanitation, water, and power supply. IWWs are trapped at the bottom of the socioeconomic pyramid, and they face several challenges in their daily lives. They also have limited social security and social protection as state systems of social insurance usually do not cover informal workers in developing countries. Although some social protection schemes have been implemented in some areas in India, till now there is no similar scheme in Nepal apart from a few small initiatives that have sought to improve the well-being of IWWs through provision of health insurance, education, and development of entrepreneurial skills. We have previously reported the prevalence of symptoms of depression to be 27.4% in this group that is higher than the general population in Nepal. Consequently, measures to safeguard and improve the mental health and wellbeing of this disadvantaged group would be of benefit. However, there is limited robust information of the mental health and psychological wellbeing for this population group. This study therefore seeks to characterize and identify the possible determinants of mental health and wellbeing for IWWs in Nepal. In particular, we were interested to understand the possible links between socio-demographic status, substance abuse, social protections such as membership of a co-operative, and exposure to disaster (bearing in mind the recent Nepal earthquake in 2015), with depression.

Methodology

Study Design

A cross-sectional survey was conducted among informal waste workers (IWWs) in the Kathmandu valley and Nuwakot region between November and December 2017. This was part of a collaborative research project that sought to explore occupational risk mitigation and health status improvement for people working in informal waste collection, recycling, and trade in Nepal. The survey was targeted in the urban areas of Shantinagar and Teku in the Kathmandu valley, and Sisdole, Nuwakot, as these areas were known to have a high concentration of waste collection, processing sites, and dumpsites. As it was not possible to identify and recruit IWWs through random sampling, purposive, and snowball sampling was used. Known IWWs were invited to participate and snowball sampling was used to identify further IWWs to recruit to the study. Informed consent was received from the study participants whose participation was entirely voluntary. Full details of the methodology used for the survey have been previously published.

Sample Size

A convenience sampling was used. Study respondents were invited to participate by enumerators who visited the waste sites. Snowballing was then used to identify further respondents. A population estimate of 7000 IWWs was used for the total population size of this group in the Kathmandu valley based on previously reported figures. We assumed a 10% non-response rate and calculated that a sample size of 614 was needed to allow for a 4% level of precision, assuming a 50% prevalence of possible determinant variables, and a confidence level of 95%. We doubled the sample size to mitigate selection bias that may arise due to the non-probability sampling method used. This gave a total target sample size for this study of at least 1228 IWWs. In the end, 1278 IWWs were recruited in total.

Measurement Tools and Data Collection

A bespoke standardized demographic health assessment questionnaire was used for this survey for sociodemographic and health indicators. A modified Patient Health Questionnaire (PHQ-9) which was internationally validated,
was used for screening depression among IWWs. The questionnaire was translated into the Nepali language. Pilot testing was done and necessary changes were made prior to data collection.

**Data Analysis and Management**

Data cleaning and analysis were performed using IBM SPSS version 24. Descriptive analysis was presented using frequency and percentage. Crosstabulation was done between the independent variables and dependent variables. The main outcome indicator of interest was depression status as captured by the PHQ-9. This dependent variable (depression status) was dichotomized into “having depressive symptoms” and “having no depressive symptoms.” The Nepal PHQ-9 was used for measuring depression status and has 5 categories based on scores (0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, and 20-27 severe). For our dependent variable, a score of 0 to 4 was considered to have no depressive symptoms while scores between 5 and 27 were considered to indicate the presence of depressive symptoms among IWWs. Univariate and multivariate logistic regression was used to assess the association between the dependent and independent variables. The independent variables included socio-demographic variables, substance abuse, membership in co-operatives, having access to social protection or savings, presence of disability or ill health in the past 3 months, and whether they were affected by the Nepal earthquake disaster in 2015.

**Result**

Table 1 presents the descriptive data of depression status among 1278 Informal Waste Workers (IWWs). As previously reported,21 27.4% of the IWWs had depressive symptoms among 1278 Informal Waste Workers (IWWs). As previously reported,21 27.4% of the IWWs had depressive symptoms. Female IWWs (43.6%) were comparatively more likely to have depressive symptoms than male IWWs (23.5%). In terms of their country of origin, Nepali IWWs (30.4%) were more likely to report depressive symptoms compared to those from India (24.3%). Most of the IWW’s were between the ages of 25 and 39 years, and 28% of them reported having depressive symptoms. Older IWWs (above 55 years) were more likely to have depressive symptoms (57.1%) than other age groups.

40.3% of the participants were smokers, and 41.6% used alcohol. Recreational drug use was rare (2.8%). Nearly a third of IWWs who were smokers (30.9%) reported depressive symptoms. There was also a noticeable trend with those who smoked more being more likely to report depressive symptoms. Of the 35 IWWs who were drug users, 37% of them had depressive symptoms. Similarly, of the 531 IWWs who consumed alcohol, 29.2% had depressive symptoms. Membership of cooperatives was low. Out of 1278 IWWs, only 146 (11.4%) were members of any cooperatives or groups. Of these, 37.0% reported having depressive symptoms.

Logistic regression analysis was performed to find any association between the selected predictive variables with depression status (Table 2). The gender trends remained with female IWWs being twice as likely to have depressive symptoms compared to males. Similarly, age trends persisted with older IWWs (above 55 years of age) being nearly 8 times more likely to have depressive symptoms compared to young IWWs aged 18 to 24 years. Trends were also seen with depressive symptoms being more likely in those who were divorced/separated, and those who perceived their work to be risky. However, there were no statistically significant associations seen for family living arrangements, or literacy. The country of origin signal disappeared in the multivariate analysis.

In the univariate analysis for substance use (Table 3), our data indicated that smokers were 1.3 times more likely to have depressive symptoms compared to non-smokers. However, there was no significant associations seen with drug use or alcohol consumption in the multivariate analysis. Disability was significantly associated with having depressive symptoms. IWWs who reporting having any disability were 3 times more likely to have depressive symptoms compared to those with no disability. Similarly, IWWs who reported having ill health in the last 3 months were twice as likely to have depressive symptoms. There was no clear association with subjective reports of having been affected by the earthquake in 2015.

IWWs who had access to some forms of social protection were less likely to have depressive symptoms compared to those who didn’t. Similarly, those IWWs who were members of any group or co-operatives were less likely to have depressive symptoms. Those who had financial savings were also less likely to have depressive symptoms compared to those who had no savings.

**Discussion**

This study found that depressive symptoms were more likely to be reported by informal waste workers who were older, or were women. Possible protective factors identified included membership of any group or co-operative, access to social protection and savings. Risk factors included the presence of disability, or recent ill health, and the perception of their work being risky. There was no clear evidence of association between alcohol and drug use and depressive symptoms, although there was a weak association seen with smoking.

This finding is in line with several other studies on common mental health disorders in IWWs. A study undertaken in India with informal waste pickers observed that females were more vulnerable to mental health disorders compared to males.24 This may be because female waste workers experience more gender-based stressors in their work compared to their male counterparts. Likewise, a South African study on the prevalence of smoking and mental illness reported that
| Independent variables | Not having depressive symptoms (n = 927) | Having depressive symptoms (n = 350) | Total |
|-----------------------|------------------------------------------|--------------------------------------|-------|
| **Sex**               |                                          |                                      |       |
| Male                  | 770 (76.5%)                              | 237 (23.5%)                          | 1007  |
| Female                | 145 (56.4%)                              | 112 (43.6%)                          | 257   |
| **Total**             | **915 (72.4%)**                          | **349 (27.6%)**                      | **1264**|
| **Country of origin** |                                          |                                      |       |
| Indian                | 465 (75.7%)                              | 149 (24.3%)                          | 614   |
| Nepali                | 461 (69.6%)                              | 201 (30.4%)                          | 662   |
| **Total**             | **926 (72.6%)**                          | **350 (27.4%)**                      | **1276**|
| **Age**               |                                          |                                      |       |
| 18 to 24              | 296 (85.8%)                              | 49 (14.2%)                           | 345   |
| 25 to 39              | 440 (71.8%)                              | 173 (28.2%)                          | 613   |
| 40 to 54              | 165 (63.2%)                              | 96 (36.8%)                           | 261   |
| 55+                   | 24 (42.9%)                               | 32 (57.1%)                           | 56    |
| **Total**             | **925 (72.5%)**                          | **350 (27.5%)**                      | **1275**|
| **Family living arrangement** |                                      |                                      |       |
| Living alone          | 382 (76.9%)                              | 115 (23.1%)                          | 497   |
| Nuclear               | 320 (68.4%)                              | 148 (31.6%)                          | 468   |
| Extended              | 58 (66.7%)                               | 29 (33.3%)                           | 87    |
| Living with others (not family members) | 79 (71.8%) | 31 (28.2%) | 110 |
| Other                 | 87 (77.0%)                               | 26 (23.0%)                           | 113   |
| **Total**             | **926 (72.6%)**                          | **349 (27.4%)**                      | **1275**|
| **Marital status**    |                                          |                                      |       |
| Single/never married  | 209 (86.4%)                              | 33 (13.6%)                           | 242   |
| Married               | 698 (70.5%)                              | 292 (29.5%)                          | 990   |
| Divorced/separated    | 3 (37.5%)                                | 5 (62.5%)                            | 8     |
| Widow/widower         | 13 (39.4%)                               | 20 (60.6%)                           | 33    |
| **Total**             | **923 (72.5%)**                          | **343 (27.6%)**                      | **1266**|
| **Perception of risk at work** |                                      |                                      |       |
| Risky                 | 660 (71.2%)                              | 267 (28.8%)                          | 927   |
| Not risky             | 242 (76.1%)                              | 76 (23.9%)                           | 318   |
| **Total**             | **902 (72.4%)**                          | **343 (27.6%)**                      | **1245**|
| **Literacy**          |                                          |                                      |       |
| Literate              | 483 (76.3%)                              | 150 (23.7%)                          | 633   |
| Illiterate            | 443 (68.9%)                              | 200 (31.1%)                          | 643   |
| **Total**             | **926 (72.5%)**                          | **350 (27.4%)**                      | **1276**|
| **Substance abuse**   |                                          |                                      |       |
| Yes                   | 356 (69.1%)                              | 159 (30.9%)                          | 515   |
| No                    | 570 (74.9%)                              | 191 (25.1%)                          | 761   |
| **Total**             | **926 (72.6%)**                          | **350 (27.4%)**                      | **1276**|
| **Number of cigarettes per day** |                                      |                                      |       |
| Not daily             | 4 (80.0%)                                | 1 (20.0%)                            | 5     |
| < 10                  | 200 (67.3%)                              | 97 (32.6%)                           | 297   |
| 11 to 20              | 141 (73.4%)                              | 51 (26.5%)                           | 192   |
| 21 to 40              | 4 (30.7%)                                | 9 (69.2%)                            | 13    |
| **Total**             | **349 (68.8%)**                          | **158 (31.2%)**                      | **507**|
| **Recreational drugs**|                                          |                                      |       |
| Yes                   | 22 (62.9%)                               | 13 (37.1%)                           | 35    |
| No                    | 888 (72.7%)                              | 334 (27.3%)                          | 1222  |
| **Total**             | **910 (72.4%)**                          | **347 (27.6%)**                      | **1257**|
| **Drink alcohol**     |                                          |                                      |       |
| Yes                   | 376 (70.8%)                              | 155 (29.2%)                          | 531   |
| No                    | 550 (73.3%)                              | 195 (26.2%)                          | 745   |
| **Total**             | **926 (72.6%)**                          | **350 (27.4%)**                      | **1276**|
| **Being a member of any co-operatives or group** |           |                                      |       |
| Not a member          | 834 (73.8%)                              | 296 (26.2%)                          | 1130  |
| Member                | 92 (63.0%)                               | 54 (37.0%)                           | 146   |
| **Total**             | **926 (72.6%)**                          | **350 (27.4%)**                      | **1276**|

*Frequencies for separate categories may not add up to the overall sample size because of missing values.
informal waste pickers with mental illness are twice more likely to smoke.\textsuperscript{15}

The financial vulnerability, low earnings and precarity of IWWs is well recognized and previous research has shown that waste workers risk being exploited socially and economically.\textsuperscript{25} Several studies have identified that the co-operatives and social protection schemes have immense potential to increase the social and economic inclusion of marginalized groups like IWWs in precarious working environments.\textsuperscript{26} In turn, this may help safeguard the psychological wellbeing of IWWs and protect against mental ill health. Our findings complements experience from India where many co-operatives have managed to secure a steady monthly salary for the waste pickers that in turn has secured the livelihoods of thousands of IWWs.\textsuperscript{26}

In Nepal, several organizations are working to provide social recognition and protection to IWWs. In the context of Nepal, the recently adopted Labor Act, 2017 and Contributions Based Social Security Act, 2017 have promised to improve the rights of informal workers but so far that has not been effectively implemented.\textsuperscript{27} So far there are neither any plans or policies that include the social protection provision which could elevate the standing of the profession of the IWWs.

From several studies conducted worldwide, it is evident that IWWs have a poorer quality of life due to their stressful living and work conditions.\textsuperscript{21} IWWs will have a broad range of health and social needs, many of which are unlikely to be met. There will undoubtedly be a range of practical measures that can be implemented such as health surveys, targeted health screening, as well as the provision of support, education and training opportunities. It is also apparent that the evidence base remains sparse and further studies, particularly focused on mental health and social protection, as well as potential effective interventions, are needed.

Amongst the limitations of this study are that the results may not be generalizable to all IWWs in Nepal as a whole, as the parent study was only undertaken in 2 districts. Moreover, participants in the survey were selected through snowball...
sampling methods, therefore it may not truly represent the entire community of informal waste pickers. Another limitation was there is a possibility that some useful information on the study aim could have been withheld by participants, although enumerators were well trained to minimize such effects. Since the survey had to be carried out in Nepali and Hindi languages, it could potentially lead to a subjective difference in the interpretation of the question by the participants. Finally, a recognized limitation of cross-sectional surveys is the inability to ascertain the temporal sequence and directionality of the associations observed.

**Conclusion**

Poor mental health and wellbeing is not uncommon among informal waste workers and there are both key risk factors but also protective factors that may help mitigate. Decent working conditions, in both formal and informal sectors, could contribute to improve their mental health. Formalizing the waste work industry and increasing social protections may also substantially improve the psychological wellbeing of this vulnerable group.

**Recommendation**

It is recommended to improve social protection for vulnerable groups like informal waste workers who rely on waste management for their livelihood. This study recommends the government to incorporate informal waste workers into social protection schemes, by improving their access to information and simplifying administrative procedures.
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Data Availability
The data for this research is held by the charity funder Médecins du Monde (https://www.medecinsdumonde.org/), which can be accessed upon request for any research purpose.

Rights Retention Statement
For the purpose of open access, the author has applied a Creative Commons Attribution (CC BY) licence to any Author Accepted Manuscript version arising.

Declaration of Conflicting Interests
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Ethical Approval
We obtained the ethical approval from the Nepal Health Research Council (NHRC), Nepal in October 2017 (Ref Num: 388/217). We received a written consent from the participants and also ensured their data confidentiality. We requested for the voluntary participation and no incentives were given to the participants. The interviews were conducted at the place of convenience of the participants. We explained about their right to deny for their participation or drop the interview at any time.

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Supplemental Material
Supplemental material for this article is available from Médecins du Monde (https://www.medecinsdumonde.org/), which can be accessed upon request for any research purpose.

References
1. Kaza S, Yao L, Bhada-Tata P, Van Woerden F. What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. World Bank Publications; 2018.
2. Ramusch R, Lange U. Role and size of informal sector in waste management – a review. Proc Inst Civ Eng Waste Res Manag. 2013;166:69-83. doi:10.1680/warm.12.00012
3. Medina M. The Informal Recycling Sector in Developing Countries: Organizing Waste Pickers to Enhance Their Impact. 2008;44.
4. MyITU. Indian firm’s digital solution for urban waste pickers. 2021; Accessed November 17, 2021. https://www.itu.int/en/myitu/News/2021/07/29/16/51/Digital-solution-India-waste-pickers-Kabadiwalla-Connect
5. Dangi M, Cohen R, Urynowicz M. Kathmandu’s Solid Waste: Engineering and Policy Analyses for Sustainable Solutions. Waste Management Research 2006. In: DAKOFA and ISWA (eds) ‘Waste Site Stories’. Proceedings of International Solid Waste Association Annual Congress, Copenhagen, 1–5 October, p. 10. ISWA, Copenhagen School of Health and Related Research.
6. Cruvinel VR, Marques CP, Cardoso V, et al. Health conditions and occupational risks in a novel group: waste pickers in the largest open garbage dump in Latin America. BMC Public Health. 2019;19(1):581. doi:10.1186/s12889-019-6879-x
7. Zipura AK, Haregu TN, Mberu B. A review and framework for understanding the potential impact of poor solid waste management on health in developing countries. Arch Public Health. 2016;74(1):55.
8. Ferronato N, Torretta V. Waste mismanagement in developing countries: A Review of Global Issues. Int J Environ Res Public Health. 2019;16(6):1060. doi:10.3390/ijerph16061060
9. Thirarattanasunthon P, Siriwong W, Borjan M, Robson M. Sociodemographic and environmental characteristics, and potential health risks, of scavengers in open municipal dump sites in Nakhon Ratchasima Province, Thailand. J Health Res. 2012;26(3):149-153.
10. Ravindra K, Kaur K, Mor S. Occupational exposure to the municipal solid waste workers in Chandigarh, India. Waste Manag Res. 2016;34(11):1192-1195.
11. Jayakrishnan T, Jeeja M, Bhaskar R. Occupational health problems of municipal solid waste management workers in India. Int J Environ Health Eng. 2016;28(2):375-390. doi:10.1177/0956247816657302
12. Dias SM. Waste pickers and cities. Environ Urban. 2016;28(2):375-390. doi:10.1177/0956247816657302
13. Wire T. Wasted lives: The tragedy of India’s ‘Safai Mitra’. 2020. Accessed November 18, 2021. https://thewire.in/rights/india-waste-pickers-covid-19-lockdown
14. Ludermir AB, Lewis G. Informal work and common mental disorders. Soc Psychiatry Psychiatr Epidemiol. 2003;38(9):485-489. doi:10.1007/s00127-003-0658-8
15. Makhubele M, Ravuhuali K, Kuonza L, et al. Common mental health disorders among informal waste pickers in Johannesburg, South Africa 2018-A cross-sectional study. Int J Environ Res Public Health. 2019;16(14):E2618. doi:10.3390/ijerph16142618
16. Action P. PRISM: poverty reduction. 2014. Accessed November 18, 2021. https://www.prithi.org/sites/default/files/resources/files/WIEGO-Waste-Pickers-Position-Paper.pdf
17. WIEGO. The right to be recognized as workers. 2013. Accessed November 17, 2021. https://www.wiego.org/sites/default/files/resources/files/WIEGO-Waste-Pickers-Position-Paper.pdf
18. Lund F. Social Protection for informal women workers in developing countries. *Indian J Hum Dev*. 2013;7(2):360-363.
19. Dethier J-J. Social Security: What can developing countries learn from developed countries? In: Braun OV, Hill RV, Pandya-Lorch R (eds) *The Poorest and Hungry: Assessments, Analyses, and Actions: An IFPRI 2020 Book*. International Food Policy Research Institute; 2009:287–298.
20. Failor T. Improving services and improving lives: waste-picker integration and municipal coproduction in Pune, India. 2010.
21. Black M, Karki J, Lee ACK, et al. The health risks of informal waste workers in the Kathmandu valley: a cross-sectional survey. *Public Health*. 2019;166:10-18. doi:10.1016/j.puhe.2018.09.026
22. Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. *The Alcohol Use Disorders Identification Test (AUDIT) Manual: Guidelines for Use in Primary Care*. World Health Organization Geneva; 2001.
23. Kohrt BA, Luitel NP, Acharya P, Jordans MJ. Detection of depression in low resource settings: validation of the Patient Health Questionnaire (PHQ-9) and cultural concepts of distress in Nepal. *BMC Psychiatry*. 2016;16(1):58.
24. Chokhandre P, Kashyap GC. Assessment of psychological well-being of waste-pickers of Mumbai, India. *Asian J Epidemiol*. 2017;10:138-143. doi:10.3923/aje.2017.138.143
25. Choudhary BK. Waste and waste-Pickers. *Economic and Political Weekly*. 2003;38:5240-5242. doi:10.2307/4414395
26. Dias S. Creating decent jobs through waste pickers cooperatives. May 2, 2018.
27. EnvJustice Project. River pollution and waste pickers’ struggle for recognition, Kathmandu, Nepal. 2020. Accessed November 18, 2021. https://www.ejatlas.org/print/river-pollution-and-waste-pickers-struggle-for-recognition-kathmandu-nepal